Hunan Integrated Management of Contaminated Agricultural Land with World Bank Loan

Environmental and Social Management Framework

Foreign Economic and Technical Cooperation Center, Agriculture Commission of Hunan Province

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## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project profile</td>
<td>1</td>
</tr>
<tr>
<td>1.1 Project background</td>
<td>1</td>
</tr>
<tr>
<td>1.2 Similar project experience</td>
<td>1</td>
</tr>
<tr>
<td>1.3 Purpose to prepare the framework</td>
<td>2</td>
</tr>
<tr>
<td>1.4 Framework contents</td>
<td>3</td>
</tr>
<tr>
<td>1.5 Environmental and social safeguard process</td>
<td>3</td>
</tr>
<tr>
<td>2. Project profile</td>
<td>4</td>
</tr>
<tr>
<td>2.1 Project Objectives</td>
<td>4</td>
</tr>
<tr>
<td>2.2 Project Descriptions</td>
<td>4</td>
</tr>
<tr>
<td>3. Framework of laws and regulations</td>
<td>11</td>
</tr>
<tr>
<td>3.1 Legal and regulatory framework</td>
<td>11</td>
</tr>
<tr>
<td>3.2 World Bank's safeguard policies and World Bank Group EHS Guidelines</td>
<td>20</td>
</tr>
<tr>
<td>3.2.1 World Bank's safeguard policies and compliance analysis</td>
<td>20</td>
</tr>
<tr>
<td>3.2.2 Analysis of project’s compliance with World Bank Group’s EHS Guidelines</td>
<td>23</td>
</tr>
<tr>
<td>3.3 Analysis of difference of China's national and local laws and regulations with World Bank’s safeguard policies</td>
<td>24</td>
</tr>
<tr>
<td>4. Environmental and social safeguard procedures</td>
<td>30</td>
</tr>
<tr>
<td>4.1 Selection of sub-project counties</td>
<td>31</td>
</tr>
<tr>
<td>4.2 Selection of project areas</td>
<td>33</td>
</tr>
<tr>
<td>4.3 Screening for potential environmental and social impacts</td>
<td>34</td>
</tr>
<tr>
<td>4.4 Preparation of environmental and social assessment Outline</td>
<td>36</td>
</tr>
<tr>
<td>4.5 Review of the Environmental and Social Assessment Outline by World Bank</td>
<td>37</td>
</tr>
<tr>
<td>4.6 Preparation of the environmental and social safeguard documents</td>
<td>37</td>
</tr>
<tr>
<td>4.7 Review and approval of the safeguard documents by Government and World Bank</td>
<td>38</td>
</tr>
<tr>
<td>4.8 Implement, supervision, and reporting</td>
<td>38</td>
</tr>
<tr>
<td>5. Project ESIA</td>
<td>40</td>
</tr>
<tr>
<td>5.1 Work objective</td>
<td>40</td>
</tr>
<tr>
<td>5.2 Working procedure</td>
<td>40</td>
</tr>
<tr>
<td>5.2.1 Determine the project area to be selected</td>
<td>40</td>
</tr>
<tr>
<td>5.2.2 Compare alternative solutions</td>
<td>40</td>
</tr>
</tbody>
</table>
5.2.3 Determine the assessment scope .......................................................... 44
5.2.4 Project area investigation ........................................................................ 44
5.2.5 Additional monitoring ............................................................................. 45
5.2.6 Due diligence .......................................................................................... 49
5.2.7 Farmland soil assessment ......................................................................... 50
5.2.8 Farmland Risk Comprehensive Management and Control Measures ......... 56
5.2.9 Potential environmental and social impacts and mitigation measures ............. 69
5.2.10 Make the ESMP ..................................................................................... 95
5.2.11 Make pest control management plan ..................................................... 116
5.2.12 Public participation and information disclosure ........................................ 116

6. Social assessment .......................................................................................... 120

6.1 Purpose to prepare the social assessment ..................................................... 120
6.2 SA Preparation ............................................................................................ 120
6.3 Working procedure ...................................................................................... 122

7. Resettlement policy framework ...................................................................... 124

7.1 Project Overview and Description of Objectives ......................................... 124
7.2 Objectives of Resettlement, Definitions and Key Principles ......................... 126
7.3 Legal and Policy Framework for Resettlement .............................................. 128
7.4. Preparation and Approval of the Resettlement Action Plan ......................... 138
7.5 Entitlements to Compensation and Resettlement ........................................... 140
  7.5.1 Eligibility for compensation .................................................................... 140
  7.5.2 Provisions on compensation measures .................................................... 141
7.6 Implementation Procedures .......................................................................... 144
  7.6.1 General procedures of land acquisition and property demolition on collective land ............................................................................................................. 144
  7.6.2 General procedure of property acquisition on state-owned land ............... 146
  7.6.3 General procedure of land acquisition ..................................................... 146
  7.6.4 Arrangement of organizational structure .................................................. 147
7.7 Resettlement Budget and Arrangements ....................................................... 148
7.8 Information Disclosure and Public Participation .......................................... 148
7.9 Grievance Redress Procedure ...................................................................... 150
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.10</td>
<td>Monitoring and Evaluation</td>
<td>151</td>
</tr>
<tr>
<td>7.10.1</td>
<td>Basis of Monitoring and Evaluation</td>
<td>151</td>
</tr>
<tr>
<td>7.10.2</td>
<td>Principles of Monitoring and Evaluation</td>
<td>151</td>
</tr>
<tr>
<td>7.10.3</td>
<td>Monitoring and Evaluation institutional arrangements</td>
<td>152</td>
</tr>
<tr>
<td>7.10.4</td>
<td>Contents of Monitoring and Evaluation</td>
<td>152</td>
</tr>
<tr>
<td>8.</td>
<td>Employee resettlement plan framework</td>
<td>154</td>
</tr>
<tr>
<td>8.1</td>
<td>Purpose for preparing employee resettlement plan framework</td>
<td>154</td>
</tr>
<tr>
<td>8.2</td>
<td>Preparation of employee resettlement plan</td>
<td>154</td>
</tr>
<tr>
<td>8.3</td>
<td>Regulations and Laws Framework</td>
<td>155</td>
</tr>
<tr>
<td>8.4</td>
<td>Implementation process</td>
<td>160</td>
</tr>
<tr>
<td>8.5</td>
<td>Main resettlement measures</td>
<td>160</td>
</tr>
<tr>
<td>8.6</td>
<td>Verification/Approval of employee resettlement plan</td>
<td>162</td>
</tr>
<tr>
<td>8.7</td>
<td>Resettlement fund and resource</td>
<td>163</td>
</tr>
<tr>
<td>9.</td>
<td>Ethnic minority plan Framework</td>
<td>163</td>
</tr>
<tr>
<td>9.1</td>
<td>Main purpose, overall objective and specific objective</td>
<td>163</td>
</tr>
<tr>
<td>9.2</td>
<td>Procedures</td>
<td>164</td>
</tr>
<tr>
<td>9.3</td>
<td>Law and policy framework</td>
<td>165</td>
</tr>
<tr>
<td>9.4</td>
<td>Basic contents of EMDP</td>
<td>166</td>
</tr>
<tr>
<td>9.4.1</td>
<td>Basic outline</td>
<td>166</td>
</tr>
<tr>
<td>9.4.2</td>
<td>Main measures to mitigate the negative impacts</td>
<td>167</td>
</tr>
<tr>
<td>9.4.3</td>
<td>Financing arrangement</td>
<td>167</td>
</tr>
<tr>
<td>9.5</td>
<td>Public participation and information disclosure</td>
<td>168</td>
</tr>
<tr>
<td>9.6</td>
<td>Organization</td>
<td>169</td>
</tr>
<tr>
<td>9.7</td>
<td>Grievance redress mechanism</td>
<td>169</td>
</tr>
<tr>
<td>9.8</td>
<td>Monitoring and evaluation</td>
<td>169</td>
</tr>
<tr>
<td>9.8.1</td>
<td>Monitoring and evaluation method</td>
<td>170</td>
</tr>
<tr>
<td>9.8.2</td>
<td>Monitoring and evaluation indicators</td>
<td>170</td>
</tr>
<tr>
<td>9.8.3</td>
<td>Monitoring and evaluation organization</td>
<td>170</td>
</tr>
<tr>
<td>10.</td>
<td>Public consultation and information disclosure</td>
<td>171</td>
</tr>
<tr>
<td>10.1</td>
<td>Public consultation and information disclosure during project preparation</td>
<td>172</td>
</tr>
<tr>
<td>10.1.1</td>
<td>Identification of stakeholders</td>
<td>172</td>
</tr>
<tr>
<td>10.1.2</td>
<td>Public consultation and information disclosure ways</td>
<td>172</td>
</tr>
</tbody>
</table>
Abbreviations

ESMF (Environmental and Social Management Framework)
ESIA (Environment and Social Impact Assessment)
ESMP (Environmental and Social Management Plan)
PMP (Pest Management Plan)
ECOP (Environmental Codes of Practice)
EMDP (Ethnic Minority Development Plan)
RPF (Resettlement Policy Framework)
EA Summary (Environmental Assessment Summary)
TOR (Terms of Reference)
WB (World Bank)
PRC (The People’s Republic of China)
PMO (Project Management Office)
EHS (Environment, Health and Safety) Guide Lines

Chemical Abbreviations

COD (Chemical Oxygen Demand)
NH₃-N (Ammonia Nitrogen)
SS (Suspended Solid)
TP (Total Phosphorus)
EOOC (Easy Oxidation Organic Carbon)
1. Project profile

1.1 Project background

Hunan Province is located in south of the middle course of the Yangtze River, China, with mild climate and rich products, and it is known as the Land of Fish and Rice. Hunan Province has produced 6% of national output of rice with 3% of the national farmlands, and made great contributions to national grain yield. Since the incident of cadmium in rice exceeding the standard, the whole southern rice industry has suffered a lot, aroused widespread attentions of society and high attention of central government, and sounded the alarm for the issues on current agricultural production security and ecological environmental protection. According to the years of positioned monitoring results of Hunan Province on agricultural environment, currently the heavy metals that pollute farmland mainly include Cd (cadmium), Pb (lead), As (arsenic), Hg (mercury), and Cr (chromium), especially Cd. Based on this serious situation of heavy metal pollution of farmland in Hunan Province, Agriculture Commission of Hunan Province plans to implement the Hunan Integrated Management of Contaminated Agricultural Land with World Bank Loan, to improve the quality safety of agricultural products, and safeguard people's life and health.

1.2 Similar project experience

Since 2014, Hunan Province has carried out the pilot work of restoring 2.7401 million mu of heavy metal-polluted farmland in Changsha-Zhuzhou-Xiangtan Area, and adjusted the planting structure of crops. The pilot work adopts the plot experiment with "VIP" mode to restore the heavy metal-polluted farmland. According to the completion status of key work announced by Agriculture Committee of Hunan Province in 2014, more early season rice reached the standard in Changsha-Zhuzhou-Xiangtan pilot area in the first year of experiment, and the cadmium content of rice reduced by average 30%, so the restoration achieved obvious results. But the restoration results in the next 2 years were not as good as the first year, and hard to maintain. Meanwhile, Changsha-Zhuzhou-Xiangtan pilot project hasn't totally performed the differentiated management by type and level of farmland pollution risks, or designed an effective standard-reaching management scheme for pollution risk, and the replicability and generalizability still need further investigation.
During implementation of the Hunan Integrated Management of Contaminated Agricultural Land, it is necessary to sum up experience in Changsha-Zhuzhou-Xiangtan pilot projects, lay special emphasis on controlling the risk of project county farmland by comprehensive method based on risk control, to fully control environmental risk of farmland, fully improve environment quality of farmland, produce qualified agricultural products safely, and provide integrated management mode of safety in agricultural production based on risk management for the farmland polluted by heavy metal and other pollutants in the whole province. Prepare project area address selection scheme and technical scheme, strengthen technical training for farmers in the project area, conduct monitoring of pollution source, soils, agricultural products, irrigation water, lime and organic fertilizers, avoid “simultaneous pollution & treatment” and secondary pollution, organize and develop supervision on key nodes in accordance with the project implementation plan, master such conditions as task implementation, fund utilization and progress in a timely way, establish technical measure implementation supervision teams in all project areas, and build job log and technical measure implementation supervision account, so as to guarantee smooth implementation of the project.

1.3 Purpose to prepare the framework

ESMF aims to guide the preparation of the environmental and social safeguard documents for the newly included integrated management sub-projects of polluted farmland in Hunan Province, ensure to take measures in project activity to avoid and minimize the environmental and social impacts; confirm, formulate and implement the mitigation measures for the impacts which can't be avoided, in accordance with related policies of World Bank and Chinese laws. The framework has established the objectives, procedures, institutional framework, and implementation arrangement to determine and manage the potential environmental and social impacts produced in project activities, provided all-round analysis method of environmental and social risks to identify their influence of such projects and propose the mitigation measures. Meanwhile, it has established the public participation and complaint mechanism to handle possible public complaints.
1.4 Framework contents

ESMF specifies the preparation process and technical requirements of environmental and social safeguard documents, as required by World Bank's safeguard policies and national laws and regulations. ESMF will include the following:

- Description of the project-related policy framework of the state, local government, and the World Bank;
- Identification of the environmental impacts of each sub-project, the plan to mitigate these impacts, and system arrangement to implement monitoring;
- The mechanism meeting World Bank's safeguard requirements (including preparation of the required sub-project ESIA);
- Capacity of implementation authority to carry out these activities, and the suggested measures for capacity construction;
- Monitoring and reporting system, including the periodic inspection and adjustment mechanism during implementation.

1.5 Environmental and social safeguard process

During project preparation, Hengyang County, Yongxing County, and Yongding District of Zhangjiajie have been confirmed as the first batch of project implementation counties. Sub-project ESIA will be prepared based on ESMF, and solve the security problems as specified by ESMF. The ESIA of Hengyang County, Yongxing County, and Yongding District of Zhangjiajie may serve as the ESIA template for sub-projects in other project option counties.
2. Project profile

2.1 Project Objectives

Recognizing these challenges for heavy metal pollution management of agricultural land, therefore ensuring safety of agricultural product areas, Hunan requested the assistance of the World Bank to prepare and implement this innovative project in addressing heavy metal pollution in agricultural lands as it is the first of its kind in the World Bank and China to (a) introduce a risk-based approach and establish a risk-based management framework; (b) improve and regulate environmental performance in both industrial and agricultural production; (c) promote integrated AEM, and (d) study sustainable financing models and develop road maps (action plans) for managing agricultural land pollution. Experience and results gained from the participating counties will be disseminated for scale-up in Hunan and China.

The project development objective is to demonstrate a risk-based integrated approach to managing heavy metal pollution in agricultural lands for safety of agricultural production areas in selected counties in Hunan.

2.2 Project Descriptions

The project includes four components (more details provided in Table 2 -1). These activities are expected to be implemented in about 15 candidate counties in Hunan (the selection criteria is provided in annex 2). Considering the project complexity, three counties (Hengyang and Yongxing counties and Yongding District) have been selected as pioneers to prepare detailed county feasibility study reports (FSRs). The three FSRs have been appraised during project preparation and the three counties will initiate implementation in the first year of the project. The FSRs for other participating counties will be prepared by the counties, appraised and approved by the World Bank during project implementation. This allows project preparation on time and quick start of project implementation right after its approval, as well as accumulation of experiences for the other participating counties. An element of competition will be applied to confirm other participating counties during project implementation, which would avoid having a lot of counties reserving money in the project but not using it in a timely manner.
Component 1: Demonstration of Risk-based Agricultural Land Pollution Management. This component aims to demonstrate the risk-based approach to reducing heavy metal levels, notably Cd, in crops and soil at demonstration areas. It will finance implementation of site-specific demonstration plans (to be approved by local agricultural bureaus) at the selected farmlands of about 8,000 ha in participating counties. A menu of technical measures have been proposed (see annex 2) including (a) heavy metal pollution source control measures (mainly field infrastructure investments for clean and sufficient water supply and removal of polluted rice straw\(^1\)), (b) agronomic measures to immobilize heavy metals in soil (reducing crop uptake), (c) planting structure adjustment, (d) soil remediation to reduce total metals in soil, (e) integrated pest management, (f) control of rice exceeding food safety standards if any at the demonstration areas, and (g) measures to protect no risk/clean farmlands. Site-specific technical measures will be determined by site characteristics (through detailed environmental monitoring) and risk assessment before demonstrations. Environmental monitoring will also be conducted during and by completion of demonstrations, to verify demonstration effectiveness. It is expected that by the end of the demonstrations (which will be evaluated annually and adjusted if needed), crops at the demonstration areas will be safe. Furthermore, the demonstrated technical measures should be maintained after the project life to sustain the project outcomes. This component will also finance innovative supervision (see details in annex 2) of implementation of these technical measures, especially timely collection of evidence (photos, audios, and videos) to prove their actual implementation and accuracy.

Crops exceeding food standards during demonstrations, if any, will be safely collected or treated as an integral part of the project. The demonstration plans will include a clear mechanism to prevent and verify that agricultural products, e.g. rice with heavy metal exceeding food safety standards, at the project demonstration areas, should not go to the market. The demonstration plans for soil remediation and planting structure adjustment will also include detailed safe handling, treatment and disposal measures for the plants that are highly enriched with Cd and/or other heavy metals and a suitable level of compensation to farmers for any changes which would affect their livelihood or restricted access to lands. The relevant farmers will be informed of effectiveness of the demonstrations in every

\(^1\) The mass of heavy metal accumulated in rice straw is estimated as 6–12 times than that in rice, according to the national experts.
harvest season.

Component 2: Strengthening Agricultural Environmental Monitoring and Management. This component aims to improve AEM and management capacity to orderly, precisely, and sustainably manage agricultural land pollution in Hunan. The activities under this component include the following subcomponents:

(a) Establishment of an AEM database for early warning. This subcomponent will finance development and establishment of an AEM database for early warning; AEM and existing data collection from other government agencies for all farmlands; data analysis; and procurement of sampling inspection vehicles, terminal computers, testing equipment for participating counties. This subcomponent will also support upgrade of the Monitoring Center of the Agricultural Bureau in Hengyang County. These will contribute to ascertaining areas and distribution of agricultural land pollution and its affects to agricultural product quality, establishing soil environmental big data, implementing agricultural land classification management which are required by the Soil Ten Provisions (Provision 1 and 3).

(b) Development of a risk-based land management tool and crop/soil risk mapping. This subcomponent will support development of a risk-based land management tool and use of the tool to map all farmlands at the participating county and provincial levels to classify areas with different risk levels, predict suitable crops for different soil types and conditions (for example, pH and organic matter), and propose risk management options, taking into account the types of heavy metal pollution sources. This will contribute to the development of technical guidelines for categorization of soil environmental quality under the Soil Ten Provisions (Provision 3).

(c) Local regulations and standards for risk-based integrated agricultural land pollution management. This subcomponent will support development of regulations and issuance of technical standards and guidelines, as well as relevant studies at the provincial and county levels to control heavy metal emission from industrial sources; minimize or cease application of agricultural inputs containing heavy metals (sewage irrigation, agrochemicals, straw, and others); and sustain risk-based pollution management. This is responding to the requirements of the Soil Ten Provisions (Provision 2 and 6 on pollution prevention).

(d) Studies on sustainable financing models and eco-compensation mechanisms for agricultural land management. This subcomponent will finance studies to
identify sustainable financing models and ecological compensation mechanisms (economic compensation level, modality, targets, and management methods) for long-term agricultural land pollution management and soil health restoration, therefore ensuring sustainable agriculture in Hunan Province. This is in line with the resolute commitments of the Chinese Government under the Soil Ten Provisions for enlarging fiscal investment, improving incentive policies, playing the role of market through public-private partnership models, increasing Government purchase, encouraging enterprises to issue shares, and exploring issuance of bonds to facilitate soil pollution prevention and control (Provision 9).

(e) **Development of agricultural land management Action Plans.** This subcomponent will support development of the Action Plans on risk-based agricultural land pollution management for each participating county and for the province. These Action Plans will guide agricultural land pollution management beyond the project life in line with the Soil Ten Provisions (Provision 9 and 10 on establishing soil environment management system and clearing responsibilities and liabilities as well as strengthening collaboration among agencies).

**Component 3: Capacity Development and Knowledge Distribution.** This component aims to (i) develop management and technical capacity of government officials, environmental monitoring staff, and farmers, as well as heavy metal discharging enterprises for addressing agricultural land pollution, and (ii) distribute knowledge gained from demonstrations for increasing awareness and building ability to make informed choices among alternatives. It includes the following five subcomponents:

(a) **Training for government officials.** Organization and provision of national and international trainings on risk-based land management, AEM, pollution prevention (source control), environmental management system (EMS), policy enforcement, and compliance for the government officials recommended from the provincial and county agricultural, environmental protection and land resource departments, development and reform committees, financial departments, and other agencies as needed. These human capital are expected to foster and sustain project outcomes beyond the project life.

(b) **Training for environmental monitoring staff.** Annual training for environmental monitoring staff from different government agencies will be carried out under the
project to continuously improve the environmental monitoring capacity.

(c) **Training for farmers.** Training will be provided for farmers, agriculture technical service providers, and farmer field schools on environmental impacts of poor farming practices, international good practices on soil management, the risk-based land pollution management tool, technical operation principles/guidelines for reducing heavy metals in crops and soil, regulations and standards to prevent agricultural inputs containing heavy metals from entering farmlands, and so on.

(d) **Technical assistance for heavy metal discharging enterprises.** This subcomponent will finance technical assistance and training for selected enterprises discharging heavy metals in key industry sectors such as nonferrous metal mining, crude lead smelting, electrolysis of zinc and lead, stibium smelting, zinc oxide, zinc sulfide, electrolysis of manganese, and nonferrous slag utilization to identify processes contributing to metal emissions and propose emission reduction actions and implementation plans.

(e) **Knowledge Distribution.** This subcomponent will finance knowledge sharing and learning of the demonstration process and results, to maximize the demonstration effect from these sites to as many farmers and government administrators as possible from other non-participating counties or even other provinces. Learning materials and technical guidelines should be collected as needed during demonstrations and compiled after demonstrations for distribution and learning purpose to increase awareness and build ability to make informed choices among alternatives.

**Component 4: Project Management and Monitoring and Evaluation.** This component will support day-to-day project implementation, procurement, financial management (FM); environmental and social safeguards functions carried out by the provincial Project Management Office (PPMO) and the county-level Project Management Units (PMUs); and coordination and collaboration among the local government agencies, nongovernmental agencies, and the farmers’ professional organizations. This component will also finance a project management information system, hiring national technical consultants, training and study tours, monitoring and evaluation (M&E) of the project indicators and outcomes, and the project launch and completion workshops.
### Table 2-1 Project activities

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Project activity</th>
<th>Activity descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cropland management demonstration based on risks</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Encrypted monitoring and risk ranking appraisal</td>
<td>Encrypted monitoring is carried out on chosen project areas following requirements by the monitoring plan (density of monitoring spots are 30-50 mu in the mountainous areas, 50-100 mu in the continuous flat areas; monitor and correspond heavy metal content of soil and agricultural products, monitor heavy metal content in bottom mud, motor water quality and heavy metal content in the irrigation water. Carry out risk ranking appraisal following monitoring data and ascertain plans on measures concerning synthetic control of risks.</td>
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<tr>
<td>1.2</td>
<td>Measures on synthetic control of risks</td>
<td>Pertinent measures on risk management and control are adopted in accordance with analysis on valid data such as rice within projects, agricultural internal source and external source, agricultural production management and so forth. See 2.1-2.4 for details.</td>
</tr>
<tr>
<td>1.2.1</td>
<td>Project measures</td>
<td>County-level engineering measures of the 15 projects contain 2 electric pumping stations, channel project spanning 346.01 kilometers, 115 sedimentation tanks, ecological interception ditch spanning 8.2 kilometers and farm track spanning 67.33 kilometers. Sedimentation tank is $2 \times 2 \times 1.0$ m in designing size. It adopts C20 cast-in-place concrete for pool wall 120 mm in thickness and C20 cast-in-place reinforced concrete 120 mm in thickness. Elevation distance from the bottom of the pool is at least 300 mm. Ecological interception ditch is transformed based on the original drainage ditch. It mainly includes transformation of ditch bottom and ditch wall and building of interception dam. The furrow bank consists of cellular cement board with well-distributed holes. Normally a cement board is 60cm * 50 cm * 5 cm (length * width * thickness) in its specification with interval between neighboring holes being 20 cm. The bottom also consists of cellular cement boards. The bottom is flat in layout. The cross section of the ditch is shaped trapezoid. It is installed with meso-position and bottom-level drain holes. Water level of the interception section can be categorized into three states namely draining, half-full and spillover. The interception dam is around 70 cm in height.</td>
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<tr>
<td>1.2.2</td>
<td>Agronomic measures</td>
<td>Control of high-accumulation rice varieties, optimization of field water management (waterflooding irrigation), soil acidification conditioning (PH value), applying of organic fertilizer, applying of soil passivator, adjustment of plantation structure, removal of straws from the croplands and other measures.</td>
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<tr>
<td>1.2.3</td>
<td>Comprehensive management of pests and insects</td>
<td>Promote agricultural clean production, encourage peasants to apply organic fertilizer, reduce the usage amount of fertilizer, scientifically apply pesticide, promote specialized control and green control of crop pests and insects, and popularize the efficient low-poison and low-residue pesticide and modern planting machinery.</td>
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<tr>
<td>1.2.4</td>
<td>Other measures</td>
<td>(1) Sorting of variety Study the rice safety production technique of project area on the basis of proposing emergency low-cadmium rice variety list in Human Province; reasonably sort the rice variety in project area; verify the cadmium accumulating index of main rice variety in project area. When the BCF index of rice variety is higher than Class VI risk, the cadmium accumulating risk of such variety is higher, which shall be controlled to enter project area.</td>
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<td>(2) Management and control of overstandard rice</td>
<td>Implement specialized enterprise purchase on overstandard rice; use rice as industrial grain and feed or other industrial utilization. Make subsidy on purchase enterprise. The subsidy standard is 200 yuan/ton.</td>
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<td>(3) Restoration of plants</td>
<td>According to pollution type, farmland condition and specific season within project area, select the enrichment or superenrichment plant varieties, e.g. red-spotted stonecrop, ciliate desert-grass, scirpus tabernaemontani (damp-resistant), amaranthus hypochondriacus, etc., and certainly remove the heavy metal out of soil.</td>
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<td>(4) Certification on place of origin of</td>
<td>Make subsidy on the body of nuisanceless, green and organic foods. The subsidy standards are respectively 5000/10000/20000 yuan.</td>
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</tr>
<tr>
<td>Serial Number</td>
<td>Project activity</td>
<td>Activity descriptions</td>
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<td>---------------</td>
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<td>----------------------</td>
</tr>
<tr>
<td>agricultural products</td>
<td>Building, propagation and popularizing cost of agricultural product brands</td>
<td>Encourage the brand building, promotion and popularizing of agricultural products, so as to increase the economic value of products.</td>
</tr>
<tr>
<td>(5)</td>
<td>Management and control of heavy metal pollution source</td>
<td>Invite professional supervision agency, and organize the township and village persons to supervise the implementing of project agronomic measures (applying of limestone, organic fertilizer and passivator; water-flooding irrigation, removal of straws out of farmland, etc.). The supervision cost is 20 yuan/mu/quarter.</td>
</tr>
<tr>
<td>1.3</td>
<td>Supervision of project</td>
<td>1.3 Supervision of project</td>
</tr>
<tr>
<td>2</td>
<td>Enhancement on monitoring and management of agricultural environment</td>
<td>1.3 Supervision of project</td>
</tr>
<tr>
<td>2.1</td>
<td>Building of agricultural environment monitoring database and early warning</td>
<td>Include one set of agricultural environment early warning software, 15 sampling detection vehicles, 30 terminal computers, 2 GPS and 2 digital type altitude instrument. Support the building of heavy metal inspection room of Hengyang City, including transformation of laboratory and adding of equipment.</td>
</tr>
<tr>
<td>2.2</td>
<td>Risk-based farmland management tools and preparation of agricultural risk map</td>
<td>Build the model according to monitoring data of Project 1, provide basic support for the risk management of farmland, determine the pollution risk levels of farmlands and crops by organically combining effective data and management tools, and make the agricultural production risk map of whole province.</td>
</tr>
<tr>
<td>2.3</td>
<td>Development or issuing of local policies and standards</td>
<td>Develop or issue the local management rules and systems and technical standards, e.g. farmland pollution control and restoration; instruct the comprehensive management and control of farmland pollution of each project city.</td>
</tr>
<tr>
<td>2.4</td>
<td>Study on sustained financing mechanism and ecological compensation mechanism</td>
<td>For the long-term farmland pollution management and soil health restoration activities, study the sustained financing mode and ecological compensation mechanism, so as to guarantee the sustained agricultural development of Hunan Province.</td>
</tr>
<tr>
<td>3</td>
<td>Capacity building</td>
<td>Cultivate the management and technical capacity of government officers, and organize the international and domestic investigation and training. Develop training on environment monitors and peasants; provide technical assistance on enterprises involving heavy metal pollution, e.g. 1021.44 persons per month in total. Develop project concept and technical popularizing activities in types of seminars, training, etc. Share and propagate project experiences and techniques in videos, paper data, etc.</td>
</tr>
<tr>
<td>4</td>
<td>Management and evaluation of project</td>
<td>Provide technical assistance and training on project managers (purchase, finance, security policies, etc.), so as to improve the management capacity; purchase the required office equipment of project management mechanism, and project daily management, purchase and finance management cost. Hold the project starting/completion seminar, and build the MIS system; collect the related information and policies of farmland environment quality change and the like in the project implementing process; monitor and evaluate the project implementing results.</td>
</tr>
</tbody>
</table>
3. Framework of laws and regulations

This part has listed the framework of laws and regulations for EA and SA during project implementation, including: 1) current laws and regulations on environmental protection, land management, agricultural production area and quality safety, policies and environment quality standards; 2) Safeguard policies of World Bank, and the EHS Guidelines of World Bank Group.

3.1 Legal and regulatory framework

(1) Relevant national laws, regulations, and policies

Constitution of the People’s Republic of China (revised in 2004): The Constitution of the People’s Republic of China stipulates that all ethnic groups in the People’s Republic of China are equal. The state protects the lawful rights and interests of the ethnic minorities and upholds and develops a relationship of equality, unity and mutual assistance among all of China’s nationalities. Discrimination against and oppression of any nationality are prohibited; any act which undermines the unity of the nationalities or instigates division is prohibited. The state assists areas inhabited by ethnic minorities in accelerating their economic and cultural development according to the characteristics and needs of the various ethnic minorities. Regional autonomy is practiced, autonomous organ is set up, and the power of autonomy is exercised in the areas where people of ethnic minorities live in compact communities. All national autonomous areas are integral parts of the People's Republic of China. All nationalities have the freedom to use and develop their own spoken and written languages, as well as the freedom to preserve or reform their own customs. Hunan Integrated Management of Contaminated Agricultural Land shall strictly obey the regulations of the Constitution on equality of nationality, fully respect the cultural custom, religious belief, spoken and written languages of ethnic minority regions, and promote the social and economic development in ethnic minority regions.

Law of People’s Republic of China on Regional National Autonomy (implemented on October 1, 1984): Regional national autonomy means that the ethnic minorities, under unified state leadership, practice regional autonomy in areas where they live in concentrated communities and set up organs of self-government for the exercise of the power of autonomy. Regional national autonomy embodies the State’s full respect for and guarantee of the right of the ethnic minorities to administer their internal affairs and its adherence to the principle of equality, unity and common prosperity for all the nationalities. Hunan Integrated Management of Contaminated Agricultural Land shall fully respect the ethnic minorities’ right of autonomy instead of interfering in their internal affairs.
Law of Environmental Protection of the People’s Republic of China (implemented on January 1, 2015): The regulations on environmental protection of this law, which shall be observed by the Hunan Integrated Management of Contaminated Agricultural Land, in order to protect and improve the environment, prevent pollution and other public hazards, safeguard public health, advance ecological civilization construction, and promote the sustainable development of economy and society.

Law of the People’s Republic of China on Prevention and Control of Water Pollution (implemented on June 1, 2008): The regulations formulated, in order to prevent water pollution, protect and improve environment, guarantee safety of drinking water, and promote the all-round and harmonious sustainable development of economy and society. Applicable to prevention and control of surface water and ground water pollution in rivers, lakes, canals, channels, and reservoirs within the territory of the People's Republic of China. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on prevention and control of water pollution.

Law of the People’s Republic of China on Prevention and Control of Atmospheric Pollution (implemented on January 1, 2016): This law specifies the supervision system and main legal system for prevention and control of atmospheric pollution, main measures and legal liabilities for prevention and control of atmospheric pollution caused by combustion, emission pollution of motor vehicles and ships, and waste gas, dust and odor pollutions. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on prevention and control of atmospheric pollution.

Law of the People’s Republic of China on Prevention and Control of Solid Waste Pollution (implemented on April 1, 2005): Applicable to prevention and control of the environment polluted by solid waste within the People's Republic of China, in order to prevent the environment from being polluted by solid waste, safeguard human health, maintain ecological security, and promote the sustainable development of economy and society. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on prevention and control of solid waste.

Law of the People’s Republic of China on Prevention and Control of Environmental Noise Pollution (implemented on March 1, 1997): Applicable to prevention and control of environmental noise pollution within the People's Republic of China, in order to prevent the environmental noise pollution, protect and improve the living environment, safeguard human health, and promote the sustainable development of economy and society. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on prevention and control of environmental noise pollution.
Law of the People’s Republic of China on Evaluation of Environmental Effects (implemented on September 1, 2003): To analyze, forecast, and evaluate the possible environmental impacts after implementation of planning and construction project, and propose the countermeasures to prevent or ease the adverse environmental impacts, as well as the method and system for tracking monitoring, this law stipulates that construction of projects that have environmental impact within the territory of the People’s Republic of China and other sea areas under the jurisdiction of the People’s Republic of China shall be subject to environmental impact assessment according to this law. Hunan Integrated Management of Contaminated Agricultural Land shall evaluate the environmental impacts in accordance with this law.

Law of the People’s Republic of China on Preservation of Antiques (October 2002): In order to strengthen regulations on protection of cultural relics, this law stipulates that within the scope of protection and the area for construction control of a protected historical and cultural site, no facility that pollutes the site and the environment thereof shall be constructed, neither any activity that may affect the safety and environment of that site shall be carried out. The already polluted historical and cultural site and its environmental facilities shall be controlled in a time limit. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on preservation of antiques.

Labor Law of the People’s Republic of China (implemented on January 1, 1995): formulated in order to protect the legitimate rights and interests of laborers, adjust labor relationships, establish and safeguard a labor system suited to the socialist market economy, and promote economic development and social progress. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on protection of employees’ rights and interests.

Labor Contract Law of the People’s Republic of China (implemented on January 1, 2008): formulated in order to improve the labor contract system, specify the rights and obligations of the parties to the labor contract, protect the legal rights and interests of employees, build and develop the harmonious and stable labor relations. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on employees labor contract.

Law of the People’s Republic of China on the Promotion of Employment (implemented on January 1, 2008): enacted in order to promote employment, coordination between economic development and employment increase, and harmony and stability of society. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on employment training, etc.
The Social Insurance Law of the People’s Republic of China (implemented on July 1, 2011): formulated for the purposes of regulating social insurance relationship, protecting the legal rights and interests of citizens in participating in social insurance and enjoying social insurance benefits, enabling citizens to share the development achievements and promoting social harmony and stability. Hunan Integrated Management of Contaminated Agricultural Land shall abide by the regulations of this law on social insurance.

Regulations on the Protection of Basic Farmland of People’s Republic of China (December 27, 1998): Primary purpose of delimiting protection areas of basic farmlands is to implement special protection of basic farmlands, so as to meet needs of China's future population and national economic development for agricultural products, and guarantee the sustainable, stable and rapid development of agricultural production and even national economy. Hunan Integrated Management of Contaminated Agricultural Land may need to occupy basic farmlands, and shall observe the regulations of this law on protection of basic farmlands, if the protection areas of basic farmlands can't be avoided.

The 13th Five-year Plan for Ethnic Minority Undertakings (implemented in November 2016): this plan is made by combining the actual situation of ethnic minorities in Hunan Province and minority areas, in order to achieve the strategic target of building a moderately prosperous society. According to the work ideas of "develop with project leading, work with project implementation, and plan with project supporting", this plan proposes 12 categories, 66 key construction projects, and policy measures in 8 aspects, including finance and taxation, finance, investment, land, ecology, industry, talent, and counterpart assistance. Hunan Integrated Management of Contaminated Agricultural Land shall be fully combined with the 13th Five-year Plan for Ethnic Minority Undertakings of Hunan Province to implement the mutual promotion.

Regulation on the Implementation of the Land Administration Law of the People’s Republic of China (Decree No. 256 of the State Council) (implemented on December 27, 1998): Article 47 stipulates that for expropriating land, the compensation shall be made according to the original purposes of the land expropriated. Compensation fees for land expropriated include land compensation fees, resettlement fees and compensation for attachments to or green crops on the land. The current land expropriation compensation system is determined in accordance with Article 47 of the Land Administration Law. If the Hunan Integrated Management of Contaminated Agricultural Land involves land expropriation compensation, the specific standards for compensation and settlement shall be formulated in accordance with Article 47 of the Land Administration Law.

The State Council’s Decision on Deepening Reform and Managing Strictly Land (GF
[2004] No. 28) (implemented on October 21, 2004) further specifies that the procedure for approval and compensation of basic farmland expropriation shall be rigorously enforced, and the expropriation compensation shall be implemented according to the legal highest standard for approval of the basic farmland occupation. Hunan Integrated Management of Contaminated Agricultural Land shall follow the procedure stipulated by this law for approval and compensation of basic farmland expropriation.

Guidance on Improving the System for Land Expropriation Compensation and Settlement (GTZF [2004] No. 238) (implemented on November 3, 2004): Formulated for the purposes of rational use of land, and protecting the legitimate rights and interests of the land-expropriated farmers, this law develops and improves the expropriation compensation standard, approaches of resettlement of land-expropriated farmers, expropriation working procedure, and expropriation implementation and supervision. Involving the guiding work for land expropriation and resettlement, the Hunan Integrated Management of Contaminated Agricultural Land needs to obey the compensation and resettlement stipulated by this law.

Measures for Announcement of Land Expropriation (Decree No. 10 of Ministry of Land Resources) (implemented on January 1, 2002): These measures are formulated in order to standardize the announcement of land requisition, protect the legal rights and interests of rural collective economic organizations, villagers or other obligees. These measures stipulate that if farmers' collectively owned land is expropriated, the land expropriation scheme and compensation shall be announced in written form within the village and group where the expropriated land locates. The land-expropriated rural collective economic organizations, villagers or other obligees may have different opinions on land expropriation compensation and resettlement scheme, or have the right to hold a hearing. In accordance with these measures, the land expropriation compensation and resettlement scheme involved by the Hunan Integrated Management of Contaminated Agricultural Land belong to announcement and need to be announced and accept the social supervision.

Notice of Ministry of Land Resources and Ministry of Agriculture on Improving Facilities and Farmland Management (GTZF [2010] No. 155 Document) (implemented on September 30, 2010): This law is formulated in order to solve the prominent problems in land expropriation, such as low compensation standard, one land different price, and high randomness. It specifies all links, such as calculation method, organization and implementation steps of land expropriation expenses, and provides the clear, specific, and feasible guiding basis for calculation of land expropriation compensation expense. Therefore, it can be implemented in accordance with this law, when the Hunan Integrated Management of Contaminated Agricultural Land needs to formulate and calculate the unified annual output
National Soil Pollution Investigation Bulletin (issued by Ministry of Environmental Protection, and Ministry of Land Resources on April 17, 2014): From April 2005 to December 2013, China conducted the first survey of national soil pollution status and basically mastered the overall status of national soil environment quality. The National Soil Pollution Investigation Bulletin was published according to the survey results, and its grading method of heavy metal pollution degree was cited in the Hunan Integrated Management of Contaminated Agricultural Land as the pollution grading method of heavy metals except cadmium.

Action Plan for Prevention and Control of Soil Pollution (issued by the State Council, May 31, 2016): This action plan is made in order to strengthen prevention and control of soil pollution, and gradually improve soil environment quality, and it can serve as the reference for Hunan Integrated Management of Contaminated Agricultural Land to formulate the management measures for polluted farmlands.

(2) Standards

Environmental quality standard for soils (GB15618-1995): This standard stipulates the index value of maximum allowable concentration of pollutants in soil and corresponding monitoring method, according to soil applications, protection objects, and main properties of soil. It is applicable to the soil in farmland, vegetable field, tea garden, orchard, pasture, woodland, and nature reserve. In the Hunan Integrated Management of Contaminated Agricultural Land, the farmland soil assessment adopts the grade II standard of Environmental Quality Standard for Soils (GB15618-1995), canal desilting adopts the grade III standard of Environmental Quality Standard for Soils (GB15618-1995). Without exceeding the grade III standard, the dredging sediments can be applied to woodland; otherwise, they shall be sent to the local landfill for landfill.

Environmental quality standards for surface water (GB3838-2002): These standards are formulated in order to prevent water pollution, protect quality of surface water, safeguard human health, and maintain good ecosystem, and they are divided into basic items on environmental quality of surface water, supplementary items and specific items on surface water source of central drinking water system. Hunan Integrated Management of Contaminated Agricultural Land strictly implements these standards for surface water protection.

Standards for Irrigation Water Quality (GB5084-2005): these standards specify the methods for implementing the requirements and standards on irrigation water quality, and sampling detection, and they are applicable to China's irrigation water with the surface water,
groundwater, treated urban sewage, and the industrial wastewater that has similar quality with urban sewage as the water source. Hunan Integrated Management of Contaminated Agricultural Land strictly implements these for evaluation and management of the irrigation water.

Quality standard for ground water (GB/T14848-1993): This standard is formulated in order to protect and develop the groundwater resources reasonably, prevent and control pollution of ground water, safeguard human health, and promote economic development, and it stipulates the quality classification, quality inspection, evaluation method, and quality protection of ground water. Hunan Integrated Management of Contaminated Agricultural Land adopts this standard for evaluation of ground water.

Ambient air quality standard (GB3095-2012): This standard is formulated in order to protect and improve the living and ecological environments, and safeguard human health. It stipulates, implements, and supervises the function classification, standard grading, pollutant item, mean time and concentration limit, monitoring method, and data statistics of ambient air. Hunan Integrated Management of Contaminated Agricultural Land adopts this standard for evaluation of ambient air.

Environmental quality standard for noise (GB3096-2008): This standard is formulated in order to prevent noise pollution, safeguard the acoustic environment quality for normal life, work, and study of urban and rural residents. It specifies ambient noise limits and measuring methods for 5 acoustic environment function areas. Hunan Integrated Management of Contaminated Agricultural Land adopts this standard for acoustic environment quality and management.

Integrated emission standard of air pollutants (GB12697-1996): This standard specifies the emission limit of 33 air pollutants, as well as various requirements during implementation of the standard. Hunan Integrated Management of Contaminated Agricultural Land needs to implement this standard for the activities involving discharge of air pollutants.

Standards for pollution control on the storage and disposal site for general industrial solid wastes (GB 18599-2001): this standard is formulated in order to prevent and control the secondary pollution of general industrial solid waste in storage and disposal site. It specifies the location, design, operating management, closing and sealing, pollution control and monitoring of general industrial solid waste's storage and disposal site. Involving the storage and disposal of general industrial solid waste, the Hunan Integrated Management of Contaminated Agricultural Land shall implement this standard.

Standard for Pollution Control on Hazardous Waste Storage (GB18597-2001 2013 Revision): this standard is formulated in order to prevent the environmental pollution during
storage of hazardous wastes, and strengthen the supervision and management of hazardous wastes storage. It specifies the general requirements on storage of hazardous wastes, as well as the requirements on location design, operation, running, safety protection, monitoring and closure of packing and storage facilities of hazardous wastes. If hazardous wastes are involved in relocation or closure of the enterprises in the area of the Hunan Integrated Management of Contaminated Agricultural Land, this standard shall be implemented.

(3) Relevant policies of Hunan Province

Outline of the 13th Five-Year Plan for National Economic and Social Development of Hunan Province: In Chapter 12, it proposes to speed up the agricultural modernization and improve the agricultural product quality safety system, and it specifies implementing differentiated land management policies, scientifically determining various land scales, and strictly controlling the land use. For different main functional area, different total pollutant discharge control and environmental standard are implemented. Hunan Integrated Management of Contaminated Agricultural Land needs to be included into the development objectives of "The 13th Five-year Plan" of Hunan Province, for performance assessment.

Notice of the People’s Government of Hunan Province on Adjusting the Compensation Standard for Land Expropriation of Hunan Province (XZF [2012] No. 46) (December 18, 2012): This law is formulated in order to further standardize the land expropriation compensation of Hunan Province, and safeguard the legal rights and interests of land-expropriated rural collective economic organizations and farmers. This law stipulates that the land expropriation compensation standard includes both land compensation and resettlement compensation. Collective land for construction, rural roads, ponds and other agricultural land shall be expropriated in accordance with the local compensation standard for land expropriation. As stipulated by the above law, involving expropriation of farmland, the Hunan Integrated Management of Contaminated Agricultural Land shall give land compensation and resettlement subsidy to the one with land expropriated, in accordance with the local compensation standard for land expropriation.

Several Preferential Policies of the People’s Government of Hunan Province on Accelerating the Social and Economic Development of Ethnic Minorities and Ethnic Regions (April 25, 2000): These policies are preferential policies formulated in order to speed up the economic development and social progress of ethnic minorities and ethnic regions; increase investment efforts in ethnic regions; accelerate construction of transportation, electric power, and communication in ethnic regions; alleviate poverty in ethnic regions through development; introduce preferential fiscal and taxation policies in ethnic regions; increase special ethnic fund; speed up agricultural development of ethnic regions; continue the grain
for green and differential subsidy for grain; support ethnic regions to accelerate construction of small towns; strongly support adjustment of the industrial structure in ethnic regions, and speed up reform, reorganization, and restructuring of enterprises; implement national and provincial preferential policies on ethnic trade and fixed manufacturer of ethnic articles; help ethnic regions to speed up technology progress; cultivate and introduce various talents. If the area of the Hunan Integrated Management of Contaminated Agricultural Land involves the implementation of EMP item points, policy advantages shall be fully taken to realize the social and economic development of ethnic regions.
3.2 World Bank's safeguard policies and World Bank Group EHS Guidelines

3.2.1 World Bank's safeguard policies and compliance analysis

The World Bank formulates ten safeguard policies in social and environmental aspects. Identify whether the ten policies are involved according to the project nature, determined assessment scope and field investigation, with results shown in Table 3-1.

<table>
<thead>
<tr>
<th>No.</th>
<th>Safeguard policies</th>
<th>Compliance</th>
<th>If applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OP/BP 4.01 Environmental Assessment</td>
<td>The project is designed to demonstrate a risk-based integrated approach to managing agricultural land contaminated with heavy metals and other pollutants for safe agricultural production in selected counties in Hunan. This project aims to demonstrate the risk-based approach to managing contaminated farmlands, and thus has significant positive environmental and social benefits. The impacts mainly the construction related activities during the construction of the small civil works such as irrigation canals on the farmland, however, the heavy metal pollution sources could be significant to the environment and community health if not well managed. If agricultural products contaminated with heavy metals in the project area inflow to the market, it will have a negative impact on society and will lead to food safety issues. Therefore, the project is classified as Category A as per OP4.01 Environmental Assessment.</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>OP/BP 4.04 Natural Habitats</td>
<td>The project is mainly a farming area with frequent human activities. There is no natural habitat here.</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>OP/BP 4.36 Forests</td>
<td>The policy is not used. The project will not support major changes or degradation activities of important forest regions or related important natural habitats determined by the policy.</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>OP/BP4.09 Pest Management</td>
<td>The project will support sustainable soil management practice to restore and maintain the soil quality, including chemical management. Therefore, Pest Management (OP/BP4.09) is used in the project. It's necessary to prepare a pest management plan (PMP), which puts forward pest control and management method, and stresses the method of integrated pest management and recommends application scopes under various conditions, and provides a list of fertilizers, insecticides and herbicides conforming to category requirements recommended by the World Health Organization according to the project demands. PMP should also include training and monitoring scheme for project stakeholders, with implementation of training and monitoring scheme included in the project budget.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>OP/BP 4.11 Physical Cultural Resources</td>
<td>There is no cultural relics protection unit in the project area. No occupation or removal of graves is involved; however, it’s necessary to adopt Disposal Procedures of Cultural Relics.</td>
<td>No</td>
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</tr>
<tr>
<td>6</td>
<td>OP/BP 4.37 Safety of Dams</td>
<td>The project construction involves inundation irrigation, water source reservoir dam, and some upper reaches of project area may involve tailing pond. It triggers Dam Safety Guarantee Policy (OP4.37) of the World Bank. The dam safety is completed by the hired dam safety experts.</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>OP/BP 4.10 Indigenous People</td>
<td>In the first three project counties, only in project villages of Yongding District, Tujia account for about 84% of local population and Bai ethnic minorities accounts for about 1% of local total population. Tujia was recognized as a minority in 1956 by Chinese government. These two groups of ethnic minorities have been well integrated with local Han people, speak mandarin Chinese. They enjoy equal opportunities, rights and interest as Han people do. These ethnic people will not be disadvantaged by the project activities. It is very unlikely to have presence of any ethnic minorities in the project areas of the future identified project sies. But since most of the project future villages are yet to be determined, in case there is any presence of IP by the Bank IP term requirement, this policy is triggered and an IPPF is included in this framework.</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>OP/BP 4.12 Involuntary Resettlement</td>
<td>Although the project activities will be mostly implemented within project villages, project civil woks may include small irrigation canals and ditches on farm land. As a common practice in China, the use of land for village level public facilities like irrigation canals will be dissolved within the related village with no need for acquiring the land. That’s, land is usually voluntarily provided by villagers through consultation and village internal land redistribution or rebalance. If the project might experience very limited changes to the current design in relation to land use. A Resettlement policy Framework is prepared to provide guidance on dealing with the issues of land acquisition and resettlement in case land acquisition and involuntary resettlement emerge during the implementation stage of the project. Resettlement Action Plan: a full RAP needs to prepare for the sub-project that more than 200 people will be affected by land acquisition and resettlement; otherwise an abbreviated RAP needs to be prepared for sub-projects where less than 200 people will be affected by land acquisition and resettlement while such impact is minor. The minor impact is that the people will not lose all of part of their house which lead to loss of less than 10% of productive materials.</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>OP/BP 7.50 Projects in International Waterways</td>
<td>The policy is not used; there is no international watercourse involved in the project area.</td>
<td>No</td>
</tr>
<tr>
<td>10</td>
<td>OP/BP 7.60</td>
<td>The policy is not used; there is no disputed area involved in the project area.</td>
<td>No</td>
</tr>
<tr>
<td>Project in Disputed Areas</td>
<td></td>
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</tr>
</tbody>
</table>
3.2.2 Analysis of project’s compliance with World Bank Group's EHS Guidelines

World Bank Group’s EHS Guidelines is also applicable to the project. The mitigation measures included in the project's ESMF fully meet the requirements of the Guidelines.

Table 3-2 List of Requirements on Project's Compliance with EHS Guidelines of World Bank Group

<table>
<thead>
<tr>
<th>EHS Guidelines of World Bank Group</th>
<th>Compliance with ESMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste water from small-scaled civil construction</td>
<td>In ESMF, it proposes to take following measures for treatment and disposal: establish the sedimentation tank on construction site, so that the construction waste water can be gathered and precipitated in the precipitation tank, and reused for construction as far as possible;</td>
</tr>
<tr>
<td>Solid waste from small-scaled civil construction</td>
<td>In ESMF, it proposes to take following measures for treatment and disposal: wastes can be used for land leveling and backfilling, as well as bedding of road subgrade, without independent spoil area to reduce occupation of land;</td>
</tr>
<tr>
<td>Dredged sediments from irrigation canal</td>
<td>In ESMF, it proposes to take following measures for treatment and disposal: monitor the dredged sediments of canal and evaluate in accordance with Environmental Quality Standard for Soils (GB15618-1995); if they are lower than grade II standard of Environmental Quality Standard for Soils (GB15618-1995), they will be backfilled for land leveling or paved on subgrade; if they fall between grade II and grade III standards, they will be used in woodland; if they exceed grade III standard, they will be sent to the local landfill for landfill with the principle of proximity.</td>
</tr>
<tr>
<td>The plant that is accumulated with heavy metals during phyto-remediation</td>
<td>In ESMF, it proposes to send the plants accumulated with heavy metals to the landfill for landfill.</td>
</tr>
<tr>
<td>Straw</td>
<td>In ESMF, it proposes to remove straws from field for utilization, for instance, being processed into straw ropes, straw braids or used in covering orchards and forests.</td>
</tr>
<tr>
<td>Household garbage produced in project activities</td>
<td>In ESMF, it proposes to take following measures</td>
</tr>
</tbody>
</table>
Agricultural inputs, such as agricultural film, pesticide bottle, and packing bag of chemical fertilizer

In ESMF, collection and safe disposal of agricultural inputs are considered

Improper liming may bring bad effects on operators

ESMF considers professional liming team or lime spreader for liming, and provides relevant personnel with professional training, as well as proper personal protective articles.

Storage and handling of pesticide

Involving storage and handling of pesticide, the project shall follow the suggestions for management of harmful substances, specified by General EHS Guide Lines

Application of pesticide

Involving application of pesticide, the project shall follow the suggestions for management of harmful substances, specified by EHS Guide Lines in Plantation Crop Production

3.3 Analysis of difference of China's national and local laws and regulations with World Bank’s safeguard policies

(1) Difference of China's national and local laws and regulations with World Bank's safeguard policies

- OP/BP4. 01 Environmental Assessment (EA)

Generally speaking, World Bank's requirements on project's EA are basically consistent with China's requirements on EA, but differ a little in some emphasis points and procedure contents. Word Bank has stricter regulations and requirements than domestic ones, while China has its own features in EA.

Firstly, the classification method differs. China's Directory of EA Classification and Management specifies the quantitative index thresholds, so as to determine whether the project needs the EA report/table. EA report is subdivided into 3 job classes. World Bank adopts the qualitative classification standard, where experts judge and divide into Class A, B, C projects according to EA policies. Class A and B projects are basically the same in EA contents, unlike China, where the EA scope, period, content, and method are specified after job class is divided further. Hunan Integrated Management of Contaminated Agricultural
Land belongs to Class A project, so EA shall be performed in accordance with World Bank's requirements on Class A project.

Secondly, the area of influence and range of assessment may differ with projects. World Bank pays simultaneous attention to the impacts and possible impacts of the project. Therefore, when making EA of the Hunan Integrated Management of Contaminated Agricultural Land, possible impacts of this project on environment shall be fully considered, and the prepared prevention, mitigation or compensation measures for adverse environmental impacts shall be listed in EA.

Thirdly, EA tools differ. China has the planning environmental assessment (EA), EA report, and EA report form, while the World Bank has the strategic EA, regional EA, ESIA, ESMP, EMP, ESMP, ESMF, ECOP, and assessment of hazards and risks involved in due diligence. For the Hunan Integrated Management of Contaminated Agricultural Land, ESMF and ESIA have been prepared, and ESIA includes the ESMP and ECOP.

Fourthly, when judging environmental impacts of the project, apart from considering the project type, scale, place, and sensitivity, the World Bank has to consider its social impacts comprehensively, closely combine EA and SA (social assessment), however domestic project often makes SA independently. Therefore, when making EA of the Hunan Integrated Management of Contaminated Agricultural Land, the social impacts brought by project activities shall be identified fully, and corresponding mitigation measures shall be proposed.

Fifthly, public participation. World Bank attaches great importance to information disclosure and public participation. Class A project requires public consultation for at least twice: after completion of EA outline and first draft of EA, In China, EA of project also requires public consultation for twice: after determination of EA presiding unit and completion of first draft of EA report. Therefore, public participation of project shall be carried out in accordance with the procedures of the World Bank, during EA of the Hunan Integrated Management of Contaminated Agricultural Land.

Sixthly, associated projects. World Bank requires the due diligence, impact analysis, and proposing measures for the items or facilities affected by this project or affecting this project. During EA of the Hunan Integrated Management of Contaminated Agricultural Land, due diligence shall be conducted to the pollution source that affects this project area, and measures shall be taken to mitigate the impacts.

Seventhly, World Bank has EHS guidelines for safety and health, while China has independent safety evaluation. Therefore, Integrated Management of Contaminated Agricultural Land needs to introduce the applicable measures for EHS guidelines into this project.
Eighthly, analyze the alternative schemes. Generally, China's EA requires no comparison or analysis of various schemes for the project. Although the Technical Guidelines for Environmental Assessment requires analysis of alternative schemes for grade I projects, generally EA only demonstrates the rationality of the scheme selected through feasibility study in practice. World Bank requires analysis of alternative schemes for EA of Class A project and it requires the systematic comparison of different scheme's impacts on environment, feasibility of easing these impacts, investment and operating costs for mitigation measures, fitness to local conditions, and requirements on training and monitoring. These alternative schemes may be different construction place, different type of process, raw material, operating conditions, and mitigation measures. ESMF of the Hunan Integrated Management of Contaminated Agricultural Land has compared the project county, project area, and with and without project, to provide scientific basis for project decision.

Ninthly, EMP and ESMP lay special emphasis on implementation of measures, supervision during project implementation is required in special chapters of ESIA and EIA, while strengthening measure supervision during project implementation is proposed in the latest domestic technical standard, coinciding more and more with World Bank policies.

- OP/BP 4.09 Pest Management

When helping the debtor to prevent and control the pest that affects agricultural or public health, the World Bank advocates and supports this strategy: popularize the biological or environmental control method, and reduce dependence on chemical synthesis pesticides. Among the projects subsidized by World Bank, the debtor studies the problems on pest management through EA of this project. When evaluating the project involving pest management, the World Bank will evaluate the legal and regulatory framework of this state and the capability of the organization, to see whether they can promote and support the safe and effective pest management that benefits the environment. When necessary, the World Bank and the debtor will include relevant contents into the project components to strengthen such capability. In order to boost the specialized uniform prevention and control of crop pest, the pest management policy of the World Bank is striving to prevent the use of and the exposure to dangerous pesticide and the World Bank won't finance any product that is listed by WHO as IA or IB product or belongs to Class II product. Chinese government has formulated the Regulations on Specialized Uniform Prevention and Control of Crop Pest, to advocate supports of the organization that develops the specialized uniform prevention and control of crop pest, standardize the service behaviors of specialized uniform prevention and control, improve the pest prevention and control capability of crops, guarantee the safety of food, agricultural products, and ecological environment. Meanwhile, Chinese government has
also published the list of high-toxic pesticides expressly prohibited by the state to use on vegetables, fruit trees, tea leaves, and Chinese herbal medicines. The World Bank and China have consistent requirements on pest management.

- **OP/BP 4.37 Safety of Dams**

  The World Bank pays attention to safety of its financed new dam, and the built dam directly subordinated to its financed project. The World Bank requires the debtor to accept and take safety measures for the dam, during design, bid invitation, construction, operation, and maintenance of the dam and relevant buildings. Chinese government has also given strict requirements for dam safety, issued the Regulations on the Safety Administration of Reservoir Dam, and proposed that the dam shall be constructed and managed in accordance with the policy of safety first. Dam construction shall conform to the technical standard for dam safety prepared by the administrative department for water resources under the State Council jointly with related dam authorities, and have the engineering design. The unit with relevant qualification certificate shall perform the engineering design of the dam, and implement the periodic safety inspection and verification system, which are consistent with World Bank's policy requirements.

- **OP/BP 4.10 Indigenous Peoples**

  In China, except for Han people which account for around 90% of the total population of the country, all other ethnics are considered as the ethnic minority. There is some difference between the definitions by World Bank and Chinese government. The WB IP definition as follows:

  1) Self-identification as member of a distinct indigenous cultural group and recognition of this identity by others;

  2) Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories.

  3) Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture.

  4) use an indigenous language, which is often different from the official language of the country or region.

  According to the definition of WB, ethnic minority means an ethnic with its own unique culture and language, and the whole group lives in a specific geographic area, this definition is different from China: even if an ethnic person lives away from his or her original ethnic minority area, such as living in a city, such a person would also still be seen as an ethnic minority. SA group will identify the project area based on World Bank's policy on ethnic minorities; if there is the ethnic minority that meets the definition of World Bank's policy on
ethnic minorities, the EMMD will be launched.

- OP/BP 4.12 Involuntary Resettlement

Generally speaking, there are no huge differences between involuntary resettlement policy in both China and WB OP4.12, there purpose and normal procedure are the same. Both of them pay attention to avoid involuntary resettlement or try to minimize it and make sure a long-term living for those immigrants at the level they used to have. During the process of involuntary resettlement activities, not only compensation but also healing, ME are required. However, there are some policy gaps between these 2 sides.

Firstly, related projects in involuntary resettlement range. When focus on the involuntary resettlement, WB concerns both within and related involuntary resettlement immigrants. But China only focus on the within part.

Secondly, compensation for legal or illegal buildings and illegally occupation. Generally, according to the policy in China, only legal one would get the compensation, by comparison, WB accept both legal and illegal ones to get compensation.

Thirdly, compensation standard. WB requests to compensate all replacement costs or replace affected house and other property with property directly due to OP4.12 policy. However, WB also stipulate if the replacement costs cannot meet the standard in specific country totally, then other methods should be adapted. This policy do not stand the idea of depreciation, hence, compensation standard in WB is always higher than it in countries.

Forthly, public participation. Chinese Government has a very indistinct requirements for participation and consultation in policies. Except for the water and electrify project, no policies have required affected immigrants to participate in the resettlement project. But WB has a clear requirement about public (especially affected groups) to join in designing, planning, implementing EA and complaining handling procedure, and treated these as a policy of revealing. WB encourages owners send brochures to the public.

SA group will identify the involuntary resettlement in the project area based on the World Bank’s operation guidelines— OP4.12. If there is involuntary resettlement in a wide range, RPF will be formulated according to the World Bank policy; if there is small range or the possibility of land expropriation in the project area later can't be excluded, the abbreviated RPF will be formulated according to World Bank policy.

(2) Environmental quality standard for soil

Table 3-3 has listed the standard limits of heavy metal in some countries' and international organizations’ environmental quality standards for farmland soil. It is known from comparison that the secondary standard value of cadmium in China's Environmental Quality Standard for Soils GB 15618-1995 is 0.30 (pH<7.5), which is stricter than that in
international environmental standards for farmland soil.

With different management framework, actual problems on soil environment, economic and technical conditions, different countries have formulated different standards and selected different control indexes, all based on lots of benchmark studies on soil environment, pollution survey and monitoring of relevant media. Therefore, the soil environment standard adopted by the Project should be formulated according to China's situation, based on China's soil benchmark study, combining pollution status and management demands, and actual situation. So the Project adopts China’s Environmental Quality Standard for Soils (GB 15618-1995).

Table 3-3 Comparison of Standard Limits of Heavy Metals in Environmental Standards for Farmland Soil

<table>
<thead>
<tr>
<th>China</th>
<th>Standard value (mg/kg)</th>
<th>&lt;6.5</th>
<th>6.5~7.5</th>
<th>&gt;7.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cd</td>
<td>0.30</td>
<td>0.30</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>Hg</td>
<td>0.30</td>
<td>0.50</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>As</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Pb</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>Cr</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Netherlands</th>
<th>Item</th>
<th>Target value (mg/kg)</th>
<th>Intervention value (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cd</td>
<td>0.8</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Hg</td>
<td>0.3</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>As</td>
<td>29</td>
<td></td>
<td>55</td>
</tr>
<tr>
<td>Pb</td>
<td>85</td>
<td></td>
<td>530</td>
</tr>
<tr>
<td>Cr</td>
<td>100</td>
<td></td>
<td>380</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EU</th>
<th>Item</th>
<th>Mass concentration limits of heavy metals in soil (soil pH6~7)/(mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cd</td>
<td></td>
<td>1~3</td>
</tr>
<tr>
<td>Pb</td>
<td></td>
<td>50~300</td>
</tr>
<tr>
<td>Hg</td>
<td></td>
<td>1.0~1.5</td>
</tr>
<tr>
<td>Cr</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Japan</th>
<th>Medium (dry farmland)</th>
<th>Item</th>
<th>Standard limit (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmland</td>
<td>Copper (Cu)</td>
<td>≤125</td>
<td></td>
</tr>
<tr>
<td></td>
<td>As</td>
<td>≤15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cd (note: its content in rice)</td>
<td>≤0.4</td>
<td></td>
</tr>
</tbody>
</table>

(3) Food safety standard

After comparing the rules on limits for heavy metal in food in CAC Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995), EU(EC) No 1881/2006, and China’s National Food Safety Standard--Limits for Pollutants in Foods (GB 2762-2012) (see table 3-4), the cadmium limit in rice specified in China's food safety standard is consistent with that specified by EU standard, which is 0.2mg/kg, lower than 0.4mg/kg specified in CAC.

Rules on limits for pollutants in food are affected by agricultural production and geographic area, features of food contaminants and control status, environmental pollution
status, residents' eating habits. China's National Food Safety Standard--Limits for Pollutants in Foods (GB 2762-2012) is revised by referring to CAC standard and assessing risk, according to China's food contamination monitoring and total dietary survey data, and combining China's mainly consumed food and heavy metal pollution features. Main purpose of the Project is to reduce the content of cadmium in the rice produced by China's farmland, so the agricultural product safety standard involved in the Project adopts China's National Food Safety Standard--Limits for Pollutants in Foods (GB 2762-2012).

Table 3-4 Comparison of Limit Standard of Heavy Metals in Food

<table>
<thead>
<tr>
<th>Food safety standards in main countries and international organizations</th>
<th>Type of agricultural product</th>
<th>Limit standard of heavy metals in food</th>
</tr>
</thead>
<tbody>
<tr>
<td>China National Food Safety Standard--Limits for Pollutants in Foods (GB 2762-2012)</td>
<td>Rice</td>
<td>Cd: 0.2, As: 0.5 (total arsenium), Pb: 0.2, Cr: 1.0, Hg: 0.02 (total mercury)</td>
</tr>
<tr>
<td></td>
<td>Grape</td>
<td>Cd: 0.05, As: 0.5, Pb: 0.2, Cr: 0.5, Hg: Unspecified</td>
</tr>
<tr>
<td></td>
<td>Orange</td>
<td>Cd: 0.05, As: 0.5, Pb: 0.1, Cr: 0.5, Hg: Unspecified</td>
</tr>
<tr>
<td></td>
<td>Grape</td>
<td>Cd: Unspecified, As: 1.0, Pb: 0.2, Cr: Unspecified, Hg: Unspecified</td>
</tr>
<tr>
<td></td>
<td>Orange</td>
<td>Cd: Unspecified, As: 1.0, Pb: 0.1, Cr: Unspecified, Hg: Unspecified</td>
</tr>
<tr>
<td>EU No 488/2014</td>
<td>Rice</td>
<td>Cd: 0.2, As: Unspecified, Pb: 0.2, Cr: Unspecified, Hg: Unspecified</td>
</tr>
<tr>
<td></td>
<td>Grape</td>
<td>Cd: 0.05, As: Unspecified, Pb: 0.2, Cr: Unspecified, Hg: Unspecified</td>
</tr>
<tr>
<td></td>
<td>Orange</td>
<td>Cd: 0.05, As: Unspecified, Pb: 0.1, Cr: Unspecified, Hg: Unspecified</td>
</tr>
</tbody>
</table>

4. Environmental and social safeguard procedures

For sub-project, specific procedures will be formulated to identify and screen environmental and social impacts of sub-project area, propose the mitigation measures, and prepare the corresponding safeguard documents. The environmental and social impacts assessment work of sub-projects will be carried out in following steps.

Step 1--Selection of sub-project counties;
Step 2--Selection of sub-project areas;
Step 3--Screening for the potential environmental and social impacts;
Step 4--Preparation of the Environmental and Social Assessment Outline;
Step 5--Review of the Environmental and Social Assessment Outline by World Bank;
Step 6--Preparation of environmental and social safeguard documents;
Step 7--Review and approval of the safeguard documents by Government and World Bank;
Step 8--Implementation, supervision, and reporting.
4.1 Selection of sub-project counties

During project preparation, a set of selection criteria will be made to determine the sub-project counties. Make reasonable and effective analysis of sub-project according to these criteria, determine the scale as needed by current reasonable forecast, and implement by stages. Environmental and social experts will participate in identification and selection of sub-project counties, assess and work for them to optimize their concept and reduce the environmental and social impacts. Specific selection criteria of sub-project counties are as follows:

- Agricultural production area dominates;
- Located in key pollution area (like One Line and Two Districts) of the whole province. Heavy metal pollution of soil in Hunan Province is mainly featured as "One Line and Two Districts". One Line: the line along Xiangjiang River basin; Two Districts: Southern Hunan and Western Hunan.
- Clear overall conditions of soil and pollution in agricultural production area (including type of contaminant and its pollution level);
- Clear and controllable pollution source. According to data on pollution status of heavy metal in farmland soil and crops in project counties, analyze the pollution cause, source and level, and select the slight, mild, moderate, and severe pollution areas with clear pollution source and controllable farmland heavy metal pollution;
- Regional representation. Select the representative and demonstrative area as project area, according to the geographical position, topography and geomorphology, climatic features, crops planting mode and structure of project county;
- Valued by local government. Local government applies to provincial government for supporting funds and related conditions, and promises to implement project as required by the project;
- Farmers would join. Local farmers should realize the bad influence from the contaminated land would bring. By implementing this project, local farmers, especially ethnic minority, the poor and women would benefit from it and gain some economical income with job opportunities.
- With experience in control of heavy metal pollution. The existing enterprises involving heavy metal pollution have been closed or have brought the pollution source under control, and won't cause new pollution to farmland.

After analysis of pollution source, pollution way, pollution status, control status of pollution source, technical capacity for pollution restoration of heavy metal in farmland of
Hunan Province, 16 districts or counties with clear and controllable pollution source of heavy metal, taken seriously by local government, actively participated by the masses, experienced in heavy metal pollution control, are selected, and they are Jishou City, Yongshun County, Baojing County, and Huayuan County of Xiangxi Autonomous Prefecture, Yongding District and Cili County of Zhangjiajie City, Zhongfang County of Huaihua City, Anhua County of Yiyang City, Hengyang County and Hengnan County of Hengyang City, Yizhang County, Linwu County, and Yongxing County of Chenzhou City, Qiyang County and Lengshuitan District of Yongzhou City, among which, Hengyang County, Yongxing County, and Yongding District of Zhangjiajie have been confirmed as the first batch of project implementation counties, and other 13 are confirmed as project option counties. The first batch of project implementation counties (3) and project option counties (12) for the Hunan Integrated Management of Contaminated Agricultural Land have the distribution characteristics as shown in figure 4-1. Anhua County, Hengyang County, and Hengnan County locate in the area along Xiangjiang River basin; Jishou City, Yongshun County, Baojing County, Huayuan County, Yongding District of Zhangjiajie City, Cili County, and Zhongfang County of Huaihua City locate in western Hunan; Yizhang County, Linwu County, Yongxing County, Qiyang County and Lengshuitan District of Yongzhou City locate in western Hunan. The details are shown in figure 4-1.
4.2 Selection of project areas

After sub-project is determined, provincial PMO will identify and select the sub-project areas by following criteria:

- Concentration principle

Farmland in project area is relatively centralized, with unified planning and reasonable
layout, and advanced by a whole village (district). Implementation of project brings good scale benefits. Proper priority is given to grain production area, and the project area is more than 70 hectares.

- Clear and controllable pollution source
  Heavy metals and other pollutants in farmland soil of project areas have clear clauses and sources, accurate types and pollution degrees. Besides, the primary pollution source is controllable or has been cut off.

- Regional representation principle
  Main farmland type should be rice field in project area, and main pollution type should be heavy metal. Led by "Cd", the heavy metal pollution also includes As, Pb, Cd, Hg, according to its features in Hunan Province.

- Typical principle
  It should include not only the typical of pollution type, but also the type of pollution risk ranging from no risk to high risk. Through project implementation, it will bring good investment benefit and influence, and demonstrate well.

- Sustainability principle
  Through infrastructure improvement and integrated agronomic measures, project area will improve the heavy metal polluted farmland, and control the agricultural non-point source pollution, to increase output and efficiency, and realize sustainable development of agriculture, economy and society in the project areas.

- Stability principle
  Select project area in line with local agricultural and water resources planning, environmental protection and land utilization planning. The project area should meet relevant national and local policies, be highly valued by local government, and equipped with reasonable professionals. Project units (farmer or enterprise) are enthusiastic to participate in the project. The masses are highly willing to participate, and it is required that more than 2/3 of farmers agree to participate.

  Sub-project will select 4-6 project areas according to the above criteria, to implement the Project.

### 4.3 Screening for potential environmental and social impacts

(1) Screen the environmental and social impacts

Once provincial PMO selects a sub-project county and a project area, the environmental and social consultants hired by provincial PMO will screen the environmental and social safeguard policies according to the safeguard policies of World Bank, to determine the type
and range of activity's potential environmental and social impacts.

PMO and the environmental and social consultants will use screening tools (see Appendix 1) to determine the potential environmental and social impacts, and the applicable safeguard policies of the World Bank. The screening results will be used to determine the category and type of the environmental and social safeguard documents needed by each sub-project.

As required by environmental policy of the World Bank, the Project falls into Class A project, the environmental impact documents required by Class A project needs to be provided (including ESMF, Sub-Project ESIA, EA Summary, and PMP).

①ESMF, including environmental and social impacts of project and their mitigation measures, preparation of sub-project EMP, system arrangement for monitoring, resettlement framework and EMDP outline, public consultation, and information disclosure.

②Sub-Project ESIA report, including the environmental/social impacts produced by project activity, mitigation measures, environmental monitoring plan, organization arrangement and responsibility, capacity construction activity, implementation progress and cost estimate. See Appendix 3 for contents of ESIA report.

③For Class A projects, a brief EA Summary needs to be prepared to sum up main results and conclusions.

④PMP, including method and scope of pest control and management.

Besides, as required by social safeguard policies of World Bank, PMO will screen the social impacts of al sub-projects, including: (1) whether there is land expropriation and involuntary resettlement (permanent and temporary); (2) The affected population; (3) whether there is an area inhabited by ethnic minorities (determine by checking the population of sub-project area); (4) Number of villagers, number of poor households, and number of women involved by project implementation. PMO will determine the importance of these impacts with the screening tools given in Appendix 1, and identify the SA and social safeguard documents needing to be prepared.

The social safeguards document of each sub-project depends on the impact of this sub-project, and is as described below:

⑤RAP: If more than 200 individuals are affected by physical or non-land economic displacement in the project, then a RAP is needed. And if affected number of people is less than 200 with minor impacts, then an abbreviated RAP should be prepared. Minor impact means no loss of part or all houses, and the loss of productive asset is less than 10%, then an abbreviated RAP.
⑥SA: If a subproject is to have significant social impacts, including impacts on the income of local farmers, then a social assessment with a report is required.

⑦EMDP: If EM or attached EM which meets the definition of IP by WB are present in project area, then SA is needed by the PMO, assessment ought to be done to assess both positive and negative impacts on those EM, and make EMDP according to the research.

Besides, during the preparation of sub-project, social gender needs to be taken into consideration. By widely and equally attending and negotiating with local project institution, push the process of social fairness and gender equality. Specific attention should be paid to the participation of weak link (especially women), during the designing and monitoring stage of contaminated land, all staff should be sensitive about the social gender issue. Equally participation and be sensitive about social gender issue need to be show in the whole process, like training, consulting, compensating, healing and other activities.

4.4 Preparation of environmental and social assessment Outline

After project security screening, provincial PMO shall submit the complete security screening list for Hunan Integrated Management of Contaminated Agricultural Land to the WB, and submit the documents including environmental and social safeguard documents required by project.

By the confirmation of WB to category chart, provincial project institution (with the assistance of environmental and social consults) should make an outline about environment and social assessment on contaminated land solving project in Hunan Province. This environment and social assessment outline should point out some key tasks in this project, and make specific requirements on ESMF, ESIA, PMP and RAP.

If the project involves land expropriation and house demolition, OP/BP4.12 Involuntary Resettlement Policy will be launched. If more than 200 people are affected by the land expropriation and house demolition involved in the project, a complete resettlement action plan (RAP) should be made. If less than 200 people are affected by the land expropriation and house demolition involved by the project, and the impacts are small, an abbreviated RAP needs to be made. A small population of affected people refers to the people not losing part or all residence, but losing no more than 10% of productive assets. Once a complete RAP needs to be prepared, the provincial PMO will draw up an outline under the support of social experts with rich experience. The complete RAP should be based on accurate social survey results, and include the measures to mitigate the negative impacts caused by resettlement (compensation of land, buildings, and other assets, support in transition period, and assistance in restoring livelihood). To ensure that the resettlement measures won't be replaced before
project implementation or limit the use of resources and assets, the resettlement activities should be jointly implemented with project investment plan. See Chapter 7 for main task of RAP. Appendix 5 is the outline of a complete RAP.

The RAP prepared for the project, and SA outline will be reviewed and confirmed by the World Bank, and visited on site by social security experts of the World Bank, to better identify social risks, confirm and improve the outline.

**4.5 Review of the Environmental and Social Assessment Outline by World Bank**

The outline of environmental and social assessment for Hunan Integrated Management of Contaminated Agricultural Land will be reviewed and confirmed by the World Bank. Meanwhile, social security experts of World Bank need to visit the project area, to know the situation better, and verify whether the outline is properly prepared.

**4.6 Preparation of the environmental and social safeguard documents**

Once the screening and document requirements are agreed by World Bank, and confirmed by government, PMO will prepare the detailed safeguard documents.

During preparation and implementation of environmental and social impacts document, information disclosure and public consultation are important and essential. The information needing disclosure should include at least the sub-project design, impacts, and suggested mitigation measures. Before environmental and social impact documents are finally completed, it should be timely consulted and published in an understandable way and language, in the place available for key stakeholders, to ensure the affected people to have enough time to obtain draft of the document before consultation. Information can be disclosed in many ways, such as poster, manual, newspaper, internet, and community meeting. Before consultation, each PMO should release all safeguard documents in the public place easy for the affected people and other stakeholders to reach, so as to lay a foundation for meaningful consultation. Disclosure and consultation mechanism should be planned and specified in relevant safeguard documents. Disclosure and consultation mechanism should be planned and specified in relevant environmental and social document.

If the affected individuals and organization think that they are not properly treated under the Project, the complaint handling mechanism should be established to handle their reasonable claims. The mechanism established by each project management office (PMO) should include: (I) record and report system, including the written and oral complaint
approaches; (II) be in charge of the personnel assigned by each level of government; (III) time limit to handle the complaint. The mechanism will be specified in safeguard document of sub-project. During implementation of project, the running of complaint handling mechanism will be regularly monitored and assessed by PMO.

4.7 Review and approval of the safeguard documents by Government and World Bank

PMO shall ensure the environmental safeguard documents to be approved by local (or central) environmental protection department or other necessary government department to comply with Chinese laws and regulations.

As required by the framework, the safeguard documents needing preparation include EA document, resettlement framework, and EMDP. All the above-mentioned safeguard documents submitted to the World Bank should include both Chinese and English versions. Environmental impact assessment document includes ESMF, ESIA for the first batch of sub-projects (including Hengyang County, Yongxing County, and Yongding District of Zhangjiajie City), and EA Summary, and can be implemented after being approved by the World Bank. Social impact assessment document includes SA Report of the first batch of sub-projects (including Hengyang County, Yongxing County, and Yongding District of Zhangjiajie City), resettlement policy framework, and necessary EMDP, and all these documents can be implemented after being approved by World Bank.

The environment and social safeguard documents about rest sub-projects shall be reviewed by the mission of the World Bank.

4.8 Implement, supervision, and reporting

(1) Implement

Project implementation organ is established in project implementation area of each sub-project, and it is responsible to implement the project and the safeguard measures during project implementation. Project office will employ the qualified and experienced experts to provide support for environmental and social management of sub-project area.
Figure 4-2 Project Management Organization Framework Diagram

(2) Supervise

Provincial PMO is responsible to supervise the implementation of social and environment management plans and the project regularly, to ensure that the project fully complies with national and local environmental laws and regulations. Project team of World Bank will visit the project area regularly during project implementation, guide and help to prepare the safeguard tools, review the screening results, report and safeguard documents, and supervise the implementation of safeguard tools to ensure that they meet the requirements of World Bank policies.

Provincial PMO needs to set up the monitoring and evaluation mechanism, including internal and external monitoring, and supervision on implementation of environmental and social management plans. The provincial PMO implements the internal monitoring and needs to establish the internal supervising mechanism from top to bottom, invite consulting expert to semiannually check and guide the implementation progress and process of environmental and social management plans, make two progress reports annually, and report to World Bank. For external monitoring, PMO will entrust independent agency or consulting expert by open tender to perform the external monitoring and evaluation once or twice a year to the environmental and social activities on the whole project, till all objectives of the project plan are realized. Independent agency or individual may be academic or institutional unit, non-government organization (NGO), or independent consulting company, but each should have the qualified and experienced staffs, and their working outline is accepted by World Bank.
(3) Report

During project implementation, county PMO should provide quarterly progress report for the provincial PMO, which should provide World Bank with semi-annual progress report, including the implementation status of sub-project and sub-project EMP.

In progress report, provincial PMO shall report the project county with resettlement plan or EMDDP. When project is completed, the independent third-party consulting company will prepare and submit the final supervision and assessment report to PMO within the agreed time limit.

5. Project ESIA

5.1 Work objective

Learn about the project status through information collection, field investigation, field monitoring, and data analysis; identify pollution status of the project, select the project area and technical route, assess the positive environmental and social impacts brought by project implementation, identify, screen, predict and analyze the possible negative environmental and social impacts, propose the targeted and effective mitigation measures for the inevitable main negative environmental and social impacts, and draw up the sub-project ESIA report.

5.2 Working procedure

5.2.1 Determine the project area to be selected

Collect the monitoring data on soil situation in project area to be selected, irrigation water source and water quality data, and surrounding pollution source (including historical pollution source and current pollution source) data, collect and analyze the data. Determine the project area to be selected for this sub-project, according to the selection principles of project area in 4.2.

5.2.2 Compare alternative solutions

(1) Comparison and Selection of With and Without Project

Comparative analysis of with and without project has been conducted, mainly from the perspective of environmental profit and loss, and social economy. See table 5-1 for details.

<table>
<thead>
<tr>
<th>Category</th>
<th>Plan for implementation of the project</th>
<th>Plan without the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Advantages</td>
<td>● The project construction meets the Outline of the 13th Five-Year Plan for ● Maintain environmental status, without environmental</td>
<td></td>
</tr>
<tr>
<td>National Economic and Social Development of Hunan Province.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Lower contents of heavy metals in agricultural products to safeguard the health of farmers and consumers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Facilitate sales of agricultural products, and safeguard the vital interests of farmers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Significant to ensure the safety of national agricultural products, maintain social stability, improve ecological environment, and promote sustainable development of regional agricultural economy.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Main Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The dust from project construction, wastes after foundation excavation and backfilling, and silt from mountain pond dredging, have short-term bad impacts on environment, but such impacts can be avoided and mitigated with the corresponding measures for environmental protection. Besides, they have few and temporary impacts during construction period.</td>
</tr>
<tr>
<td>• Liming may cause changes in soil structure, physical and chemical properties, what's worse, improper liming may influence operator's health. But such impacts may be mitigated by determining the application amount of lime based on different texture and pH, selecting special agricultural lime, spreading lime by professionals or lime spreader and other measures.</td>
</tr>
<tr>
<td>• Farmers may not be used to the new farming skills in a short time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>impacts caused by project construction, liming, and other agricultural activities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• It harms people's health to eat the agricultural products with heavy metal exceeding standard for a long time, and it may cause diseases of skin, nervous system, kidney, and blood system.</td>
</tr>
<tr>
<td>• Bring serious challenges to grain production safety, and seriously threaten the agricultural sustainable development.</td>
</tr>
<tr>
<td>• It is hard to sell the grain polluted by heavy metals, thus affecting farmer's income.</td>
</tr>
<tr>
<td>• With too many labors are out working, the poor always farming in a traditional way and found themselves in a poor circle, and lack of experience on controlling the heavy metal contaminate d land.</td>
</tr>
</tbody>
</table>
Farmland in Hunan Province has been polluted by heavy metal in different degrees, soil environment quality and its safety performance have been decreased, directly threatening the quality safety of agricultural products, and harming health of the masses. Although the without project proposal has no environmental impacts caused by agricultural activities, such as small civil construction and liming, the agricultural products of Hunan Province are still and will continue to be polluted by heavy metals. The agricultural products eaten by common people still have heavy metals in excess of the standards, harming their health. Sales of the agricultural products polluted by heavy metal are still affected, influencing the immediate interests of farmers. Project construction scheme will bring certain environmental impacts, but such impacts can be avoided or mitigated by corresponding environmental protection measures. The impact on construction period is small and temporary, and implementation of the Project can improve food safety and people's living standard, and bring long-term social and environmental benefits. Therefore, project construction scheme is obviously better than zero scheme and project construction is quite necessary.

(2) Comparison of Project Areas

Compare the proposed project areas and determine the specific project implementation area through overall consideration of the area of the project area and that of centralized area, main farmland type, whether belong to main grain-producing area, heavy metal pollution type, whether pollution source is clear and controllable, attention of local government, and participation willingness of farmers.

See table 5-2 for comparison of project areas. Environmental and social experts from provincial PMO will participate in identification and selection of project counties, assess and work for them to reduce the environmental and social impacts.
<table>
<thead>
<tr>
<th>Main factors for comparison of project area</th>
<th>Name and analysis of project area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project area 1</td>
</tr>
<tr>
<td>Regional representation</td>
<td>The area of the selected project area, hectare</td>
</tr>
<tr>
<td></td>
<td>Concentrated continuous area, hectare</td>
</tr>
<tr>
<td></td>
<td>Main farmland type</td>
</tr>
<tr>
<td></td>
<td>Whether belong to major grain production area (Annual output of grains, ton)</td>
</tr>
<tr>
<td>Clear controllable pollution source</td>
<td>Whether the causes of heavy metal pollution are clear (including the surrounding industrial and mining enterprises, upstream tailing pond and other)</td>
</tr>
<tr>
<td></td>
<td>Whether the existing tailing pond is safe without leakage, if any</td>
</tr>
<tr>
<td></td>
<td>Whether main pollution source is controllable or causes new pollution to the downstream farmland</td>
</tr>
<tr>
<td></td>
<td>Quality of irrigation water (including upstream sediment)</td>
</tr>
<tr>
<td>Heavy metal pollution type</td>
<td>PH range</td>
</tr>
<tr>
<td></td>
<td>Content of main heavy metal pollution factor (Cd, As, Pb, Cd, Hg) (mg/kg)</td>
</tr>
<tr>
<td></td>
<td>Content of heavy metal in rice (mg/kg)</td>
</tr>
<tr>
<td>Recognition degree and participation willingness</td>
<td>Whether it’s included in the related local plan</td>
</tr>
<tr>
<td></td>
<td>Whether the local heavy metal pollution has been treated</td>
</tr>
<tr>
<td></td>
<td>Participation enthusiasm of farmer or agriculture specialized cooperative</td>
</tr>
<tr>
<td>Project investment</td>
<td>Total investment of all project areas (RMB 10,000)</td>
</tr>
</tbody>
</table>
5.2.3 Determine the assessment scope

After determining project area, choose the appropriate assessment scope according to situation of the project area, with the following principles:

(1) Include the area that may affect the project area into the assessment scope

- Identify the irrigation water source of project area, and the surrounding potential surface water, groundwater and air pollution sources, including the industrial and mining enterprises involving discharge of heavy metals in upstream of project area, tailings pond, remaining historical pollution source, and slag heap, etc., and determine the areas that may affect the Project, and include them into the assessment scope.
- Heavy metal pollution brought by agricultural productions, such as agricultural chemicals, chemical fertilizer, organic fertilizer, and agricultural wastes.
- The upstream tailings pond sharing the same surface water system with project area should be included into assessment scope.
- The mountain pond and reservoir as irrigation water source of project area, as well as the upstream reservoir, river, and sediment in mountain pond shall be included into the assessment scope.

(2) Include the area that may be affected by project activities into the assessment scope

Identify the project construction activity, agricultural activity (such as applying lime and organic fertilizer) and other project activity, and determine the positive or negative influence area that they may cause, and include such area into the assessment scope.

5.2.4 Project area investigation

Initially analyze the soil pollution status of farmland in project area through site survey, data collection and analysis, public consultation and information disclosure, etc.

(1) Site survey

In the assessment scope of project area, carry out the site survey, mainly including but not limited to the following contents:

- Survey the area of project, planting structure, planting pattern, and irrigation water source;
- Collect basic information of the families in the project area, and their planting structure, management model, family labors consistency, cost of planting, poverty degree, and women involvement, etc..
- Identify the environmental protection target, and investigate the sensitive targets around the project area that may be affected, such as residential area, school, hospital, and protection area of
(2) Data collection and analysis

- Collect the data in the assessment scope, such as hydrology, climate, topography and geomorphology, and soil type;
- Investigate the land use status in the assessment scope, and collect the current land use map;
- Collect the pollution status (applying status of the pesticide, chemical fertilizer and organic fertilizer, etc.) of agricultural non-point source in project area;
- Collect the existing soil monitoring data within assessment scope, including contents of pH, Cd, Pb, As, Hg, Cr, and organic matter in soil. (Such monitoring data are the general survey data on agricultural heavy metal pollution in the whole Hunan Province in 2012, and the monitoring density is one sample per 350mu);
- Collect pollution data of Cd, As, Pb, Cr, and Hg in agricultural products;
- Collect the monitoring data of surface water within assessment scope, including the irrigation water source in project area and the water pH, \( \text{COD}_{\text{Cr}} \), \( \text{NH}_3\text{-N} \), TP, Cd, Pb, As, Hg, Cr\(^{6+}\) contents in the surface water that may be affected by project;
- If the project area is irrigated by groundwater, the monitoring data of groundwater need to be collected, including pH, \( \text{COD}_{\text{Mn}} \), \( \text{NH}_3\text{-N} \), TP, Cd, Pb, As, Hg, Cr\(^{6+}\);
- Collect the monitoring data of sediment in irrigation water, including sediment pH, and Cd, Pb, As, Hg, Cr contents;
- Analyze the collected data.

5.2.5 Additional monitoring

If the collected data can't meet requirements, the field additional monitoring should be performed, and the field monitoring plan should be made, including the monitoring factor, point distribution method, sampling quantity, sampling and analysis method.

(1) Soil monitoring

Monitoring factors: pH, organic matter, cation exchange capacity (CEC), Cd, Pb, As, Hg, Cr, and available Cd.

Point distribution and sampling method: point distribution for soil monitoring follows the data requirements of one point per 50-100mu for mountain area and one point per 100-200mu for
with good natural state of soil, flat ground, relatively stable factors, and 2m in total area inside grid in "X" shape, as the sampling plot of monitoring points, to become a soil sample. Soil sample is collected by 5-drill auger boring from the plough layer soil of each field (generally 15cm), mix the samples, and then mix with the soil sample of the whole blending sampling area, reduce to around 2.0kg by quartering, continue to mix, put it into sample (cloth) bag by 2 samples, fill in 2 sample labels, seal with ziplock bag, and put in inner and outer bags, to prevent labels from being damaged and fuzzy. Ensure to remove the surface dust and sundries when sampling, and clean the sampling tool before collecting the next soil sample, to avoid the cross contamination between samples.

Analysis method: analyze Pb and Cd according to GB/T 17141-1997, analyze Hg and As according to GB/T 22105-2008, analyze Cr according to GB/T 17137-1997, analyze the CEC according to NY/T 295-1995 and NY/T 1121.5-2006, analyze the available Cd according to GB/T23739-2009, analyze organic matters according to NY/T1121.6-2006, detect pH according to NY/T 1377-2007.

(2) Agricultural product monitoring

Monitoring factors: Cd, Pb, As, Hg and Cr.

Point distribution and sampling method: sample during harvest of crops. Sampling point for agricultural product monitoring shall try to correspond to that for monitoring of heavy metals in soil. Rice is sampled during its harvest season. Double-cropping rice is sampled twice, and middle-season rice or single cropping late rice is sampled once. For planting area of substitute, sample the substitute during its harvest season, and the sampling times are consistent with the cropping seasons. For food crop, collect the mixed sample in edible part; for non-food crop, collect the mixed sample in available part. For rice sampling, distribute 5 points of division in diagonal line, and sample 0.25 kg of rice in each point, to compose 1.25 kg of sample. Other agricultural product will be sampled according to specific situation, by referring to sampling or relevant technical specification for rice sampling.

Analysis method: analyze Cd according to National Food Safety Standards--Determination of Cadmium in Foods (GB 5009.15-2014); analyze Pb according to National Food Safety Standard--Determination of Lead in Foods (GB 5009.12-2010); analyze Hg according to National Food Safety Standard--Determination of Total Mercury and Organic Mercury in Foods (GB 5009.17-2014); analyze Cr according to National Food Safety Standard--Determination of
conservation and environmental protection. Generally the monitoring data can be cited. If it is unable to collect the irrigation water source in project area and the water quality monitoring data of surface water that may be affected by the project, be sure to perform field monitoring.

Refer to Standards for Irrigation Water Quality (GB5084-2005) to select the characteristic factors related to the project as monitoring factors of the project: pH, COD$_{cr}$, NH$_3$-N, TP, Cd, Pb, As, Hg, and Cr$^{6+}$.

Point distribution and sampling method: as required by Agricultural Standard of the People's Republic of China—Procedural Regulations Regarding the Environment Quality Monitoring of Water for Agricultural Use (NY/T396-2000), set up monitoring of farmland irrigation water source by grade on cross section of river near main water inlet of farmland irrigation in project area, at main water inlet of trunk canal/branch canal irrigation, and each pond weir. Distribute more points at outlet of irrigation water of "suspected key polluted water source" and in irrigation ditch at input of suspected new pollution. In any instance, points shall be set in blending part of water body to ensure samples to be representative. If water is collected at intakes of river, lake, and pond, water shall be directly sampled at around 50m under the intake water gate; if no water is collected at intake, sample at 10cm under water surface at the intake, with a sampler attached to a rope. Cross section of river shall avoid the stagnant water area and try to be selected in the place with straight stretch of river, stable riverbed, steady water flow, without rapids. For ditch, sample water at its center. The sampling personnel shall stand at the downstream of sampling point, and avoid vigorous agitation of deposits under water to prevent distortion of water sample. Before collecting water sample with sampler, wash the sampler, sampling bottle and plug with the water sample for 3 times. Remove the drifters (such as leaf, plastic film, and branch) on water surface mixed in the collected water sample. Send the water sample timely within 24h after it is collected, of which, samples for determining COD$_{cr}$, ammonia nitrogen, and TP are put in glass bottle, while samples for determining pH, Cd, Pb, As, Hg, and Cr$^{6+}$ are put in plastic bottle. After collecting water sample, fill in sample label, and stick it to upper part of sample bottle. At the determined sampling point and bank, select or set up special sample marker for identification, and make use of GPS to ensure that each water sample is collected from the same position.

Analysis method: detect pH according to GB 6920-1986, detect COD$_{cr}$ according to GB 11914-1989, detect NH$_3$-N according to HJ 535-2009, detect TP according to GB 11893-89, analyze
source, but considering the special case, be sure to perform field monitoring to the groundwater.

    Monitoring factors: pH, CODMn, NH3-N, TP, Cd, Pb, As, Hg and Cr6+.

    Point distribution and sampling method: set up a monitoring point at outlet of intake well of groundwater in project area, drain water for several minutes before sampling water to remove the impurities and old water accumulated in pipeline.

    Analysis method: refer to Technical Specifications for Environmental Monitoring of Groundwater (HJ/T 164-2004) for sampling. Detect pH according to GB/T 5750.4-2006, detect CODMn according to GB 11892-1989, detect NH3-N according to GB/T 5750.5-2006, analyze TP according to GB 11893-1989, and analyze Cd, Pb, As, Hg and Cr6+ according to GB/T 5750.6-2006.

(5) Monitoring of air pollution source

    If industrial and mining enterprises are involved in emission of heavy metal exhaust pollutants in the assessment scope, and the emission data of the heavy metal pollution factors in such exhaust can't be collected, make sure to supplement the field monitoring of the heavy metal pollution factors in the exhaust.

    Monitoring factors: TSP in ambient air, Cd, Pb, As, Hg, Cr, and flue gas contents in stationary pollution source.

    Point distribution and sampling method: refer to national standard, the Determination of Particulates and Sampling Methods of Gaseous Pollutants Emitted from Exhaust Gas of Stationary Source (GB/T 16157-1996).

    Analysis method: Analyze TSP in ambient air according to GB/T 15432-1995, analyze Cd in stationary pollution source according to HJ/T 64.1-2001 or HJ/T 64.2-2001, analyze As, Cr, Hg according to Air and Exhaust Monitoring and Analysis Method, analyze Pb according to HJ 538-2009, and detect flue gas content according to GB 16157-1996.

(6) Monitoring of sediment

    Monitoring factors: pH, Cd, Pb, As, Hg, Cr and available Cd.

    Point distribution and sampling method: sample sediment at intake and ditch of river, lake and pond, within 5m around water sample point and within 5~10cm in depth. Collect the sediment under the water sample point with sampling grab, plastic spoon, shovel and other sampling tools or by hand, remove the sundries, such as obvious branches and stones, put the drained sample into double-layer plastic bag. If a sample is not enough, collect some more samples around it, and mix them, 1.0 kg in...
Investigate the heavy metal pollution sources within assessment scope of project area, when discharge of their waste gas and water, and stacking of solid waste affect the project area, ensure to perform the due diligence, which mainly includes:

(1) Companies with ongoing production

1) Producing and discharging of pollutants in waste water, waste gas, and solid waste

Learn about production process and facility, and main type of discharged pollutants. Investigate discharge of wastewater, and discharge and treatment of heavy metals and other pollutants in the waste water; emission of waste gas, discharge and treatment of heavy metals, dust, and other pollutants in waste gas; producing, treatment, and stockpiling of solid wastes, producing and treatment of dangerous solid wastes.

2) Construction of disposal facilities of waste water, waste gas, and solid waste and operation status

Investigate the pollution control facilities for pollution source, including construction and operation of sewage treatment facility; waste water's compliance with standard; construction and operation of waste gas treatment facility; waste gas's compliance with standard; construction and management of warehouse of solid waste; construction and operation of solid waste treatment facility.

3) Setting of environmental management organization

Specifically include the composition and main responsibility of environmental management organization.

4) Environmental management system

Specifically include the establishment and implementation of environment management system certification, cleaner production audit, report and register of pollution discharge, environmental risk management, and other system.

(2) Closed-down or relocated companies

Collect conditions on disposing production utilities and buildings after closedown and relocation of companies in the project area and its surrounding areas, dig into disposal condition of industrial wastewater and solid wastes, investigate disposal condition of pollutant soil after closedown and relocation of companies, acceptance check on environmental protection in
(3) Refuse landfill

Make a survey on scale, storage capacity and current storage capacity of refuse landfill around the project area, durable years for remaining storage capacity, management measures and whether its designing, operation, management and maintenance and so on conform to Standard for Pollution Control on the Landfill Site of Municipal Solid Waste (GB 16889-2008). Carry out key investigations on disposal of landfill leachate, collection and use of landfill gases and seepage-proofing effects of refuse landfill.

5.2.7 Farmland soil assessment

Farmland heavy metal pollution risk early warning system can identify the rice condition in excess of the standard as the farmland pollution main risk pre-warning evaluation index, and then the exclusive method shall be adopted to conduct the respective soil pollution risk evaluation, farmland pollution source risk evaluation and farmland management risk evaluation for the purpose of the risk evaluation and pre-warning so as to put forward the pertinent risk management measures. Farmland heavy metal pollution risk early-warning flow block diagram, as follows:
Take the monitoring results of rice pollution status as the basis for risk warning, take the mean value and standard error of heavy metals (Cd, As, Pb, Hg, Cr) content in rice in the area as the assessment target, and take the national food quality standard as the warning standard.

1. Heavy metal pollution index of rice (Ei)

\[
E_i = \frac{A_i}{S_i'}
\]

In the formula:

- \(E_i\) —— synergic monitoring on single factor index of heavy metal i in agricultural products
- \(A_i\) —— synergic monitoring on measured concentration of heavy metal i in agricultural products;
- \(S_i'\) —— Limited standard value of heavy metal i in agricultural products;

2. Mean value for heavy metal pollution index of rice  \(\overline{E_i}\)

In the formula:

- \(\overline{E_i}\) —— Mean value of heavy metal pollution indexes in rice
- \(E_{i1}, E_{i2}, E_{in}\) —— Heavy metal pollution index of rice in 1, 2 to n sampling units in the monitoring region

3. Standard deviation (Sd) and standard error (Se) of heavy metal pollution index of rice

\[
S_d = \sqrt{\frac{(E_{i1} - \overline{E_i})^2 + (E_{i2} - \overline{E_i})^2 + \ldots + (E_{in} - \overline{E_i})^2}{n}}
\]

\[
Se = \frac{S_d}{\sqrt{n}}
\]

In the formula,

- \(S_d\) —— standard deviation of heavy metal pollution index in rice in different sampling units in the monitoring region
- \(Se\) —— standard error of heavy metal pollution index in rice in different sampling units in the monitoring region

(3) Cd pollution risk in rice is graded by Cd content in rice or pollution index, and takes 2 times of the difference between the mean value and the standard error of each monitoring unit in its area as the judgement value. Specific risk warning is graded as follows:

<table>
<thead>
<tr>
<th>Risk</th>
<th>(E_i + 2Se)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 5-3 Risk Warning System of Cd Pollution in Rice Field**
Low risk II

1.0~1.5 Realize safety production of rice, and strengthen targeted risk management of farmland pollution through further investigation of main control factors of rice pollution risk.

Medium risk III

1.5~2.0 Realize safety production of rice, and strengthen targeted risk management of farmland pollution through further investigation of main control factors of rice pollution risk.

High risk IV

2.0~2.5 Realize safe utilization of agriculture, adjust agricultural planting structure through farmland reform, meanwhile strengthen targeted restoration of polluted farmland

Extremely high risk V

>2.5 Realize safe utilization of agriculture, and strengthen restoration of polluted farmland by phytoextraction, and other means.

- **Farmland's endogenous (soil) pollution risk warning**

  The warning system will firstly assess the soil risk on the premise of knowing that there is risk of rice exceeding standard in farmland of the area. Assess the risk of Cd pollution in soil with modeling method and empirical method. Obtaining the farmland soil nature and Cd content, and Cd content in rice, and other information resources from system, build the model:

  \[
  \log (BCF) = B - C \log(Sa-Cd) - F \log(OM) - DpH
  \]

  In the formula:

  BCF—Rice grain bio-concentration factor (Cd in grain/Cd in soil)
  Sa-Cd—Content of available Cd in soil (mg/kg)
  OM—Organic matter in soil (g/kg)
  pH—Acid-base property of soil
  B, C, F, D—Constant

  Empirical method is an assessment method of empirical parameters without sufficient information resources of regional soil and crops, and it takes Cd content in soil and pH as assessment indexes, and may cause the all Cd content and pH in soil with rice exceeding standard to correspond to table 5-4:

  \[
  \begin{array}{|c|c|c|c|c|}
  \hline
  \text{Level of risk} & \text{Cd content in soil (mg/kg)} \\
  \hline
  \text{Low risk II} & 1.0~1.5 & \\
  \hline
  \text{Medium risk III} & 1.5~2.0 & \\
  \hline
  \text{High risk IV} & 2.0~2.5 & \\
  \hline
  \text{Extremely high risk V} & >2.5 & \\
  \hline
  \end{array}
  \]

  Table 5-4 Threshold of Cd Content in the Soil of Rice Field with Pollution Risk under Different Soil pH
2. Ranking of other heavy metal pollution risks

Other heavy metals are tentatively ranked in accordance with times of ultra standard of the state standard on soil quality. Refer to the following table for specific ranking.

Risk index of other heavy metal pollution (Pi)

\[
P_i = \frac{C_i}{S_i}
\]

(5)

In the formula:

- \(P_i\) — Single factor pollution index
- \(C_i\) — measured concentration of some pollutant (mg/kg)
- \(S_i\) — second-level standard value for quality of soil environment of some pollutant (mg/kg)
- \(i\) — it represents a pollutant (or some heavy metal pollutant)

Table 5-5 Times of ultra standard of the standard on soil quality

<table>
<thead>
<tr>
<th>Level of risk</th>
<th>times of ultra standard of the standard on soil quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>No risk I</td>
<td>&lt;1.0</td>
</tr>
<tr>
<td>Low risk II</td>
<td>1.0~1.5</td>
</tr>
<tr>
<td>Medium risk III</td>
<td>1.5~2.0</td>
</tr>
<tr>
<td>High risk IV</td>
<td>2.0~2.5</td>
</tr>
<tr>
<td>Extremely high risk V</td>
<td>&gt;2.5</td>
</tr>
</tbody>
</table>

With pollution risk in rice, if Cd content in soil is lower than the threshold in table 5-3, there is no Cd pollution risk of soil in this area, but there may be non-soil pollution risk, including farmland production management risk and farmland pollution source risk, which should be further assessed.

If the soil exceeds the threshold in table 5-5, it means there is endogenous soil pollution risk in farmland of this area, measures, such as regulating, repairing or changing the non-food crops need to be taken according to soil pollution degree, to ensure the quality safety of rice.

- **Farmland's external (environment) pollution risk warning**

Farmland pollution source risk assessment includes Cd content in irrigation water, deposition (dry and wet) of Cd in rice, and Cd input in other farmland inputs (including rice straw, organic fertilizer and chemical fertilizer).
considered the pollution source and its controllability in Hunan, and its influence on pollution risk of farmland soil and rice. See table 5-6 for specific risk indexes.

**Table 5-6 Cd Content in Rice Field from Different Pollution Sources, and Its Input Threshold**

<table>
<thead>
<tr>
<th>Level of risk</th>
<th>Cd content (mg/kg) or Cd input (mg/mu)</th>
<th>Total input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Irrigation water</td>
<td>Dry and wet deposition</td>
</tr>
<tr>
<td>No risk I</td>
<td>0.001/600</td>
<td>300</td>
</tr>
<tr>
<td>Low risk II</td>
<td>0.002/1200</td>
<td>500</td>
</tr>
<tr>
<td>Medium risk III</td>
<td>0.003/1800</td>
<td>700</td>
</tr>
<tr>
<td>High risk IV</td>
<td>0.005/3000</td>
<td>1000</td>
</tr>
<tr>
<td>Extremely high risk V</td>
<td>0.005/3000</td>
<td>1000</td>
</tr>
</tbody>
</table>

One-to-two-year-long monitoring and evaluation are carried out on status quo of pollution sources of other heavy metals, their impacts on soil and rice in the cropland and their balance characteristics in project areas based in Hunan after project implementation for the purpose of further segmenting their classifying indexes.

If the Cadmium content estimated value is within the value in the abovementioned figure, the interpolation method shall be adopted for calculating the input quantity.

If extraneous heavy metal input exceeds the threshold in table 5-4, it will bring severe risk to farmland pollution; targeted measures need to be taken for risk management:

- **Irrigation water**: trace the pollution source of irrigation water, and perform corresponding technical or management measures, such as control of industrial discharge, separation of polluted water, and purification of irrigation water source.

- **Atmospheric deposition**: trace the industrial discharge that influences atmospheric deposition, control and purify the discharged industrial waste gas from its source.

- **Agricultural inputs**: strictly control the utilization of agricultural inputs, such as chemical fertilizer, organic fertilizer, and straw. Generally dealing with the straw with rice exceeding standard is required to adopt low-stake harvesting, and removal for use; try to control the application of organic fertilizer in rice. Chemical fertilizer needs to be inspected and controlled within the threshold.
Test criteria for variety BCF is suggested as the rice grain BCF in field, obtained with soil pH of 4.5–5.5, loam soil, organic matter of 30–40g/kg, all Cd content in soil of 0.4–0.5mg/kg, clean water source (Cd content in irrigation water is less than 1 ug/L) for normal irrigation management (shallow water management at rice transplanting-regreening stage, and after grain filling, deep water management at top tillering, booting-grain filling, and field drying both after tillering and at maturation period).

See table 5-7 for assessment criteria of rice variety BCF. The rice variety with low risk is recommended to replace the one with medium risk and above in the polluted rice field.

<table>
<thead>
<tr>
<th>Rice variety BCF</th>
<th>&lt;0.4</th>
<th>0.4~0.8</th>
<th>0.8~1.2</th>
<th>1.2~1.6</th>
<th>&gt;1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk classification</td>
<td>No risk I</td>
<td>Low risk II</td>
<td>Medium risk III</td>
<td>High risk IV</td>
<td>Extremely high risk V</td>
</tr>
</tbody>
</table>

One-to-two-year monitoring and analysis are carried out on BCF of main popularized varieties in varying paddy seasons under typical pollution level of relevant heavy metals of other heavy metals in Hunan-based project areas after project implementation for the purpose of further segmenting their classifying indexes.

With low risk of farmland's external pollution, if rice BCF exceeds the standard measured value during actual production, there is risk of agronomic production measures. Main risk in agronomic production includes unreasonable water management measure and soil tillage practices etc.

Water management measure: practice has proven that alternate wetting and drying water management measure is good for promoting the activation and release of heavy metal ion. If rice accumulation risk is determined in water irrigation during farmland pollution risk management, long-term flooded irrigation management is required for the polluted rice field, flooded control should be ensured for at least 3 weeks before and after the critical period (booting-grain filling) of heavy metal absorption and accumulation to lower the activity of Cd in soil, and reduce rice absorption and accumulation.

Soil tillage practices: no-tillage, rotary tillage, and other measures are taken for rice field, to concentrate rice roots on the surface layer with centralized distribution of Cd in the rice field, and promote rice's absorption and accumulation of Cd. Therefore, if soil tillage practice is found with risk on rice accumulation during farmland pollution risk management, deep ploughing may be adopted to improve the root environment and the regulation of Cd.
(1) Investigation on Heavy Metal Pollution in Farmland

1) Investigation and evaluation of the current situation of farmland environment quality

Conduct an integrated encryption survey and evaluation for the current status of farmland contamination such as soil heavy metal pollution (including related soil properties), heavy metal pollution of agricultural products, heavy metal pollution sources in the project area in the first year of project implementation, and realize the data dynamic renewal and the risk early warning, and according to the needs of encrypted monitoring data, make adjustment of technical program of the project area in real time. In the process of monitoring, focus on the environmental quality of farmland, which is compound contaminated by Cd and As.

<table>
<thead>
<tr>
<th>No.</th>
<th>Investigation and evaluation</th>
<th>Investigation indicator</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Investigation and evaluation of current situation of heavy metal pollution in soil</td>
<td>PH, heavy metal content, organic matter content, texture, etc.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Investigation and evaluation of current situation of heavy metal pollution in agricultural products</td>
<td>Rice variety, heavy metal content, etc.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Investigation and evaluation of farmland heavy metal pollution source</td>
<td>Irrigation water, sediment, agricultural inputs, atmospheric deposition, etc.</td>
<td></td>
</tr>
</tbody>
</table>

2) Investigation and evaluation of farmland heavy metal pollution balance

During the project implementation, select the sensitive concerns showing that the project’s environment affects the prediction results as the monitoring points to conduct farmland heavy metal pollution input and output investigation, and monitor the heavy metal content/flux in the irrigation water input the farmland, atmospheric deposition, agricultural inputs, and harvest of crop output in the farmland, and runoff drainage, etc., and evaluate key impact sources of heavy metals in farmland and the equilibrium trend under different regional environmental conditions, soil pollution degree and management measures, and provide basic support for early warning of farmland heavy metal pollution and environmental protection management.

(2) Management and Control Measures for Pollution Source

Establish and improve the management and control mechanism of pollution control and pollution interception of the pollution source, carry out threshold control for the irrigation water, atmospheric deposition, agricultural inputs and straw in the project area. Related threshold values are made following Early Warning System on Pollution Risks in Croplands in Hunan formulated for
IV~V pollution source risk (specific management and control measures are shown in Table 5-9)

<table>
<thead>
<tr>
<th>No.</th>
<th>Risk source type</th>
<th>Management and control measures</th>
</tr>
</thead>
</table>
| 1   | Irrigation water                 | 1) Targeted source control: Emissions control of enterprises involved in heavy metals, sewage diversion, water treatment;  
2) Purification of irrigation field: Ecological purification pond, ecological ditch, sediment cleaning;  
3) Entry interception: Purifying device of irrigation water. |
| 2   | Atmospheric deposition           | 1) Atmospheric emissions of enterprises involved in heavy metals: Carry out publicity for the atmospheric emissions of the surrounding enterprises involved in heavy metals and provide technical help for emission control, and consult with the competent authority for carrying out emission control management;  
2) Farmland pollutant balance regulation and control: For the low-risk dry and wet deposition that cannot conduct enterprises emission management and control, take the straw removal, combined with planting enrichment plants in fallow winter season for farmland balance management and control. |
| 3   | Agricultural inputs (including straw) | Strictly implement the relevant threshold standards in “Early Warning System of Farmland contamination Fisk”, and control Cd content and content of other heavy metals of all agricultural inputs in the project area. |

(3) Agronomic Management Measures

1) High cumulative rice variety control

“Hunan Heavy Metal Polluted Cultivated Land Restoration and Farm Crops Plantation Structure Adjustment Pilot Project” requires the screening of the cadmium low accumulation rice varieties, so there appear 39 emergency low cadmium accumulation rice varieties strongly recommended by Hunan Province (refer to Figure 5-9). On that basis, the rice safety adequate production technical research is conducted in the project area and the rice varieties in the project area are rationally screened to determine the Cadmium accumulation index as the mainly recommended rice varieties in the area. When the rice variety BCF index is higher than VI level risk, its variety Cadmium accumulation risk is much higher and it shall be controlled from entering into the project area.

Carry out BCF identification test of the main varieties, i.e. select 9 typical plots for the main varieties of each region, carry out targeted measurement of the soil properties (organic matter, CEC,
<table>
<thead>
<tr>
<th>Variety type</th>
<th>Variety Name</th>
<th>Breeding unit (First Completed Unit)</th>
<th>Validation No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early season</td>
<td>Hybrid rice</td>
<td>Zhuliangyou 729</td>
<td>XSD 2011002</td>
</tr>
<tr>
<td>Early season</td>
<td>Hybrid rice</td>
<td>Zhuliangyou 706</td>
<td>XSD 2006006</td>
</tr>
<tr>
<td>Early season</td>
<td>Hybrid rice</td>
<td>Liangyouzao 17</td>
<td>XSD 2014001</td>
</tr>
<tr>
<td>Early season</td>
<td>Hybrid rice</td>
<td>Zhuliangyou 211</td>
<td>XSD 2007016</td>
</tr>
<tr>
<td>Early season</td>
<td>Hybrid rice</td>
<td>Zhuliangyou 15</td>
<td>XSD 2007015</td>
</tr>
<tr>
<td>Early season</td>
<td>Hybrid rice</td>
<td>Tanliangyou 215</td>
<td>XSD 2012001</td>
</tr>
<tr>
<td>Early season</td>
<td>Conventional rice</td>
<td>Xiangzaoxian 42</td>
<td>XSD 2006001</td>
</tr>
<tr>
<td>Mid-season</td>
<td>Hybrid rice</td>
<td>Shenyou 9595</td>
<td>XSD 2014008</td>
</tr>
<tr>
<td>Mid-season</td>
<td>Hybrid rice</td>
<td>C Liangyou 386</td>
<td>XSD 2014009</td>
</tr>
<tr>
<td>Mid-season</td>
<td>Hybrid rice</td>
<td>Y Liangyou 19</td>
<td>XSD 2008033</td>
</tr>
<tr>
<td>Mid-season</td>
<td>Hybrid rice</td>
<td>C Liangyou 651</td>
<td>XSD 2012009</td>
</tr>
<tr>
<td>Mid-season</td>
<td>Hybrid rice</td>
<td>C Liangyou 755</td>
<td>XSD 2009026</td>
</tr>
<tr>
<td>Mid-season</td>
<td>Hybrid rice</td>
<td>Shenliangyou 5814</td>
<td>GSD 2009016</td>
</tr>
<tr>
<td>Mid-season</td>
<td>Hybrid rice</td>
<td>Jingliangyou Huazhan</td>
<td>XSD 2015022</td>
</tr>
<tr>
<td>Season</td>
<td>Type</td>
<td>Name</td>
<td>Institute</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Mid-season rice</td>
<td>Hybrid rice</td>
<td>Jianliangyou Huazhan</td>
<td>Hunan Jinjian Seed Industry Science &amp; Technology Co., Ltd.</td>
</tr>
<tr>
<td>Mid-season rice</td>
<td>Hybrid rice</td>
<td>Luyou 9803</td>
<td>Sichuan Province Rice and Sorghum Institute</td>
</tr>
<tr>
<td>Mid-season rice</td>
<td>Hybrid rice</td>
<td>C Liangyou 87</td>
<td>Hunan Agricultural University</td>
</tr>
<tr>
<td>Late Season Rice</td>
<td>Hybrid rice</td>
<td>C Liangyou 7</td>
<td>Hunan Agricultural University</td>
</tr>
<tr>
<td>Late Season Rice</td>
<td>Hybrid rice</td>
<td>Fengyuanyou272</td>
<td>Hunan Yahua Seed Industry Hi-tech Research Institute</td>
</tr>
<tr>
<td>Late Season Rice</td>
<td>Hybrid rice</td>
<td>Zhongyou 9918</td>
<td>Changsha City Agricultural Scientific Research Institute</td>
</tr>
<tr>
<td>Late Season Rice</td>
<td>Hybrid rice</td>
<td>Jinyou 284</td>
<td>Hunan Yahua Seed Industry Hi-tech Research Institute</td>
</tr>
<tr>
<td>Late Season Rice</td>
<td>Hybrid rice</td>
<td>Xiangfeiyou 8118</td>
<td>Hunan Branch Yulong Seed Industry Co., Ltd.</td>
</tr>
<tr>
<td>Late Season Rice</td>
<td>Hybrid rice</td>
<td>Liangyou 336</td>
<td>Hunan Jinjian Seed Industry Science &amp; Technology Co., Ltd.</td>
</tr>
<tr>
<td>Late Season Rice</td>
<td>Hybrid rice</td>
<td>C Liangyou 266</td>
<td>Hunan Provincial Nuclear Agricultural Science and Space Mutation Breeding Research Institute</td>
</tr>
</tbody>
</table>

2) Optimize water management measures of the field

By optimizing the field water management, reduce the soil heavy metal activity. It is required by water management technology of farmland contamination risk management, in the premise of ensuring the sufficient irrigation water without risk and sufficient water, to ensure the flooding irrigation of the whole growth period of rice, dehydration after the rice dough stage, in order to facilitate rice harvest by harvester. At least in the critical period (filling period) of absorption and accumulation of heavy metals, it is required to ensure no dehydration of the farmland which should be in flooding state.

3) Soil acidification conditioning

For the farmland with soil pH<6.5, use lime to regulate the soil pH, adjust the soil pH value to
be used in slack season. Use surface broadcast application, and conduct soil tillage to make lime and soil mix evenly.

Application amount: Scientifically select lime application amount generally according to the soil pH and texture, and the specific application amount in the first year is shown in the table below, and the application amount in the second year can be adjusted according to the change of soil pH, generally the amount should be reduced to half in the second year, and it should stop using in the third year, and the application amount in the fourth year is the same as the second year, and the rest can be done in the same manner.

Table 5-11 Lime application amount (unit: Kg/ha)

<table>
<thead>
<tr>
<th>Soil texture/pH value</th>
<th>&lt;4.5</th>
<th>4.5-5.5</th>
<th>5.5-6.5</th>
<th>&gt;6.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand soil</td>
<td>3,150</td>
<td>2,250</td>
<td>1,800</td>
<td>Not applied</td>
</tr>
<tr>
<td>Loam</td>
<td>3,600</td>
<td>2,700</td>
<td>2,250</td>
<td>Not applied</td>
</tr>
<tr>
<td>Clay</td>
<td>4,500</td>
<td>3,600</td>
<td>3,375</td>
<td>Not applied</td>
</tr>
</tbody>
</table>

Alternative fertilization methods on soil acidification conditioning

Alternative fertilization methods used to adjust soil acidification can be used for areas with zero or low risks for rice, PH in soil less than 6.5 and long-term application of acidic fertilizer with low and medium risks. Neutral and alkaline compound fertilizer can be applied with dosage being 600-800 kg per hectare. Potential risks in rice and soil can be controlled.

4) The application of organic fertilizer

Organic fertilizer can form complex compound with soil heavy metal elements which will affect the mobility of soil heavy metals and plant availability, and change the absorption of heavy metals by plants. As for the farmland with soil organic matter ≤30g/kg, apply the commercial organic fertilizer for 7,500kg/hectares; as for the farmland with soil organic matter between 30~45g/kg, apply the commercial organic fertilizer for 3,000kg/hectares in one-time application as basal fertilizer; as for farmland with soil organic matter >45g/kg, organic fertilizer may not applied.

According to the current situation of regional high heavy metal background values and the requirements of improving humification rate of the organic fertilizer, strictly control the content of heavy metals in organic fertilizer; thereinto, the Cd content should be controlled under 1mg/kg, easily oxidized organic carbon content (see Appendix for measurement method) should not take
It is suggested to use the soil passivant from “2015 New Products Show Test of Hunan Province” with better effect and of carbon silicon elements containing alkalinity (pH>11), and it is required that the Cd reduction effect is more than lime contrast, and rice yield reduction effect is less than 5%, and there is no secondary pollution, and the amount should be less than 300kg with cost less than 500 yuan/mu, which can effectively reduce the activity of heavy metals in soil. As for the soil of middle alkaline contaminated by Cd, or existence of As pollution, Cd - As pollution risk, it is required to consider the neutral (pH<9) soil passivant containing carbon, silicon, iron and the like, so as to achieve simultaneous passivation of Cd and As in soil.

6) Adjust the planting structure

For the areas with more serious pollution, according to the regional planting habit, industrial base and market demand, adjust the planting structure of crops (or fallow), and it may be considered to plant grain and oil, garden, grass crops and other kinds of crops.

Table 5-12 Adjustment of planting structure types and crops

<table>
<thead>
<tr>
<th>Types</th>
<th>Recommended crop</th>
<th>Suitable farmland type</th>
<th>Suitable season</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain and oil like crops</td>
<td>Corn</td>
<td>It can grow on sandy loam, loam, clay, and the suitable soil pH is 5 ~ 8.</td>
<td>Spring and summer sowing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sorghum</td>
<td>Adaptability is strong, and it has no strict requirements on the soil, and it can be planted on all kinds of soil, all types of landscape.</td>
<td>Spring and Autumn cropping</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil sunflower</td>
<td>Adaptability is strong, and it has no strict requirements on the soil, and it can be planted on all kinds of soil, topography.</td>
<td>Sowing in mid and late of June</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oilseed rape</td>
<td>Loose loamy soil with deep soil layer, good structure, rich organic matter, retaining fertilizer and moisture, and weak acid or neutral soil is better.</td>
<td>Open production-generally sowing in late December</td>
<td></td>
</tr>
<tr>
<td>Garden like crops</td>
<td>Mulberry</td>
<td>Drought-enduring, intolerant to waterlogging, poor soil tolerance, strong adaptability to the soil.</td>
<td>Cuttage can be conducted in spring, summer, autumn.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flowers and plants</td>
<td>Soft texture, strong fertilizer adsorption and water holding capacity, and good water and gas permeability.</td>
<td>Perennation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fruit tree</td>
<td>Perennation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turf</td>
<td>Strong soil adaptability, large pH adaptable range.</td>
<td>Spring and autumn sowing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guimu-1</td>
<td>Prefer warm and humid climate, no strict requirements on the soil, and the sand loam with deep soil layer and good water holding capacity.</td>
<td>It can be planted throughout the year in the South and can be</td>
<td></td>
</tr>
</tbody>
</table>
According to the types of pollution, farmland conditions and specific seasons in the project, choose sedum, ciliate desert-grass, scirpus tabernaemontani gruel (waterlogging tolerance), amaranthus hypochondriacus and other enriched or ultra enriched plants species, to a certain extent, remove heavy metals in soil.

Table 5-13 Characteristics table of accumulators or hyperaccumulators

<table>
<thead>
<tr>
<th>No.</th>
<th>Plant name</th>
<th>Biomass</th>
<th>Remediation element</th>
<th>Enrichment factor</th>
<th>Suitable condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sedum alfredii/sedum plumbizincicola</td>
<td>Dry matter yield 1,800kg/hm²; plant height 30-40cm</td>
<td>Cd</td>
<td>7.5</td>
<td>Born at the wet stone under the hill slopes below an altitude of 1,400 meters (in Sichuan up to 2,000-3,000 meters).</td>
</tr>
<tr>
<td>2</td>
<td>Amaranthus hypochondriacus</td>
<td>Large biomass, plant height of 2-3 meters</td>
<td>Cd</td>
<td>6-9</td>
<td>Prefer warmth, growing period of more than 4 months, but in temperate and cold temperate climate conditions it can also well grow. No strict requirements for the soil, the most suitable for semi-arid, semi-humid areas, it can also grow in acidic soil, heavy saline-alkali soil, barren sandy soil and clayey soil with poor ventilation. Strong drought resistance.</td>
</tr>
<tr>
<td>3</td>
<td>Scirpus tabernaemontani gruel</td>
<td>15.27g/ strain Large biomass, plant height of 1-2 meters</td>
<td>Cd</td>
<td>10.58</td>
<td>It is produced in many provinces of China; grow by the lakeside or in shallow pond. The best growth temperature is 15-30 °C, and growth will stop below 10 °C. With low temperature resistance, it can be exposed to winter in most parts of the north.</td>
</tr>
<tr>
<td>4</td>
<td>Ciliate desert-grass</td>
<td>Large biomass, plant height of 2 As</td>
<td>7-80</td>
<td>Often live on the ground and attached to the swallet under the forest by brookside and tree...</td>
<td></td>
</tr>
</tbody>
</table>
optimum growth temperature from March to September is 16 ~ 24 ℃, from September to March of the next year is 13 ~ 16 ℃. The temperature in the winter is not less than 8 ℃, but at a short time, it can bear the low temperature of 0 ℃. And it is also resistant to high temperature above 30 ℃. 

(5) Engineering Measures

1) Water source engineering

In order to ensure the implementation effect of optimization of water management in the project area, increase 4-5 times per mu quarterly for irrigation, due to the increasing demand for irrigation water. In order to solve or alleviate the contradiction of supply and demand of water in project area, take the engineering measures such as constructing reservoirs, electric pumping station, etc. for regulation on runoff.

- Reservoir

Reservoir location chooses the mountainside or foot whose terrain is slightly lower and which is easy for water catchment. Lay at slope toe or local depression of slope surface, and connect to the terminal of irrigation and drainage ditch. The reservoir capacity should be specifically determined according to the local conditions, based on the total runoff of the slope surface, water demand and the construction laborsaving, less occupation of cultivated land and convenience for application, and other principles. Reservoir is ground-type RC cast-in-place structure; pour 200mm thick C20 cast-in-place concrete on the 100mm thick crushed stone cushion on the bottom of reservoir, drainage slope of the reservoir bottom i=0.005, sloping to the inlet and outlet; reservoir base requires hard base course, and if it is the soft soil, it is required to thicken channel foundation or cushion, which should be determined according to the site situation in the construction.

- Electric pumping station

The electric pumping station constructed by the project is located at the place where the terrain is open, the bank slope is suitable and which is favorable for the project layout. Pumping room
guarantee water diversion and be conducive to flood, sand and pollution preventive. And according to the irrigation area and the required flow rate of the electric pumping station, according to the required elevation of field surface elevation, select the required pump model and supporting motor type.

2) Channel work

In order to ensure adequate and clean irrigation water in the project area, it is necessary to carry out dredging and transformation of the channels with excessive sediment; carry out irrigation and drainage separation for the area with both irrigation and drainage, so as to effectively prevent secondary pollution and meet the requirements of irrigation and drainage.

The layout of the project channel work requires that the cross section of the channel work use the rectangular C20 cast-in-place concrete channel. The basic practice is to lay down the pebble cushion after plain soil is rammed for the channel bottom, and then to cast in place the C20 concrete, and the two sides of the wall is the C20 concrete. The channel form, width and depth should be determined according to the irrigation area, water flow, ratio-grade and other factors.

3) Field road

Machinery has been used on the field in application of lime, removing crop straw from the field, changing to plant flower seedlings and other commercial crops; thus, it is required to improve some field roads according to the actual situation in the project area.

4) Ecological engineering

● Pre-reservoir

Pre-reservoir refers to the small size of water area set at water inlet of the rivers and lakes and reservoirs, and the water from the river is stored first in the small water area where a series of water purification measures are carried out, after silt coming with the water is deposited, then the water can be discharged into rivers, lakes and reservoirs. The pre-reservoir consists of 3 parts, namely, the subsidence zone, the strengthening purification system, and reuse system. Strengthening purification system is divided into shallow water ecological purification area, deep water strengthening purification area.

①Subsidence zone: make use of the existing ditches to make proper transformation, and cultivate reeds and other large aquatic plants, which can intercept the particulate matter and silt in the surface runoff.
Deep water strengthening purification area: Use algae with easy sedimentation, microbial floating bed and other efficient artificial purification technology to further carry out purification for water body.

③Reuse system: make use of the existing ditches to make proper transformation for reuse system. The surface runoff treated by pre-reservoir can be reused for farmland irrigation through the reuse system.

● Sedimentation tank

If the content of heavy metals in the irrigation water sediment in the project area exceeds the standard, it is required to construct a sedimentation tank and take other engineering measures to deposit sediment of the irrigation water to prevent it from entering the farmland. Detection and collection program of sediment of the sedimentation tank is the same with farmland monitoring program.

The main part of the sedimentation tank of the project is actually a widening and deepening open channel, consisting of inflow channel, sedimentation area, outflow channel and other parts, and the water flow rate into the sedimentation area suddenly decreases, and sediment-carrying capacity decreases, sediment can be deposited at the bottom of the sedimentation area so that water quality can be in line with irrigation requirements. The design size of sedimentation tank is 2×2×1.0 m, cast-in-place concrete structure, and the wall is 120mm thick C20 cast-in-place RC; the base slab is 120mm thick C20 cast-in-place RC. The elevation of the basin bottom is at least 300m away from the elevation of the channel bottom.

● Ecological interception ditch

In order to prevent some areas with both irrigation and drainage in the project area from causing secondary pollution, set reasonable interception ditch in the farmland drainage concentrated area in the project area to play the role of artificial wetlands, and carry out filtration for the water flowing from the farmland so as to effectively intercept the sediment with heavy metals exceeding the standard.

Ecological interception ditch in the project is transformed mainly on the basis of the original drainage ditches; mainly including the ditch bottom, wall reconstruction and interception dam construction. The wall of the ditch is made of honeycomb cement board, and holes are evenly distributed on the cement board. Generally, the cement board size is 60cm×50cm×5cm (length × width × thickness)
A trapezoid, where two drainage holes are set at the middle and bottom position, and according to the need, the water level of the interception dam can be divided into three states of exhausting, half full and overflow, and the height of the interception dam is about 70cm.

(6) Restoration measure for Lead, arsenic, chromium mercury polluted farmland and compound polluted farmland

- Soil lead pollution restoration and control method

The recommended low accumulation rice variety and the restoration technical measures for flooding irrigation and lime application to adjust pH values, etc., shall be suitable for the slight and light lead pollution cultivated land with the single pollution index $1 < P_i \leq 3$ to ensure the control effect. The recommended low accumulation rice variety and the restoration technical measures for flooding irrigation and application of lime, soil conditioner, foliage resistance control agent shall be suitable for the moderate lead polluted farmland with the pollution index $3 < P_i \leq 5$ to ensure that the lead content in the farm products complies with the standard. In view of the heavy lead pollution cultivated land with the pollution index $P_i > 5$, the plantation structure shall be properly adjusted: the farm crops plantation structure shall be adjusted (or shall be left fallow) to change for the silkworm, protein feed mulberry, nursery stock, flowers, water (sweet) melon, kenaf/jute, cotton, ramie or seeds, etc.

Flood irrigation: The flooding irrigation shall be conducted for the rice prior to the transplantation until its mature period in the area will abundant water source under the premise of guaranteeing that the irrigation water source can comply with the standard in the water cleanliness; in area short of water source, it is required to guarantee that the rice shall not be hydrated within 7 days prior to the period from the grouting until the harvesting to reduce the soil oxidization-reduction potential (Eh) and reduce the soil lead activity.

Lime application: Prior to the application of the base fertilizer, it is required to fully apply the quicklime to adjust the soil Ph values, but it is better to adopt the broadcast application. Say, it will produce the best effect to have the manual application arranged in the rice active tillering stage by adopting the artificial fertilization. In view of the rice field with soil pH value less than 5.0, lime shall be applied for 150kg/mu; in view of the field with PH at 5.0-6.0, lime shall be applied for 100kg/mu; in case of the pH value between 6.0 and 6.5, lime shall be applied for 50kg/mu.
for planting three varieties of flowers, say, milk vetch (red flower); oilseed rape (yellow flower) and Raphanus sativus vas. Raphanistroides (white flower).

Adjust the plantation model: Give the prominent recommendation to the spring corn and all areas shall select the various plantation models according to their respective production conditions and the market demands. Say, Oilseed rape+ summer corn, spring corn+ autumn corn, oilseed rape + sunflower, oilseed rape + sesame, spring corn + sweet potato, early-maturing spring corn+ autumn peanut and sorghum for wine making.

Other plant ecological restoration of highly enriched crops: Under the premise of the farmers’ willingness, the plantation of the high crops of high adsorption of heavy metal accumulation, say, sweet sorghum, Sedum alfredii Hance and other biological materials with the extremely large biomass liveweight and comparatively longer growth period in order to immediately remove the heavy metal contents within a short period of time and change the soil physical and chemical properties and restore the cultivated land.

- Soil arsenic pollution restoration and control method
  Promote arsenic low accumulation rice varieties;
  Apply the foliage resistance control agent: recommend the water-soluble Si-fertilizer as the major foliage resistance control agent to impede and control the transfer of soil arsenic to the rice.
  Additionally apply soil conditioner: additionally apply the soil conditioner (passivator and bioprepareate, etc.) in the slight and light pollution areas to reduce the soil arsenic activity. The commonly used passivators mainly include iron compound, iron/manganese oxide, lime, clay minerals, and industry by-products.
  Special attention: if the Arsenic polluted farmland is used for planting rice, it is not proper to adopt the long-term flooding irrigation method, particularly during the period from the grouting to the harvesting, but it is better to adopt the moistening irrigation or dry-wet alternate method.

- Soil mercury pollution restoration and control method
  Soil mercury pollution restoration and control method is quite similar to the lead pollution restoration and control method, so it is suggested to take the restoration and control method similar to lead pollution restoration and control method according to the degree of the pollution.
  Additionally apply soil conditioner: say, the organic manure, superphosphate, calcium carbonate and soluble non-toxic metal sulfides (K2S, etc.).
- Soil Cr pollution restoration and control method

Soil Cr pollution restoration and control method is quite similar to the lead pollution restoration and control method, so it is suggested to take the restoration and control method similar to lead pollution restoration and control method according to the degree of the pollution.

Additionally apply soil conditioner: Activated carbon, lime + activated clay minerals (Na-MMT, kaolinite and zeolite), organic matter or iron reducing materials, etc.

- Heavy metals compound polluted farmland restoration and control method

Cationic compound pollution heavy metal restoration and control method is quite similar to the single cadmium pollution restoration and control method, which is quite similar to the single pollution restoration method.

Cadmium mild-to-moderate arsenic pollution control method: additionally apply soil condition, particularly the commonly used compound polluted soil chemical inactivators, say, calcareous substances, metals and its oxides (iron salt passivation agents, such as, FeS04 and FeCl3, etc.), and clay minerals (Kaolin, sepiolite, zeolite and bentonite), organic substances (biochar and organic fertilizer) and pulverized fuel ash and steel slag, etc.

Cadmium and arsenic heavy pollution control method: Cadmium and arsenic heavily polluted area shall have the plantation structure adjustment or fallowing.

(7) Other Measures

1) Management and control of rice exceeding the standard

As for the rice exceeding the standard, make reasonable use of it according to the extent of exceeding standard. As for the rice whose times of ultra standard are 1~2.5, the project counties choose the nearest designated enterprise for food purchasing and storage as industrial food and feed by the acquisition of special enterprises; the rice with Cd content of >0.5mg/kg, other industries use (aginomoto, alcohol, and starch).

2) Crop straw leaving from the field

When the straw Cd content is >1.5mg/kg, it should be removed from the farmland to curb the trend of farmland Cd pollution.

Removal approaches: Because the current straw and other straw has lost the use of the way, in the past, the state vigorously promoted straw returning to field to prevent the burning of straw from affecting...
cooperative, changing harvesting mode (half-feed harvest to ensure the whole straw removal for reusing) and increasing the broken grass bundling mode (purchase bander and harvest).

Straw removal for reusing should take the principle of acting according to local conditions, integrated utilization, generally, select the method of removal for reusing according to the products or method of the straw specifically used by the region, such as processing straw rope and straw weaving (straw bags, straw curtain, etc.) which should coordinate with half-feed harvester to ensure the entire straw; straw fuel utilization should be through straw bundling, depression bar or block and other works; straw plates, straw papermaking, straw edible mushrooms, methane, fertilizer(return to other field-orchard, tea garden, flower seedlings matrix fertilizer), residue after integrated utilization of rice straw (including straw ash, biogas residue, etc.) should be properly handled through centralized landfill or other fixed ways.

It is suggested that the operation mechanism of straw removal use PPP mode, the project department should arrange part of the funds for ecological compensation including farmland contamination remediation compensation, and the government may arrange compensation funds for biomass recycling or power generation through carbon emission reduction compensation of the government. Then, select the advantaged enterprises, and gain profit through the acquisition of straw and resource utilization so as to maintain the normal operation of the project.

3) Integrated management of pest and disease damage

Promote agricultural clean production, encourage farmers to increase organic fertilizer application, reduce chemical fertilizer application, scientifically apply pesticide, promote specialized unified control and green prevention and control for crop diseases and insect pests, and promote high efficient pesticides with low toxicity and low residual and modern plant protection machinery.

- Protective measures for risk-free areas

With respect to non-polluted farmlands, pollution risk mechanism in cultivated land is set up, field management is optimized, new agricultural technologies are promoted and new pollutants are prevented and contained to make sure that no new areas subject to heavy metal pollution are added.

5.2.9 Potential environmental and social impacts and mitigation measures

(1) Main impacts of surrounding pollution source and mitigation measures

The Integrated Management Project of Polluted Farmland is mainly constructed in farmland, but
into nearby river without being treated or being treated but failing to reach standard, it may pollute the farmland as local farmers irrigate the farmland with the water inside the river; the heavy metal pollutants in the air discharged by enterprises may pollute farmland along with atmospheric deposition; if the waste residue produced by industrial and mining enterprises are not safely stored or handled in strict accordance with relevant standard, the heavy metals inside it may pollute the downstream farmland.

Mitigation measures:
- Collect the information on industrial and mining enterprises involving discharge of heavy metal pollutants in project area within the assessment scope. If the data on discharge of heavy metal pollutants can't be collected, field monitoring shall be performed;
- Build a list of enterprises needing key control according to investigation and monitoring results, urge enterprises to prevent pollution and manage environment in strict accordance with EA requirements to ensure standard discharge of pollutants;
- If the pollution problems can't be solved, project area shall be re-selected.

2) Tailings storage
Leakage of tailings storage will pollute downstream farmland. Tailings pond has the risk of dam break, which will pollute environment and damage ecology seriously.

Mitigation measures:
- Hire World Bank's experts on dam safety to assess the dam safety, develop the dam safety action plan, and take corresponding measures for dam safety and reinforcement when necessary;
- Strengthen management and inspection of tailings facility, ensure to take measures to prevent leakage, loss, and flying of tailings dust, and take preventive measures in advance, to eliminate accident potential;
- If the pollution problems can't be solved, project area shall be re-selected.
- Companies are urged to work on safety management mechanism in tailings pond and carry out severe assessment on people in charge of management and protection to ensure safe operation of tailings pond.

3) Remaining historical pollution source
The remaining slag heap of shut enterprises in project area and project area's upstream may
investigation results;

- Remaining waste residue shall be stored and disposed in strict accordance with relevant standards (General solid waste implements the Standard for Pollution on the Storage and Disposal Site for General Industrial Solid Wastes (GB 18599-2001); hazardous wastes implement the Standard for Pollution Control on Hazardous Waste Storage (GB18597-2001 2013 Revision)) to ensure that the waste residue heap that may pollute the farmland in project area and its surrounding area have been disposed safely, and won't cause new pollution;

- If the pollution problems can't be solved, project area shall be re-selected.

4) Company closedown or relocation

Industrial wastewater or waste residues in companies that are already closed down or relocated in the project areas or upstream of the project areas might yield pollution on agricultural areas in the downstream areas if they fail to be safely stored and disposed by severely abiding by relevant standards. Relocation of companies might lead to unemployment risks to employees.

Mitigation measures:

- Companies are urged to ensure normal operation or use of pollution control utilities during the closedown and relocation, and to properly handle pollutants left over or arising during the relocation process. Pollution control utilities can only be dismantled after producing facilities are dismantled and relevant pollutants are disposed of. If pollution control utilities can’t be normally operated or used, companies should come up with and implement tentative disposal plans on various pollutants during the closedown or relocation process. Such should be cleared up and dismantled in a standard way as aboveground and underground building, structure, production equipment, pipeline, pollution control utilities, toxic and harmful chemicals and so on.

- Companies are urged to handle toxic and harmful substances, dangerous wastes, general industrial solid wastes and so forth left over in the original site and arising during the closedown and relocation process. Those that fall to hazardous wastes should be commissioned to specialized units with business certificate of hazardous wastes for safety disposal and implementation of double draft mechanism on transfer of hazardous wastes; those that fall to general industrial solid wastes require formulation of disposal plans following relevant state standards on environmental conservation; and those solid wastes with their dangerous characteristics unable to be directly judged should be
Companies are urged to launch measures on allotment of staffs covering allotment of staffs whose labor relations are severed and are ready to go for re-employment by entering labor market, allotment of those who are transferred to the social insurance office and apply for unemployment insurance benefits, allotment of staffs who are transferred to the social insurance office for self-employment (entrepreneurship), allotment of special staffs (staffs with occupational injury, ‘three stage’ staffs) and allotment of temporary contract workers.

5) Pollutant prevention and control and environmental management after companies are relocated to the Park

Mitigation measures:

- Companies getting settled in the Park should abide by ‘three simultaneousness’ concerning safety and environmental conservation utilities: simultaneous designing, construction and operation; and safety, fire control and environmental conservation utilities can be put into commissioning after they are tested qualified by relevant departments.

- Companies are supervised to severely implement total quantity control and license mechanism by strictly implementing total quantity control on sewage following environmental conservation standards and relevant industrial standards, setting up regular check and maintenance mechanism on environmental protection, guaranteeing normal operation of various utilities, installing on-line monitoring system used to test relevant pollutant factors on pollution sources in key companies that are listed in pollution ranges needing key supervision and forming networking with environmental protection departments.

(2) Main environmental impacts of project civil construction and their mitigation measures

Civil construction of the Project mainly contains electric pumping station, channel project, sedimentation tank, ecological interception ditch and farm track. Construction engineering of the Project are mainly located in the existing farmland, and involve no large farmland water conservancy works. There is a considerable part of investment in supporting management measures, so the overall environmental impact has no large range. It does not involve land acquisition, demolition and ethnic minorities and impacts brought about by construction are small-scaled and short-living that vanish along with conclusion of construction. Environmental impacts of project construction are mainly
channel project, sedimentation tank, ecological interception ditch and farm track. Waste gas in construction mainly refers to the waste gas produced by fuel machinery for construction and tail gas discharged by transport vehicles. These pollutants have small emissions, with certain influence on constructors, and small impacts on regional environment.

**Mitigation measures:**
- Most of the earthwork from channel excavation is backfilled in land leveling and construction of boundary ridge between fields, near which, the roads between fields are constructed, and all the earthwork is reused in fields;
- Avoid the subgrade excavation and filling in windy and rainy days;
- Strictly manage the stack and storage of powdery construction materials for project, such as cement, lime, and sand, and cover the surface;
- Construct the project by sections, reduce the scope of dust; reduce pollution of dust by spraying water and other measures;
- Select the construction machinery and vehicle with good operating conditions;

2) Water environment

Waste water in construction period mainly includes the waste water from construction and production, and domestic sewage. Construction waste water mainly comes from concrete curing and aggregate flushing, although it is small in amount, it contains certain amount of oil and silt. Random discharge of it without proper handling will pollute soil, surface water, and groundwater. Besides, dredging of irrigation and drainage channels will disturb the sediment of water body, increase the concentration of SS in water body, and bring short influence to downstream water environment. Project constructors rely on nearby village for board and lodging, little household sewage is discharged.

**Mitigation measures:**
- Try to construct channel in non-irrigation period, and build water passage when necessary;
- Establish the sedimentation tank on construction site, so that the construction waste water can be gathered and precipitated in the precipitation tank, and reused for construction as far as possible;
- Strengthen construction management, strictly control spill and leakage of construction machinery; take measures for drainage system and water conservation in temporary storage area of
Noise in construction period mainly comes from the construction site, and material transportation. Noise from construction site mainly comes from the construction machinery and collision of material handling. Since construction noise is made by many kinds of construction machinery and transport vehicles, moreover, general equipment has an intermittent operation. Therefore, the construction noise is featured with intermittence and transience. In different stages of construction period, different noise source will bring different degrees of influence on the sound environment quality in the project area, which is usually located in farmland and its surrounding, far away from villages, without other sensitive points of sound environment nearby, so such influence can be minimized by strengthening management and taking relevant environmental control measures.

**Mitigation measures:**

- Select the advanced and reliable low-noise equipment in equipment selection;
- Arrange the time for construction reasonably, and prohibit construction at lunch break and night;
- Absorb shock of foundation or set up shock absorption support for the machinery with large noise.

4) Solid waste

Solid waste in construction period mainly comes from the wastes after foundation excavation and backfilling, the silt from dredging of mountain pond, and the household garbage from constructors. If the wastes are not timely handled, the landscape will be affected and dust will be produced in gale and dry weather; some silt from dredging of mountain pond may have the heavy metals exceeding standard, mishandling of it will pollute the surrounding surface water and soil; if household garbage is not timely handled, mosquito and stench will be produced to spread disease at moderate temperatures, causing adverse effects on surrounding environment.

**Mitigation measures:**

- Monitor the content of heavy metals in the slit of mountain pond, and select corresponding disposal measures;
- Temporary sedimentation tank, is set up in low-lying wasteland in construction stage of channel dredging that is used to dry and dredge bottom mud. Following results on monitoring of bottom mud in the irrigation canal, bottom mud that conforms to
are yet to reach the third-level standard can be used in nearby woods; and bottom mud that surpasses the third-level standard in Standards on Soil Environment Quality (GB15618-1995) can be transported to the landfill for sanitary landfill.

- Wastes can be used for land leveling and backfilling, as well as bedding of road subgrade, without independent spoil area to reduce occupation of land;
- After being collected by bag of garbage can, set up on construction site, the household garbage will be transported to the local household garbage landfill of project village or town;

5) Ecological impact

Since the project is constructed in farmland, all crops are planted manually with little natural vegetation; usually damage of artificial vegetation is temporary with small scope, and will end as the construction is completed.

**Mitigation measures:**

- For construction of field farm track, try to trim the existing road;
- Timely allocate and utilize the temporary dregs produced during construction, pave them as subgrade, and compact the surface.

6) Social impacts

Small-scaled civil construction might bring impacts on surrounding peasants on a small range and end when the construction is over. Small-scaled civil construction can bring profits to surrounding peasants by hiring them.

**Mitigation measures:**

- The construction work should be transformed or renovated on grounds of the original wasted or existing channels. Project construction does not involve land acquisition and resettlement;
- The construction process should be civilized and should pay full respect to local culture and customs;
- Resettlement compensation planning will be launched if project construction would affect peasants’ livelihood or sap their incomes. Measures are adopted for proper compensation and resettlement. Their livelihood should be at least restored to the level prior to the project.

(3) Main environmental impacts of agricultural activity and their mitigation measures
Cd content in rice. But liming may change the structure, physical and chemical property of soil, and bring adverse effects on creatures in farmland, such as finless eel and loach, long-term excessive liming may accelerate the massive decomposition of organic matters, to lower soil fertility, harden soil and damage soil structure easily. In addition, improper liming may affect operator's health. Use of liming can add to human cost and lead to deteriorated net earnings of peasants.

**Mitigation measures:**
- Application amount of lime can be set up in accordance with soil characteristics and degree of risks in different project areas (sections) following soil monitoring results;
- Lime applied requires use of lime exclusively used for agricultural purposes with inspection certificate on key indexes of product quality issued by authoritative outfits and calcium oxide content in unslaked lime reaching as high as 70%.
- Cost compensatory plan is proposed and incorporated to the budget.
- Strictly determine the application amount of lime, according to soil monitoring results, different soil texture, pH, and other features.
- Be sure to select the special agricultural lime;
- Develop the Regulations on Environmental Protection of Lime Application, and train relevant personnel.
- Select the professional liming team or lime spreader for liming, provide proper personal protective articles and require wearing, and take safety protection measures.

2) Apply soil passivator

From current using effects, as high as 90% of heavy metal-polluted farmland soil can be restored by passivator and combined agronomic regulation measures, but special attention shall be paid that large amount of passivator may bring adverse effects on environment quality of soil. Applying of passivator can add to cost of raw materials and human resources.

**Mitigation measures:**
- Type, application amount and application means of soil passivators are determined on the basis of soil monitoring results and in accordance with soil characteristics and degree of risks in varying project areas (sections).
- Plan on technological training and cost compensation is proposed and incorporated to the budget.
b ringing new heavy metal pollution.

- Develop the regulations on environmental protection of soil passivator application, and train relevant personnel;
- Make integrated tracking, monitoring and evaluation of the impacts of passivator application on soil texture, physical and chemical properties, environment quality, growth of crops, product and quality, and so on.

3) Apply organic fertilizer

Rich in organic matters and nutrients needed for growth of crops, organic fertilizer can not only provide nutrients for crops to grow and improve soil, but also improve quality of crops, boost crop output, promote high and stable production of crops, maintain soil fertility, meanwhile increase utilization of fertilizer, and reduce production cost. Organic fertilizer is prepared with the livestock manure, remains of dead animals and plants, and other sideline product resources rich in organic matters as the main materials, produced after they are fermented and thoroughly decomposed. Since feed additives with certain amount of Cu, Zn, Cd and other heavy metal elements are widely used in Chinese feed factories and farms, many heavy metal elements not absorbed by livestock are accumulated in the livestock's dung, application of which may increase the heavy metals in soil, thus causing secondary pollution.

Organic fertilizer can interact with heavy metal elements in the soil to form complex before affecting mobility of heavy metal in soil and validity of plants and altering plant’s absorption of heavy metals. As organic fertilizers are rich in organic substances as well as nutrient substances needed for growing of crops, they can not only furnish nutrition needed for growing of crops, improve soils, improve quality of crops, boost output of crops, propel high and stable yield of crops, maintain soil fertility, but also improve use ratio of fertilizers and bring down production costs. But applying of nonconforming organic fertilizers might bring about secondary pollution of heavy metal to soil in the farmland. Applying of organic fertilizers will boost cost on raw materials and human resources.

**Mitigation measures:**

- Advocate commercial organic fertilizers, and select the one that has passed field test and secondary pollution assessment, and determined as safe with product registration.
- The heavy metal content of the applied organic fertilizer shall be lower than the Organic
Hunan Integrated Management of Contaminated Agricultural Land.

- The Project Office should intensify supervision regarding excrement of animals occurring in breeding industry in surrounding peasant households. Excrement in breeding industry that is free from detection or is monitored as overproof is not allowed to access the farmland in case of new heavy metal pollution;
- Cost compensatory plan is prepared and incorporated to the budget.

4) Apply chemical fertilizer

As one of the crop varieties needing the most fertilizer, 100kg of rice needs to absorb 2.0-2.4kg of nitrogen, 0.9-1.4kg of phosphoric anhydride, and 2.5-2.9kg of potassium oxide. Content of heavy metal is low in nitrogen and potassium fertilizer, the chemical fertilizer frequently used by rice, and has no big influence on accumulation of heavy metal in soil. However, phosphate fertilizer is mainly made from rock phosphate and naturally associated with Cd, which ranges from several mg to hundreds of mg in 1000kg of phosphate fertilizer, so improper use of phosphate fertilizer may cause Cd pollution to soil.

**Mitigation measures:**

- Make fair use of chemical fertilizer, encourage farmers to increase application of organic fertilizer, and reduce application of chemical fertilizer;
- Select the chemical fertilizer with heavy metal content meeting the National Standard of the People's Republic of China, Ecological Index of Arsenic Cadmium Lead Chromium And Mercury for Fertilizers (GB/T 23349-2009);
- Chemical fertilizers with completed two certificates or three certificates (production license, registration certificate of products and certificate on product quality standard) as are required by existing state laws and regulations are used.
- Develop the regulations on environmental protection of chemical fertilizer application for Hunan Integrated Management of Contaminated Agricultural Land.

5) Apply pesticide

During production cycle of rice, common pests are rice stem borer, rice leaf roller, rice planthopper, and rice thrips; common diseases are sheath blight, rice blast, false smut; common pesticides are chlorantraniliprole, abamectin, emamectin benzoate, pymetrozine, imidacloprid, validamycin, benzyl propiconazole, and tricyclazole. There are following main environmental risks
Mitigation measures:

- Carry out monitoring on plant diseases and insect pests, identify type of pest accurately, and select the efficient, less toxic and residual pesticide variety and dosage form, according to focus of prevention;
- Determine application times and dosage of pesticide according to the occurrence period and quantity of pest, and duration of pesticide;
- Pesticides falling to 1a and 1b in risk rankings in Proposals on Categorization of Pesticide in the World Health Organization should be averted. Strictly control the application of high-toxic pesticide, and ban the use of highly residual pesticide that leads to carcinogenesis, teratogenesis and mutagenesis;
- Only pesticides manufactured by license-holding manufacturers after registration and approval of government departments can be used; the pesticide products should pass quality inspection and have quality inspection certificate, be labelled or attached with manual, indicated with the pesticide name, enterprise name, and active ingredient, content, toxicity, function operating instructions, precautions, production date and expiration date of the pesticide;
- Application of pesticide should faithfully implement the operating instructions and the rules on safe interval period of crop, to ensure safe application of pesticide, avoid environmental pollution, and put an end to poisoning of people and livestock;
- Popularize the biological control measures, and try to reduce the use of chemical pesticide.
- Develop the regulations on environmental protection of pesticide application for Hunan Integrated Management of Contaminated Agricultural Land.
- Training on disease and pest control is carried out on peasant households and agricultural technical staffs;
- Cost compensatory plan is prepared and incorporated to the budget.

6) Adjustment of plantation structure

For areas subject to severe pollution, plantation structure (or fallow) following plantation habits, industrial base and market demands of the region, such crops as grain and oil, park crops, pasture crops and so on can be replanted. Adjustment of plantation structure helps boost safe products and
within a short period of time after structure adjustment.

**Mitigation measures:**

- Replant crops that are planted in the local place so that they would not exert ostensible impacts on local ecological surrounding;
- Come up with subsidiary plan with respect to restructuring;
- Launch training plan pertinent to restructuring.

7) Crop straw leaving from the field

When the straw Cd content is >1.5mg/kg, it should be removed from the farmland to curb the trend of farmland Cd pollution. Removal of straw from cropland will add to human resources costs and management costs.

**Mitigation measures:**

- The operational mechanism of PPP model is adopted, subsidiary on operators of croplands or specialized harvest cooperatives is encouraged, harvesting model (semi-feeding harvesting to ensure removal of entire turf) is altered, and smashed grass bundling means (bundling machine can be purchased for harvesting) can be added to realize removal of crop straws from the croplands in the project areas;
- Removal and use of straws should follow the principle of adjusting measures to local conditions, synthetic use and being cost-effective. Means on use or removal are chosen for products or means of specific straw use following concrete regions that cover processing straw ropes, straw plaited article (straw bag, woven straw and so on), straw fuel, straw panel, straw paper-making, straw edible mushroom, marsh gas, fertilizer (restoration of cropland in other sites-orchard, tea garden, flowering plant nursery stock base material and fertilizer):
" Residues after comprehensive use of straws (including straw ash, biogas residue and such) should be properly handled that can be dumped intensively or handled in other fixed channels;
- When straws are used to cover the orchard, sampling supervision should be carried out on the fruits in the orchard.

(4) Other environmental and social impacts and mitigation measures

1) Phytoremediation

Phytoremediation helps bring down heavy metal content in soil that has such advantages as low cost, no destruction of soil and ecological environment of river, no induction to secondary pollution
Plants rich in heavy metals are transported to the nearby refuse landfill for sanitary landfill. Due diligence is carried out on the refuse landfill to ensure that its designing, operation, management and maintenance conform to *Standard for Pollution Control on the Landfill Site of Municipal Solid Waste* (Gb 16889-2008);

- Transplantation of plants rich in heavy metals can adopt sealed transport to avert being sprayed around.
- Plans on subsidiary are formulated pertinent to possibly existing conditions like fallow or prohibited sowing.

2) **Management and Control of over-standard rice**

It is far lower than market price or procurement price; reuse of residues after industrial use of over-standard rice is prone to extremely low risks of heavy metal pollution.

**Mitigation measures:**

- Intensify monitoring on rice. Appointed companies are responsible for purchasing, storing or warehousing over-standard rice following state protective price or market price so that it would not influx to the market;
- Over-standard rice is reasonably utilized by making of industrial alcohol and the residue after the industrial utilization is transported to the nearby refuse landfill for sanitary landfill. Due diligence is carried out on the refuse landfill to ensure that its designing, operation, management and maintenance conform to *Standard for Pollution Control on the Landfill Site of Municipal Solid Waste* (Gb 16889-2008);
- Make up for those lower than the purchase price following price spread.
- Formulate *Plan on Control of Rice with Overproof Heavy Metals*.

3) **Risk of public opinions**

During the project implementation process, such issues as exaggeration of heavy metal pollution or errored attribution might occur as some residents do not form adequate understanding on heavy metal in the cropland.

**Mitigation measures:**

Data acquired from the PMO via monitoring should be properly used and analyzed during the project initiation and implementation stage; publicity is strengthened to enhance residents’ awareness...
4) Ethnic minorities

Tujia Nationality and Bai Nationality are highly fused with Han Nationality in the project area. They do not collectively clinch on the project area and thus do not align with definition on ethnic minorities following the World Bank, so known project areas would not trigger the policy on ethnic minorities in the World Bank. But as the remaining ten-odd counties are yet to launch their specific project villages, it can’t be excluded that ethnic minorities in tune with the World Bank’s definition might exist, so it might trigger policy on ethnic minorities OP4.10 in the World Bank.

Mitigation measures:

To safeguard legitimate interests of ethnic minorities and bring down negative impacts, EMDP is enacted to guide to bringing down social risks and maintaining rights of ethnic minorities.

For the negative environmental and social impacts produced by the project activities, various measures to mitigate environmental and social impacts are proposed in the environmental and social management framework (ESMF) to avoid or mitigate the negative environmental impacts produced in each period, see table 5-14 for details.
Table 5-14 Table on identification of project activity and measures to mitigate potential environmental and social impacts

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Project activity</th>
<th>Activity descriptions</th>
<th>Potential social and environmental impacts</th>
<th>Mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cropland management demonstration based on risks</td>
<td>Encrypted monitoring is carried out on chosen project areas following requirements by the monitoring plan (density of monitoring spots are 30-50 mu in the mountainous areas, 50-100 mu in the continuous flat areas; monitor and correspond heavy metal content of soil and agricultural products, monitor heavy metal content in bottom mud, motor water quality and heavy metal content in the irrigation water. Carry out risk ranking appraisal. Samples are drawn from the project areas and sent to laboratories with qualifications for analysis and monitoring. Liquid and solid wastes might be produced during the chemical analysis process, but the laboratories would handle with them following state management regulations, so the environmental impacts remain measly. Liquid and solid wastes in the testing room are under safe disposal.</td>
<td></td>
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</tr>
<tr>
<td>1.1</td>
<td>Encrypted monitoring and risk ranking appraisal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Measures on synthetic control of risks</td>
<td>Pertinent measures on risk management and control are adopted in accordance with analysis on valid data such as rice within projects, agricultural internal source and external source, agricultural production management and so forth. See 2.1-2.4 for details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.1</td>
<td>Project measures</td>
<td>County-level engineering measures of the 15 projects contain 2 electric pumping stations, channel project spanning 346.01 kilometers, 115 sedimentation tanks, ecological interception ditch spanning 8.2 kilometers and farm track spanning 67.33 kilometers. (Sedimentation tank is 2 * 2 * 1.0 m in designing size. It adopts C20 cast-in-place concrete for pool wall 120 mm in thickness and C20 cast-in-place reinforced concrete 120 mm in thickness. Elevation distance from the bottom of the pool is at least 300 mm. Ecological interception ditch adopts C20 cast-in-place reinforced concrete with 150 mm in thickness. Ecological interception ditch adopts C20 cast-in-place reinforced concrete with 150 mm in thickness. The project is small in scale. The number of construction workers is 5-10 at most. Construction camps are not needed and such are not involved as land acquisition, demolition and ethnic nationalities. Such activities as roadway excavation, filling and so on should be averted during blast and raindrops. Such activities as roadway excavation, filling and so on should be averted during blast and raindrops. Powder materials used in projects such as cement, lime, sands and so on should be under strict management in terms of pile-up and storage with coverage on the surface; Dust spraying, noise, waste water and solid wastes might occur during the construction process, but they impose short-lived and minor impacts and are solely limited to a small scale of construction and will</td>
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<tr>
<th>Serial Number</th>
<th>Project activity</th>
<th>Activity descriptions</th>
<th>Potential social and environmental impacts</th>
<th>Mitigation measures</th>
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|               | ditch is transformed based on the original drainage ditch. It mainly includes transformation of ditch bottom and ditch wall and building of interception dam. The furrow bank consists of cellular cement board with well-distributed holes. Normally a cement board is 60cm * 50 cm * 5 cm (length * width * thickness) in its specification with interval between neighboring holes being 20 cm. The bottom also consists of cellular cement boards. The bottom is flat in layout. The cross section of the ditch is shaped trapezoid. It is installed with meso-position and bottom-level drain holes. Water level of the interception section can be categorized into three states namely draining, half-full and spillover. The interception dam is around 70 cm in height. | vanish when the construction is over.  
● Dredging of irrigation channels involves the possibility that the bottom mud might be contaminated by heavy metals. | operational states are chosen;  
● Channel construction is best to be carried out during non-irrigation periods and when necessary, temporary water excess channels can be built.  
● Settling pond can be set up in the construction venues. Construction waste water is collected and precipitated through the settling pond and should be reused to construction to the utmost.  
● Intensify construction management, severely rein in leakage, drainage or spillover of construction machines, implement sound measures on drainage system and water conservation in temporary pile solid areas and guard off impacts of water and soil loss caused by piled-up spoil on the water environment;  
● Enhance education of environmental protection on construction staffs, improve environmental awareness of construction staffs and construction staffs are not allowed to litter or throw about solid wastes and waste water.  
● Choose advanced and reliable low-noise devices in equipment selection;  
● Reasonably assign construction time and prohibit construction during noon and night hours;  
● Spoil (residue) and backfilling for foundation excavation is used to flatten land and construct ridges; Construction and earthwork around existing ridges on the path in the field are all reused back in the field;  
● Temporary settling pond is set up in low-lying wasteland in construction stage of channel dredging that is used to dry and dredge bottom mud. Following results on monitoring of bottom mud in the irrigation canal, bottom mud that conforms to second-level standards in Standards on Soil Environment Quality (GB15618-1995) can be dumped in the low-lying |
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<thead>
<tr>
<th>Serial Number</th>
<th>Project activity</th>
<th>Activity descriptions</th>
<th>Potential social and environmental impacts</th>
<th>Mitigation measures</th>
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<tr>
<td>1.2.2 Agronomic measures</td>
<td>Control of high-accumulation rice varieties, optimization of field water management (waterflooding irrigation), soil acidification conditioning (PH value), applying of organic fertilizer, applying of soil passivator, adjustment of plantation structure, removal of straws from the croplands and other measures.</td>
<td>• All agronomic measures are carried out in the croplands. Such are not involved as land acquisition, demolition and ethnic nationalities. • Waterflooding irrigation helps reduce absorption of rice on heavy metals during the grouting and head sprouting period of rice. • Applying of lime helps adjust PH value of soil and bring down crops’ absorption of heavy metals. But overt applying of lime might cause soil hardening. Failing to adopt preventive measures when applying lime might have a bearing on health of people who apply the lime. • Applying of soil passivators helps bring down activity of heavy metals in soil. • Applying of organic fertilizers helps improve physicochemical property of soil but applying of nonconforming organic fertilizer might bring about secondary pollution on soil in the croplands.</td>
<td>• Application amount of lime, passivators, organic fertilizer and fertilizers is settled on the basis of soil monitoring results and in accordance with soil characteristics and degree of risks in different project sections (areas); • Lime being applied should be lime used exclusively for agricultural purposes and should have certificate on inspection on key indexes of product quality issued by authoritative outfits. Content of calcium oxide is required to reach as high as 70% for unslaked lime; use of passivating restoratives should be agricultural medicaments allowed to be used in the croplands and registered in the Ministry of Agriculture in order to ensure that no new heavy metal pollution is injected. • Professional lime application teams or lime spraying machine is used for applying lime. Proper personal protective articles are offered and safety and...</td>
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<tr>
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<td></td>
<td>• Adjustment of plantation structure would add to cost and lead to dwindling net incomes by peasants.</td>
<td>Preventive measures are implemented;</td>
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<td></td>
<td>• Removal of straws from croplands helps bring down heavy metals in soil of the croplands. Dispose with potential environmental impacts on the venue after removing straws from the croplands.</td>
<td>• Set out regulations on environmental protection of application of lime and passivator and carry out training on relevant staffs;</td>
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<td></td>
<td>• Agronomic measures might confront reduction of outputs and nonconforming agricultural products and hence might affect livelihood of peasants.</td>
<td>• Carry out comprehensive tracking and monitoring appraisal on the impacts exerted by applying of passivators on soil texture, physiochemical property and environmental quality and on growing, output and quality of crops.</td>
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<td></td>
<td>• Commercial organic fertilizers are recommended. Choose commercial organic fertilizers that have carried out field trial, passed secondary pollution appraisal to ensure product safety and are registered.</td>
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<td>• Heavy metal content in organic fertilizers being applied should be lower than the standard in <em>Organic Fertilizer</em> (NY525-2012), industrial standard for agricultural sector in the People’s Republic of China;</td>
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<td>• If excrements of livestock and poultry are used as organic fertilizers, then heavy metal in fodders for feeding livestock should align with requirements in <em>Feed Hygiene Standards</em>.</td>
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<td>• Reasonably use fertilizers, encourage peasants to apply more organic fertilizers and decrease use of chemical fertilizers;</td>
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<td>• Use fertilizers with heavy metal content in tune with <em>Ecological Index of Arsenic, Cadmium, Lead, Chromium and Mercury in Fertilizer</em>, (GB/T23349/2009), national standard of the People’s Republic of China; fertilizers with completed two or three certificates (production license, product registration and certificate for product quality standard) are used following requirements in existing laws and regulations.</td>
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<td>Serial Number</td>
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<tr>
<td>1.2.3</td>
<td>Comprehensive management of pests and insects</td>
<td>Promote agricultural clean production, encourage peasants to apply organic fertilizer, reduce the usage amount of fertilizer, scientifically apply pesticide, promote specialized control and green control of crop pests and insects, and popularize the efficient low-poison and low-residue pesticide and modern planting machinery.</td>
<td>Formulate plans on cost compensation and subsidy for profits of peasant households; Properly handle with residues (including straw lime, biogas residue and such) after synthetic use of straws via concentrated landfilling or other fixed means. Carry out sample monitoring on fruits in the orchard when straws are used to cover the orchard.</td>
<td>Monitor the pests and insects; accurately identify the types of pests and insects. According to the key control objects, select the efficient low-poison and low-residue pesticide variety and type. Determine the applying times and amount according to the pest and insect generation period, generation amount and pesticide sustaining period. Avoid using the Classes 1a and 1b insecticide identified in World Health Organization Insecticide Type Suggestions; strictly control the applying of high-poison pesticide. Avoid using high-residue and “mutagenesis, carcinogenesis and teratoenesis” pesticide. Only use the insecticide which is manufactured by manufacturer holding license after obtaining the approval of government department. The used pesticide shall be subject to quality inspection and be equipped with quality certificate. The pesticide shall be attached with tag or description, and be indicated with pesticide name, enterprise name and effective ingredient, content, poison, purpose, description, precautions, production date, validity date, etc. of pesticide. The pesticide shall be carefully applied according to use and operation regulation and safety interval period in safety way, so as to avoid</td>
</tr>
<tr>
<td>Serial Number</td>
<td>Project activity</td>
<td>Activity descriptions</td>
<td>Potential social and environmental impacts</td>
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|               |                  |                       | environment pollution, and prohibit poisoning of human and livestock. | ● Popularize and apply biological control measures, and minimize the usage amount of chemical pesticide.  
● Perform training of pest and insect control knowledge on agricultural technicians and peasants.  
● Timely clean, and recycle the agricultural films and product packages; send to the local agricultural product package recycling unit to treat and dispose, so as to avoid polluting environment of place of origin. |
| 1.2.4         | Other measures   |                       |                                             |                    |
| (1)           | Sorting of variety | Study the rice safety production technique of project area on the basis of proposing emergency low-cadmium rice variety list in Human Province; reasonably sort the rice variety in project area; verify the cadmium accumulating index of main rice variety in project area. When the BCF index of rice variety is higher than Class VI risk, the cadmium accumulating risk of such variety is higher, which shall be controlled to enter project area. | ● No environment effect |                    |
| (2)           | Management and control of over-standard rice | Implement specialized enterprise purchase on over-standard rice; use over-standard rice to make industrial alcohol; Make subsidy on purchase enterprise. The subsidy standard is 200 yuan/ton. | ● The reutilization of the residue after industrial utilization of over-standard rice has heavy metal pollution risk, although the risk is very little.  
● The price of agricultural product is lower than market price. | ● Enhance the monitoring on rice. The overstandard rice is purchased by special enterprise and stored in special warehouse according to national protection price or market price, so as to prevent the overstandard grain from entering market.  
● Over-standard rice is reasonably utilized by making of industrial alcohol, the residue after the industrial utilization is transported to the nearby refuse landfill for sanitary landfill. Due diligence is carried out on the refuse landfill to ensure that its designing, operation, management and maintenance conform to Standard for Pollution Control on the Landfill Site of... |
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<th>Serial Number</th>
<th>Project activity</th>
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<tr>
<td>(3)</td>
<td>Restoration of plants</td>
<td>According to pollution type, farmland condition and specific season within project area, select the enrichment or superenrichment plant varieties, e.g., red-spotted stonecrop, ciliate desert-grass, scirpus tabernaemontani (damp-resistant), amaranthus hypochondriacus, etc., and certainly remove the heavy metal out of soil.</td>
<td>● Reduce the content of heavy metal in soil; However, the transporting-out and disposal of plants enriching heavy metal may bring heavy metal pollution; the highly-enriched plant absorbs little heavy metal in soil, and the risk is little. ● The income of peasant may be reduced, and even the income is none.</td>
<td>● Carry the heavy metal-enriched plants to the nearby garbage landfill to sanitarily fill; deliberately investigate the garbage landfill; the design, running, management and maintenance of garbage landfill shall meet the requirements of Standard for Pollution Control on the Landfill Site for Domestic Waste (GB 16889-2008). ● Transport the heavy metal-enriched plants in sealed way, so as to avoid scattering. ● Make the subsidy plan</td>
</tr>
<tr>
<td>(4)</td>
<td>Certification on place of origin of agricultural products</td>
<td>Make subsidy on the body of nuisanceless, green and organic foods. The subsidy standards are respectively 5000/10000/20000 yuan.</td>
<td>● No adverse environment effect</td>
<td></td>
</tr>
<tr>
<td>(5)</td>
<td>Building, propagation and popularizing cost of agricultural product brands</td>
<td>Encourage the brand building, promotion and popularizing of agricultural products, so as to increase the economic value of products.</td>
<td>● No adverse environment effect</td>
<td></td>
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<tr>
<td>(6)</td>
<td>Management and control of heavy metal pollution source</td>
<td>The project shall deliberately investigate the project area and surrounding waste slag of project area, and propose suggestions on environment management. Enhance the training of enterprise environment management aspect.</td>
<td>● If the wastewater produced by industrial and mine enterprises is not treated or is directly drained into nearby rivers without reaching standard, when the local peasants use the river water to irrigate farmland, the farmland may be polluted; the heavy metal pollution exhausted into atmosphere by enterprises may pollute farmland along with atmosphere settling; if the waste slag produced by enterprises involves heavy metal pollution in evaluation scope of project area. If failing to collect the exhaust data of heavy metal pollution, investigate at site.</td>
<td>● Collect the data of industrial and mine enterprises involving heavy metal pollution in evaluation scope of project area. If failing to collect the exhaust data of heavy metal pollution, investigate at site. ● Establish the list of key control enterprises according to investigation and monitoring results, supervise the enterprises to strictly control pollution</td>
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*Municipal Solid Waste (Gb 16889-2008)*;
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<th>Project activity</th>
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<th>Mitigation measures</th>
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</table>
| 1             | Removed or closed enterprises | The project will not cause the removal of enterprises, but involve the enterprises which shall be removed according to requirements of environment protection department. The project shall deliberately investigate the project area and surrounding waste slag of project area, and propose suggestions on environment management. | industrial and mine enterprises is not strictly subjected to safety storage and disposal according to related standards, the heavy metal in waste slag may pollute the downstream farmland. | • Perform training on enterprises.  
• If the industrial waste water and waste slag left by the removed or closed enterprise within project area or at upstream of project area are not strictly subject to safety storage and disposal according to related standards, it may pollute the downstream farmland.  
• It may cause the unemployment risk of staff. |
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<tr>
<th>Serial Number</th>
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<th>Mitigation measures</th>
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<tr>
<td></td>
<td>Tailing pond</td>
<td></td>
<td></td>
<td>Make the staff arrangement plan.</td>
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<td>The building of park enterprises shall follow the “three-simultaneous” requirements of safety facilities and environment protection facilities, e.g. simultaneous design, simultaneous construction and simultaneous operation. The safety, fire and environment protection facilities cannot be put into production until being qualified in the acceptance by related departments.</td>
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<td>Supervise the enterprises to strictly total pollution emission control and permit system; strictly implement total pollution emission control according to environment protection standard and related industrial standards; build periodical environment protection check and maintenance system; guarantee the normal running of facilities. For pollution sources of key enterprises which are listed into key pollution monitoring scope, install the online monitoring system capable of detecting related pollution factors, and internetworking with environment protection department.</td>
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<td></td>
<td>The leakage of tailing pond may pollute the downstream farmland, but the possibility is little.</td>
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<td></td>
<td>Invite the world bank dam safety expert to evaluate the safety of dam, and make the safety activity plan of dam. When necessary, take the applicable dam safety measures and risk-removal reinforcing measures.</td>
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<td></td>
<td>Enhance the management and check on tailing facilities. Provide the anti-seepage measures, loss-preventing measures, and tailing dust-preventing measures.</td>
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<tr>
<td></td>
<td>Left waste slag</td>
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<td></td>
<td>If the waste slag stack is not standardly treated.</td>
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<td>The left waste slag shall be strictly stored and</td>
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<td>Serial Number</td>
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<td>Potential social and environmental impacts</td>
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<tr>
<td>1.3</td>
<td>Supervision of project area and surrounding waste slag of project area, and propose suggestions on environment management.</td>
<td>project area and surrounding waste slag of project area, and propose suggestions on environment management.</td>
<td>It may pollute the surrounding farmland.</td>
<td>disposed according to related standards; the common solid wastes shall be treated according to Standard for Pollution Control on the Storage and Disposal Site for General Industrial Solid Wastes (GB 18500-2001). The hazardous wastes shall be treated according to Standard for Pollution Control on the Hazardous Wastes (GB 18597-2001 2013), so as to safely treat the waste slag stack which may pollute the project area and surrounding farmland, and avoid new pollution.</td>
</tr>
<tr>
<td>2</td>
<td>Enhancement on monitoring and management of agricultural environment</td>
<td>Invite professional supervision agency, and organize the township and village persons to supervise the implementing of project agronomic measures (applying of limestone, organic fertilizer and passivator; water-flooding irrigation, removal of straws out of farmland, etc.). The supervision cost is 20 yuan/mu/quarter.</td>
<td>No adverse environment effect</td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Building of agricultural environment monitoring database and early warning</td>
<td>Include one set of agricultural environment early warning software, 15 sampling detection vehicles, 30 terminal computers, 2 GPS and 2 digital type altitude instrument. Support the building of heavy metal inspection room of Hengyang City, including transformation of laboratory and adding of equipment.</td>
<td>If the waste liquid and solid waste are produced in the building of heavy metal inspection room, it may pollute the surrounding environment, but the amounts of the waste liquid and solid waste are fewer, so the effect is little.</td>
<td>Properly treat and dispose the waste liquid and solid produced by inspection room.</td>
</tr>
<tr>
<td>2.2</td>
<td>Risk-based farmland management tools and preparation of agricultural risk map</td>
<td>Build the model according to monitoring data of Project 1, provide basic support for the risk management of farmland, determine the pollution risk levels of farmlands and crops by organically combining effective data and management tools, and</td>
<td>Study on soft topic, and no adverse effect</td>
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If the waste liquid and solid waste are produced in the building of heavy metal inspection room, it may pollute the surrounding environment, but the amounts of the waste liquid and solid waste are fewer, so the effect is little. | Properly treat and dispose the waste liquid and solid produced by inspection room. |

Study on soft topic, and no adverse effect | |

Study on soft topic, and no adverse effect | |
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<tr>
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<th>Project activity</th>
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<th>Mitigation measures</th>
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<tbody>
<tr>
<td></td>
<td>make the agricultural production risk map of whole province.</td>
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<td></td>
<td>Study on soft topic, and no adverse effect</td>
</tr>
<tr>
<td>2.3</td>
<td>Development or issuing of local policies and standards</td>
<td>Develop or issue the local management rules and systems and technical standards, e.g. farmland pollution control and restoration; instruct the comprehensive management and control of farmland pollution of each project city.</td>
<td></td>
<td>Study on soft topic, and no adverse effect</td>
</tr>
<tr>
<td>2.4</td>
<td>Study on sustained financing mechanism and ecological compensation mechanism</td>
<td>For the long-term farmland pollution management and soil health restoration activities, study the sustained financing mode and ecological compensation mechanism, so as to guarantee the sustained agricultural development of Hunan Province.</td>
<td></td>
<td>Study on soft topic, and no adverse effect</td>
</tr>
<tr>
<td>3</td>
<td>Capacity building</td>
<td>Cultivate the management and technical capacity of government officers, and organize the international and domestic investigation and training. Develop training on environment monitors and peasants; provide technical assistance on enterprises involving heavy metal pollution, e.g. 1021.44 persons per month in total. Develop project concept and technical popularizing activities in types of seminars, training, etc. Share and propagate project experiences and techniques in videos, paper data, etc.</td>
<td></td>
<td>No adverse environment effect</td>
</tr>
<tr>
<td>4</td>
<td>Management and evaluation of project</td>
<td>Provide technical assistance and training on project managers (purchase, finance, security policies, etc.), so as to improve the management capacity; purchase the required office equipment of project management mechanism, and project daily management, purchase and finance management cost. Hold the project starting/completion seminar, and build the Mis system; collect the related information and policies of farmland environment</td>
<td></td>
<td>No adverse environment effect</td>
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<tr>
<td>Serial Number</td>
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<td>Activity descriptions</td>
<td>Potential social and environmental impacts</td>
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<tr>
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<td>quality change and the like in the project implementing process; monitor and evaluate the project implementing results.</td>
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</table>
Through the analysis result of Table 5-14, the project activities of the project can be classified into construction of field irrigation facilities, maintenance and dredging of mountain ponds, construction of field farm tracks, small civil engineering, and agricultural activities, etc. To mitigate the environmental impacts of the specific project activities in the project area, this project will prepare the Environmental Codes of Practice (ECOP) (including ECOP of constructions of field irrigation facilities, mountain ponds, field farm tracks, small civil engineering, and agricultural activities, etc.) and the environment mitigation measures in specific points (including the heavy metal pollution enterprise of due diligence and other sensitive points of environment and society), so as to avoid and mitigate the negative impacts.

5.2.10 Make the ESMP

ESMP will propose a series of mitigation, monitoring, and organization construction measures taken during project implementation and operation, to remove or compensate for the project's adverse effects on environment and society, or reduce them to an acceptable level, as well as the arrangement to ensure implementation of these measures. The sub-project ESMP of Hunan Integrated Management of Contaminated Agricultural Land shall include project description, and requirements of related laws and regulations, policies, technical specifications, standards, and World Bank's policies; environmental management organization arrangement, responsibility assignment, and capacity assessment; environmental and social impacts and their measures (including ECOP and mitigation measures in specific points); environmental monitoring; training and capability building; public participation and information disclosure; implementation arrangement and cost estimate. See Appendix 2 for main contents of sub-project ESMP.

According to project features, sub-project ESMP may propose the environmental management and monitoring plans by stage, including the suggested work contents, budget, schedule, personnel allocation and training requirements, as well as the support and service needed for implementation of mitigation measures, environmental management and monitoring. The proposed mitigation measures shall be agreed by the parties concerned and the affected group, before being listed into ESMP See Table 5-15 to Table 5-16 for specific contents. Each sub-project shall be refined according to their own features.
### Table 5-15 Lists of General Mitigation Measures for Environmental and Social Impacts

<table>
<thead>
<tr>
<th>Influencing factor</th>
<th>Potential impact</th>
<th>Mitigation measures</th>
<th>Implemented by</th>
<th>Supervised by</th>
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</thead>
</table>
| Sound environment  | Noise in construction period mainly comes from the construction site, and material transportation. Noise from construction site mainly comes from the construction machinery and collision of material handling. | - Select the advanced and reliable low-noise equipment in equipment selection;  
- Arrange the time for construction reasonably, and prohibit construction at lunch break and night;  
- Absorb shock of foundation or set up shock absorption support for the machinery with large noise, and bind up the damping material; | County PMO | Environmental Protection Department of Hunan, environmental protection bureau of sub-project county |
| Atmospheric environment | Dust is produced during construction of irrigation facility, maintenance and dredging of mountain pond, construction of field farm tracks and small civil engineering, as well as road excavation, waste transportation and handling, site trimming and construction. Waste gas in construction mainly refers to the waste gas produced by fuel machinery for construction and tail gas discharged by transport vehicles. These pollutants have small emissions, with certain influence on constructors, and small impacts on regional environment. | - Most of the earthwork from channel excavation is backfilled in land leveling and construction of boundary ridge between fields, near which, the roads between fields are constructed, and all the earthwork is reused in fields;  
- Avoid the subgrade excavation and filling in windy and rainy days;  
- Strictly manage the stack and storage of powdery construction materials for project, such as cement, lime, and sand, cover the surface, and take measures for water spray when necessary;  
- Select the construction machinery and vehicle with good operating conditions;  
- Strengthen overhaul and maintenance of construction vehicles, and prohibit the use of the vehicle that has exceeding its service life, and the one with tail gas exceeding standard.  
- Try to use the construction vehicles with low fuel consumption and small exhaust, and use the high quality fuel to reduce emissions of harmful waste gas. | County PMO | Environmental Protection Department of Hunan, environmental protection bureau of sub-project county |
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<tr>
<th>Water environment</th>
<th>Solid waste</th>
<th>County PMO</th>
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<tr>
<td>Mainly include waste water from construction and production, and domestic sewage. Construction waste water mainly comes from concrete curing and aggregate flushing, although it is small in amount, it contains certain amount of oil and silt. Random discharge of it without proper handling will pollute soil, surface water, and groundwater.</td>
<td>Solid waste in construction period mainly comes from the wastes after foundation excavation and backfilling, the silt from dredging of mountain pond, and the household garbage from constructors. If the construction wastes produced during construction are not timely handled, the landscape will be affected and dust will be produced in gale and dry weather; some silt from dredging of mountain pond may have the heavy metals exceeding standard, mishandling of it will pollute the surrounding surface water and soil; if household garbage is not timely handled, mosquito and stench will be produced to spread disease at moderate temperatures, causing adverse effects from machinery and vehicles;</td>
<td>Try to construct channel in non-irrigation period, and build temporary water passage when necessary. Establish the precipitation tank on construction site, so that the construction waste water can be gathered and precipitated in the precipitation tank, and reused for construction as far as possible. Strengthen construction management, strictly control spill and leakage of construction machinery; take measures for drainage system and water conservation in temporary storage area of soil, to prevent the impacts of soil erosion of waste stock on water environment; Strengthen environmental protection education of constructors to improve their environmental awareness. Constructors shall not litter or pour waste or sewage. After being collected by bag of garbage can set up on construction site, the household garbage will be transported to the local household garbage landfill of project village or town; Monitor the content of heavy metals in the silt of mountain pond, and select corresponding disposal measures; Wastes can be used for land leveling and backfilling, as well as bedding of road subgrade, without independent spoil area to reduce occupation of land.</td>
</tr>
</tbody>
</table>

Environmental Protection Department of Hunan, environmental protection bureau of sub-project county

Environmental Protection Department of Hunan, environmental protection bureau of sub-project county
| Cultural relics | —— | Once cultural relics are found during construction, ensure to notify local cultural relics preservation department immediately, and timely protect the site, and continue construction after they are properly handled by cultural relics department. | County PMO | Provincial PMO |
| Social Influence | ● The noise may disturb local residents.  
● The delivering of wastes may affect local transportation  
● Routes between farmland may occupy little cultivated land. | ● Plan working time properly, no operation at noon or night.  
● Respect local cultural tradition  
● If cultivated land will be occupied, ask permission first, and make compensation for the occupied part, solve the problem in the area. | County PMO | Provincial PMO |
According to related investigation, there is no cultural relic in the project area. However, if cultural relics or suspected ones are discovered during excavation or construction, the construction unit shall preserve the site immediately as required by Law of the People's Republic of China on the Protection of Cultural Relics (Dec. 29, 2007), and report to the local Cultural Relics Bureau for disposal, and resume construction only after disposal of Cultural Relics Bureau. If cultural relics or suspected ones are discovered during construction, construction unit shall ensure to:

- Stop construction in place of the discovery, and report to personnel of county PMO in the first time;
- Demarcate the discovered relics or area;
- Protect the movable objects in the discovered place from losing and damage, and try to appoint special responsible person to ensure that they are guarded at night.
- County PMO reports to local county Cultural Relics Bureau and provincial PMO;
- Local county Cultural Relics Bureau organizes professionals to investigate and assess;
- According to investigation and assessment results, if it is a cultural relic, ensure to report to provincial Cultural Relics Bureau for initial determination of protection level, and continue the project construction after cultural relics preservation department takes measures and approves project construction; if it is not a cultural relic, county PMO will notify the construction party to continue construction.

See figure 5-2 for cultural heritage reporting procedure.
If cultural relics or suspected ones are discovered:

Stop construction, and report to personnel of county PMO.

County PMO:

Report:

Local county administration of cultural heritage of

Organize professionals to investigate and assess:

They are cultural relics:

Provincial administration of cultural heritage:

State Administration of Cultural Heritage:

Take measures and agree:

They are not cultural relics:

Provincial PMO:

Determine protection level initially:

Construction party continues the construction:

Provincial PMO:

Construction party continues the construction:

Figure 5-2 Cultural Heritage Reporting Procedure
<table>
<thead>
<tr>
<th>Stage</th>
<th>Environment factor</th>
<th>Potential impact</th>
<th>Mitigation measures</th>
<th>Implemented by</th>
<th>Supervised by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design stage of feasibility study</td>
<td>County PMO</td>
<td>Sound environment</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County PMO</td>
<td>Atmospheric environment</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County PMO</td>
<td>Water environment</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td>Project construction stage</td>
<td>County PMO</td>
<td>Solid waste</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County PMO</td>
<td>Cultural relics</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County PMO</td>
<td>Social environment</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td>Project operation stage</td>
<td>County PMO</td>
<td>Agricultural activity</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td>Due diligence</td>
<td>County PMO</td>
<td>Large farms</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County PMO</td>
<td>Industrial and mining enterprises involving pollution discharge of heavy metals</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County PMO</td>
<td>Remaining historical pollution source (Slag/Shut enterprise)</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County PMO</td>
<td>Tailings storage</td>
<td>County PMO</td>
<td>Environmental Protection Department of Hunan, environmental protection bureau of sub-project county</td>
<td></td>
</tr>
</tbody>
</table>
(1) Setting of environment management system

Hunan Integrated Management of Contaminated Agricultural Land mainly involves the following organizations: management organizations (Committee for Hunan Integrated Management of Contaminated Agricultural Land, provincial PMO, county PMO), supervision organizations (World Bank, environmental protection department, environmental protection bureau), implementation organizations (agricultural bureau of project county, implementation town and village), consulting individuals or companies (environmental and social consultant, environmental monitoring company). These organizations compose the complete project environment management system, but each of them undertakes different work and responsibility. Main responsibility of each organization is shown in table 5-17. Project’s Environmental Management Organization Framework Diagram sees figure 5-3.
<table>
<thead>
<tr>
<th>Nature of organization</th>
<th>Name of organization</th>
<th>Responsibilities of organization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provincial project joint meeting</td>
<td>■ Provide comprehensive macro guidance for implementation and coordination of relevant policies as well as solving of relevant difficulties, supervise project implementation, review and approve project plan, seek for supporting capital, implement inter-department coordination and help solve difficulties existing in project implementation.</td>
</tr>
</tbody>
</table>
|                       | Provincial PMO | ■ Take charge of overall coordination and management of the project to ensure smooth implementation of relevant policies in environmental and social management plan, which mainly includes:  
  ■ Check and coordinate with the work of each local environmental management department.  
  ■ Take charge of arranging survey activities of environmental experts of World Bank.  
  ■ Summarize reports of each sub-project in different stages and submit them to World Bank for review.  
  ■ Report work to provincial PMO on a regular basis.  
  ■ Coordinate county PMO to handle the appeals and complaints |
|                       | County PMO | ■ Take charge of implementation and management of each sub-project to ensure smooth implementation of relevant policies in environmental and social management plan, which mainly includes:  
  ■ Supervise and urge the project implementer to implement environmental management plan.  
  ■ Prepare staged report of project environmental management.  
  ■ Report work to provincial PMO on a regular basis.  
  ■ Responsible for receiving and handling of appeals and complaints |
<p>| Supervision organization | World Bank | Supervisor and check implementation of environmental management plan. |
| Supervision organization | Environmental protection bureau | The governmental administration organization conducts whole-process environmental supervision management of project activities according to law, including approval of environmental impact assessment report, provision of guidance, and remediation acceptance. |
| Supervision organization | The third party supervisory organization | Project area implemented by agriculture specialized cooperative organizations, each project administrative village established project quality supervision team composed of the village committee members, farmer representatives, female representatives, representatives of rural poor households and representatives of vulnerable target population (including ethnic minority representatives in ethnic minority nationality regions). Responsibilities: firstly, supervise jointly projects implemented by farmer professional cooperative and agriculture-related enterprises with the agricultural supervision company |</p>
<table>
<thead>
<tr>
<th>Implementation organization</th>
<th>Project implementation organization established by project implementation township of each county</th>
<th>Take charge of project implementation and execution of environmental protection measures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consulting service organization</td>
<td>Environmental and social consultants</td>
<td>Implement environmental review, consulting and technical support upon the entrustment of project environmental management organization.</td>
</tr>
<tr>
<td>Environmental monitoring organization</td>
<td>Undertake professional environmental monitoring tasks upon the entrustment of project environmental management organization</td>
<td></td>
</tr>
</tbody>
</table>
Figure 5-3 Project’s Environmental Management Organization Framework Diagram
(2) Capability building and technical support

1) Purpose of training

Capability building is crucial for implementation of EMP. With the help of environmental and social consultant and the World Bank, PMO shall develop the training plan within project scope, to provide different stakeholders with proper training. Purpose of the training is to ensure the environmental management to be implemented smoothly and effectively, make related personnel familiar with the contents and procedures of environmental management, improve their capacity of environmental management, and ensure the effective implementation of environmental protection measures.

2) Training object

Training object: related personnel of PMO, implementation party, provincial environmental protection department, environmental protection bureau of project county, and environmental monitoring organization.

3) Training content

The training will include but not be limited to:

- Environmental and social safeguard policies of the World Bank
- Laws, regulations, and policies on China's environmental protection and restoration of polluted farmland;
- Environmental management mode of World Bank loan project, and environment clause in loan agreement;
- The Project's EMP, including environmental monitoring plan;
- Environmental standard;
- Responsibilities of all stakeholders;
- Preparation of EMP implementation progress report and environmental monitoring report;
- Mitigation measures after project is operated.

(3) Environmental monitoring plan

1) Purpose of monitoring

The environmental monitoring plan is developed to monitor the implementation of each measure, so as to adjust the environmental protection action plan according to monitoring results, and provide basis for implementation time and implementation scheme of environmental protection measures. Environmental monitoring includes construction period and operation period, and it aims to timely and comprehensively master the pollution status of the project to be constructed, learn about the changes and scope of
influence brought by project construction to the local environment quality, and the environment quality changes in operation area, timely feedback information to competent authority, and provide scientific basis for environmental management of project.

2) Monitoring unit

The monitoring organization is local environmental monitoring station or qualified social organization for environmental monitoring, the responsible organization is each provincial PMO, and the supervision organization is the environmental protection bureau of each project county. Implementation of monitoring

3) Implementation of monitoring

According to forecasting results of environmental impacts and pollution status in construction period and operation period, monitor the greatly influenced environment factors, determine the monitoring factors by pollution nature of project, analyze the monitoring with the relevant method in the Specification for Environmental Monitoring promulgated by the State Environmental Protection Administration, and assess in accordance with the national standard confirmed by EA. Keep detailed records of the implementation status of environmental monitoring and the results of monitoring report, include them into monthly report and quarterly report, and timely submit to local PMO.

4) Monitoring plan

- Monitoring of soil heavy metals

  Monitoring points: One point every 30-50 mu of mountainous area; one point every 50-100 mu of contiguous flat areas. The point is selected using the grid method. In the grid, a sampling plot is selected as the typical one that has a good condition of natural soil, flat ground, various relatively stable factors and 2 mu areas or so. The sampling plot should not be set up near the residential buildings, ditches, dunghill, waste heaps and mounds or in the sloping fields and depressions, etc. with subordinate landscape features. It should be more than 50 meters far away from the road or railway, and not deliberately avoid or reach the polluted plot.

  Monitoring items: pH, organic matter, cation exchange capacity (CEC), total Cd, total As, total Pb, total Hg, total Cr, available Cd.

  Monitoring time: Once a year for pH, available Cd; once for organic matter, cation exchange capacity CEC in the first year of project implementation survey; once for total Cd, total As, total Pb, total Hg, total Cr in the first year of survey and once for evaluation of the implementation effectiveness.

  In the process of demonstration project implementation, each project county should
select two zones (appropriately a single zone of 1,000 mu, set in the high risk areas as far as possible) as the demonstration zone, to carry out the soil sampling and detection which one-to-one corresponds with the agricultural product. Detection items: pH, total Cd, total As, total Pb, total Hg, total Cr, available Cd. Once per crop per year.

- **Monitoring of heavy metals in the agricultural products**
  Monitoring items: Cd, Pb, As, Hg, Cr.
  Monitoring time: Sample in the crop harvest period. The sampling point of agricultural products should correspond as far as possible with the soil heavy metal monitoring sampling point. Five or more composite samples should be collected from each of agricultural product samples. Monitoring frequency should be once per crop per year.

- **Monitoring of quality of farmland irrigation water**
  Monitoring points: The monitoring point of farmland irrigation water source should be set up hierarchically at the cross section of river near the main water inlet, main water inlet of trunk/branch canal irrigation and each of key reservoirs and ponds in the project area. Irrigation water samples should be collected at the water outlet of ground drainage and irrigation backwater in the project area.
  Monitoring items: pH, Cd, Pb, As, Hg, Cr6+, CODCr, NH3-N, TP (1 time).
  Monitoring time: Monitoring in the first and third year of the project implementation, 4 times (March, May, July and September) in the year of double cropping rice; 3 times (May, July and September) in the year of single cropping rice.

- **Monitoring of groundwater**
  The project area in Hunan Province basically does not involve groundwater as the irrigation water source, but a field monitoring of ground water should be carried out in the special area if it is involved in groundwater as water source.
  Monitoring points: A monitoring point should be set up at the water outlet of groundwater well in the project area. Sampling of water should be carried out beginning with a few minutes of water discharging to eliminate the accumulated impurities and stale water in the pipe.
  Monitoring items: pH value, CODMn, NH3-N, total phosphorus, Cd, Pb, As, Hg, Cr6+.
  Monitoring time: Monitoring 1 times in the first year of the project implementation.

- **Monitoring of the irrigation water sediment**
  Monitoring points: A sediment monitoring point should be set up at each detection point of farmland irrigation water source, which corresponds with the monitoring sampling
point of surface irrigation water body. A sample should be collected from each sediment monitoring point.

Monitoring item: pH value, total Cd, total As, total Pb, total Hg, total Cr, water soluble Cd.

Monitoring time: 1 times in the first year of survey and 1 times in the final phase of the project implementation (evaluation of effectiveness of implementation). Sediment collecting time should avoid the large-scale sampling time as far as possible. Sediment should be collected at the time when the second–fourth times of sampling is made.

● Monitoring of fertilizer

Compound fertilizer and phosphate fertilizer. Monitoring indicators: Cd, Pb, As, Hg, Cr. Detection frequency: 1 times in the first year of survey. 3 samples should be collected from each batch of compound fertilizer and phosphate fertilizer.

Organic fertilizer. Monitoring indicators: Cd, Pb, As, Hg, Cr, EOOC, total carbon. Detecting standards: The cadmium content of organic fertilizer used for purchase should be controlled under 1mg/kg, and the ratio of EOOC content in total carbon content should not exceed 15%. For others, refer to the standard of organic fertilizer of Ministry of Agriculture.

Every batch of the applied organic fertilizer should be detected by way of collecting 3 samples.

Other agricultural inputs, such as the monitoring of lime, passivator and so on.

Each monitoring is performed for the each purchase of a batch of agricultural inputs at a time, and three samples are collected in each batch. Monitoring index: Cd, Pb, As, Hg, and Cr.

● Monitoring of pests

Pesticide use status: Recording the kind of pesticide used in the project area, pesticide application frequency and dosage. The detection frequency should be 1 times a year;

Farmland ecosystem status: Monitoring the incidence of diseases and insect pests, the number of pests and natural enemies. The detection frequency should be 4 times / year (seedling stage, adult plant stage, fruit-bearing stage and harvest picking stage);

Pesticide residues in crops: More than 5 composite samples should be collected from each sample of agricultural product. The detection frequency should be 1 times per crop per year.

● Monitoring of the sedimentation pond sediment

Monitoring points: One sample should be collected from each sedimentation pond, by
way of quartering.

Monitoring time: Once a year.

Monitoring factors: pH, total Cd, total Pb, total As, total Hg, total Cr, water-soluble Cd.

- Balance monitoring

Each project county shall choose 2 representative project areas, and each project area shall choose 3 typical plots. Repair measures for the plot selected as the balance monitoring shall not be taken during the implementation of the project.

Soil: Collecting 1 basic sample from each typical plot. Monitoring 1 time a year. Detecting Cd, As, Pb, Hg, and Cr;

Plants: Collecting the aboveground part of mature rice, 3~5 samples from each typical plot, each sample having 5~7 plants;

Irrigation water: One composite sample should be collected from inlet water at each time of irrigation and 8 samples should be collected every year;

Atmospheric dry and wet deposition: With the simple sedimentation tank collection method, continuous monitoring of 2 years should be made and one times of collecting samples should be carried out every 3 months within the year;

Fertilizers: The amount of heavy metals that fertilizers brought into the plot should be calculated using the detected data in fertilizer monitoring.

The environmental monitoring plan for the project of Hunan Integrated Management of Contaminated Agricultural Land is shown in Table 5-18. The environmental monitoring plan of the county of specific project will need to be re-determined based on the pollution characteristics of the project area, environmental conditions and technical requirements of the scheme.
<table>
<thead>
<tr>
<th>Monitoring item</th>
<th>Monitoring parameters</th>
<th>Arrangement of monitoring point positions (quantity)</th>
<th>Monitoring frequency</th>
<th>Executive standards and specifications</th>
<th>Unit price (Yuan per sample)</th>
<th>Monitoring organization</th>
<th>Supervision organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation surface water</td>
<td>pH, Cd, Pb, As, Hg, Cr⁶⁺, COD₅, NH₃-N and TP (once only)</td>
<td>Farmland irrigation water source detection points are located at river sections around main irrigation water inlet of cultivated land in project area, main irrigation water inlets of main canals/branch canals and small reservoir in each key reservoir level by level. Irrigation water drainage sampling is carried out at ground drain of project area and irrigation water recession outlet.</td>
<td>Monitoring year: the first and third year upon implementation of the project. Monitoring frequency: 4 times within a year (March, May, July and September in case of double cropping rice). 3 times within a year (May, July and September in case of single cropping rice).</td>
<td>Procedural regulations regarding the environment quality monitoring of water for agricultural use (NY/T396-2000)</td>
<td>472</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Sediment in irrigation water sources</td>
<td>pH, total Cd, total Pb, total As, total Hg, total Cr and water soluble Cd</td>
<td>Monitoring sites of sediment are established at all monitoring points from water sources for field irrigation matching sampling points for monitoring of irrigation surface water. One sample is collected from each monitoring site of bottom mud.</td>
<td>Twice, namely, once in the first year and once at the end of the implementation of project (for implementation effect review.</td>
<td>Technical Specification for Soil Environmental Monitoring (HJ/T 166-2004)</td>
<td>432</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Sediment from sedimentation basins</td>
<td>pH, total Cd, total Pb, total As, total Hg, total Cr, available Cd</td>
<td>One sample is collected from each sedimentation basin with the method of quartering.</td>
<td>One time every year</td>
<td>Technical Specification for Soil Environmental Monitoring (HJ/T 166-2004)</td>
<td>432</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Monitoring of underground water (only applicable to areas reliant on groundwater for water source)</td>
<td>pH, COD₅, NH₃-N, total phosphorus, Cd, Pb, As, Hg, Cr⁶⁺</td>
<td>1 monitoring point is located at water outlet of underground water well in project area</td>
<td>To be monitored once in the first year of the demonstration project</td>
<td>Technical Specification for Environmental Monitoring of Groundwater (HJ/T 164-2004)</td>
<td>472</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Soil</td>
<td>pH, available Cd</td>
<td>One point per 30-50 mu in</td>
<td>One time every year</td>
<td>Technical Specification for Soil</td>
<td>100</td>
<td>Qualified</td>
<td>Provincial</td>
</tr>
<tr>
<td>Monitoring item</td>
<td>Monitoring parameters</td>
<td>Arrangement of monitoring point positions (quantity)</td>
<td>Monitoring frequency</td>
<td>Executive standards and specifications</td>
<td>Unit price (Yuan per sample)</td>
<td>Monitoring organization</td>
<td>Supervision organization</td>
</tr>
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<tr>
<td></td>
<td></td>
<td>mountain areas and one per 50-100 mu in vast of flat areas</td>
<td>Twice, namely, once in the first year and once at the end of the implementation of project (for implementation effect review.)</td>
<td>Environmental Monitoring (HJ/T 166-2004)</td>
<td>300</td>
<td>organization entrusted</td>
<td>and county PMOs</td>
</tr>
<tr>
<td></td>
<td>total Cd, total Pb, total As, total Hg, total Cr</td>
<td>Organic matter and cation exchange capacity (CEC)</td>
<td>Merely once in the first year of the implementation of project</td>
<td></td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil in demonstration fields</td>
<td>pH, total Cd, total As, total Pb, total Hg, total Cr, available Cd</td>
<td>Two fields are selected: 1,000 mu are preferable for fields of single cropping rice located at high risk areas as much as possible. One point per 30-50 mu in mountain areas and one per 50-100 mu in vast of flat areas</td>
<td>Samples are collected during harvest period and are monitored per crop per year on an annually basis.</td>
<td>Technical Specification for Soil Environmental Monitoring (HJ/T 166-2004)</td>
<td>418.5</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Agricultural products</td>
<td>Cd, Pb, As, Hg, Cr</td>
<td>Product sampling points shall match sampling points for monitoring of soil heavy metals as much as possible and more that 5 composite samples shall be collected for each sample</td>
<td>Samples are collected during harvest period and are monitored per crop per year on an annually basis.</td>
<td>National Standards for Food Safety - Determination of Cadmium in Food (GB 5009.15-2014); National Standards for Food Safety - Determination of Lead in Food (GB 5009.12-2010); National Standards for Food Safety - Determination of Total Mercury and Organic-mercury in Food (GB 5009.17-2014); National Standards for Food Safety - Determination of Chromium in Food (GB 5009.123-2014) National Standards for Food Safety - Determination of Total arsenic and Abio-arsenic in Food (GB 5009.11-2014)</td>
<td>352</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Monitoring of compound</td>
<td>Cd, Pb, As, Hg, Cr</td>
<td>3 samples are collected for each batch of fertilizer</td>
<td>Purchasing each batch of</td>
<td></td>
<td>500</td>
<td>Qualified organization</td>
<td>Provincial and county</td>
</tr>
<tr>
<td>Monitoring item</td>
<td>Monitoring parameters</td>
<td>Arrangement of monitoring point positions (quantity)</td>
<td>Monitoring frequency</td>
<td>Executive standards and specifications</td>
<td>Unit price (Yuan per sample)</td>
<td>Monitoring organization</td>
<td>Supervision organization</td>
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</tr>
<tr>
<td>Monitoring of organic fertilizer</td>
<td>Cd, Pb, As, Hg, Cr</td>
<td>3 samples are collected for each batch of fertilizer</td>
<td>Purchasing each batch of organic fertilizers once.</td>
<td>Cadmium content in organic fertilizer shall be limited below 1 mg/kg and the proportion of readily oxidizable organic carbon content in total carbon content shall not exceed 15%. For other restraints, refer to the standard of organic fertilizer from the Ministry of Agriculture - Organic Fertilizer (NY 525-2012)</td>
<td>500</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Monitoring of other agricultural inputs, such as the monitoring of lime, passivator and so on</td>
<td>Cd, Pb, As, Hg, Cr</td>
<td>3 samples are collected for each batch of agricultural inputs</td>
<td>Purchasing each batch of agricultural inputs once.</td>
<td></td>
<td>500</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Monitoring of plant disease and insect pests</td>
<td>Type, frequency and dosage of pesticide used; morbidity of plant diseases and insect pests, quantity of injurious insects and natural enemies; agricultural output and pesticide residues in agricultural products</td>
<td>Monitoring of crops and pesticide residues in agricultural products shall be made a key to each project area with more than five composite samples being collected for each farm product sample.</td>
<td>Type, frequency and dosage of pesticide used, morbidity of plant diseases and insect pests, quantity of injurious insects and natural enemies are monitored on an annually basis. Pesticide residues in agricultural products are monitored once per crop per year.</td>
<td>National Standards for Food Safety - Maximum Residue Limits for Pesticides in Food (GB2763-2014)</td>
<td>/</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Balance monitoring</td>
<td>Soil: Cd, As, Pb, Hg, Cr</td>
<td>2 typical project areas are selected in each project county and 3 typical fields are selected for each project area.</td>
<td>1 basic sample is collected for each typical field and is monitored on an annually basis.</td>
<td>Technical Specification for Soil Environmental Monitoring (HJ/T 166-2004)</td>
<td>300</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Monitoring item</td>
<td>Monitoring parameters</td>
<td>Arrangement of monitoring point positions (quantity)</td>
<td>Monitoring frequency</td>
<td>Executive standards and specifications</td>
<td>Unit price (Yuan per sample)</td>
<td>Monitoring organization</td>
<td>Supervision organization</td>
</tr>
<tr>
<td>-------------------------------------</td>
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<td>---------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Plant: Cd, As, Pb, Hg, Cr</td>
<td>Each sample with 5-7 roots is collected from the upper part of rice fields at maturity stage</td>
<td>3 or 5 sample is collected for each typical field and is monitored on an annually basis</td>
<td>/</td>
<td></td>
<td>352</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Irrigation water: pH, Cd, Pb, As, Hg, Cr⁶⁺, COD₃⁻, NH₃-N, TP</td>
<td>1 composite sample is collected at every time of field irrigation of incoming water</td>
<td>8 samples are collected each year</td>
<td>Technical Specification for Environmental Quality Monitoring of Agricultural Water Source (NY/T396-2000)</td>
<td>472</td>
<td></td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Atmospheric dry and wet deposition: Cd, As, Pb, Hg, Cr</td>
<td>One for each typical project area</td>
<td>To be monitored for 2 consecutive years and samples are collected once every 3 months within a year</td>
<td>To be monitored for 2 consecutive years and samples are collected once every 3 months within a year</td>
<td>Technical Specification for Automatic Monitoring of Environmental Air Quality (HJ/T 193-2005) Specification for Monitoring of Environmental Air Quality (No.4 Notice of the State Environmental Protection Administration in 2007)</td>
<td>600</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
<tr>
<td>Fertilizer: Cd, As, Pb, Hg, Cr</td>
<td>Based on data for fertilizer monitoring</td>
<td></td>
<td></td>
<td></td>
<td>720</td>
<td>Qualified organization entrusted</td>
<td>Provincial and county PMOs</td>
</tr>
</tbody>
</table>

Note: 1) GPS positioning and on-site photography are required for soil and farm product sampling so as to ensure scientific accuracy and accuracy of monitoring. Upon collection of each sample, the latitude and longitude of the patch from which the sample is collected shall be determined with a GPS locator being placed right in the center of the sampling patch and then be recorded once the data are stable (generally for 5 minutes after display of latitude and longitude). GPS uses WGS 84 coordinate system with latitude and longitude expressed in decimal system and reserved to over six significant decimal places and at the same time saves the sampling trace record. Registration form of sampling site shall be filled in on-site for entries of “point code, sampling location, latitude and longitude, local class, altitude, land use status, paddy or dry land, sampling depth, irrigation mode and irrigation guarantee rate”. In case of each sampling, photos of sampling point shall be taken by a digital camera against the background of a landmark. All photos shall give a clear indication of time and place of shooting and a distinct show of all samplers. 1-4 photos could be taken according to
circumstances of landmark background and shall be named by sample code. In consideration of intensive maturity of rice, data collection for sampling site could be staggered with sample collection for the purpose of higher efficiency.

2) If through the preliminary investigation, after confirming the main pollutants, the types of pollutants can be reduced in the governance and the assessment after the governance, in order to reduce testing cost. For example, if the pollutant in some project area is confirmed as Cd, and there is no problem about other elements, so the monitoring of other pollutants can be ignored in the project implementation.
5.2.11 Make pest control management plan

The Project will launch the pest management policy of World Bank. The project will draw up the pest management plan, by analyzing the current national policies on pest control, natural conditions, the current pest situation, the integrated treatment capacity and situation of pest, and pesticide usage in Hunan Province, propose the method and scope of pest control and management, emphasize to use the integrated management method and the usage in different conditions; as required by World Bank, formulate the specific implementation strategies, including the organization establishment and responsibility of province, city, and county, capability building of implementers, training of personnel at all levels, implementation of related policies, supervision and management of plan, project monitoring and appraisal and so on, and write the detailed report according to the pest management plan and the related requirements of World Bank. The pest management plan will provide a list of pesticides and herbicides that will be used in this project and meet the requirements of World Health Organization, and the detailed provisions for participants of the training project and monitoring plan.

The Project will draw up an integrated pest management plan of the project areas in the whole province to guide the pest management of each sub-project.

5.2.12 Public participation and information disclosure

(1) Public participation
1) Identification of stakeholder

To ensure that public consultation can reflect the public opinion on the project objectively, and make public participation fully representative with focus, public survey will cover the project area or its surrounding area that may be affected. For public survey object, key stakeholders shall be identified first. Project's stakeholders are identified, according to the Project's features and possible environmental impacts, sensitive population and organization. After identification, the Project's stakeholders are roughly classified into the following: 1) the unit and population (farmer, rural cooperative, and agricultural machinery service organization) directly benefiting from the project; 2) the unit and population suffering environmental and social impacts for project implementation, especially those with special sensitive target; 3) government organization and management department on project implementation, including the agriculture department, environmental protection department, water conservancy department, livestock sector, quality and technical supervision department, safety supervision department, poverty relief office, civil affairs bureau, human resources and
social security bureau, land bureau, and housing expropriation office of project area; 4) industrial and mining enterprises in project area, especially those involving heavy metals; 5) relevant experts.

2) Contents

This assessment process needs two rounds of public participation, as required by the Law of the People's Republic of China on Environmental Impact Assessment, the Temporary Act of Environmental Impact Assessment of Public Participating promulgated by Ministry of Environmental Protection, and the operation policy of World Bank (OP4.01).

The first round is in project's preliminary preparation stage after screening the environmental problems and before the final determination of EA outline. In this round, public consultation will focus on the stakeholder's and the public's cognition and knowledge of the project, their attitude towards the project, and their worries about relevant environmental and social impacts. Directly communicate and contact with the representatives of the affected population in project area and its surroundings, and all stakeholders, to listen to their opinions and take their advice.

The second round is in the completion stage of first draft of EA report. In this round, public consultation will mainly inform all stakeholders of the Project's potential environmental impacts and the adopted mitigation measures, reply and discuss about their opinions and questions, and inform the public of the complaint channel for the environmental problems on the Project.

3) Ways

Public participation of the Project adopts the following ways: questionnaire, symposium, seminar, and interview, etc.

Symposium mainly includes: 1) county-level cadres symposium, which is participated by government leader, and personnel of agriculture department, environmental protection department, water conservancy department, livestock sector, quality and technical supervision department, safety supervision department, poverty relief office, civil affairs bureau, human resources and social security bureau, land bureau, and housing expropriation office. 2) Rural cadres symposium. In each project town and village, hold the symposium participated by township cadres, responsible person of agrotechnical station, and village cadres. See Appendix 9 for the outline of interview with village cadres for Hunan Integrated Management of Contaminated Agricultural Land. 3) Villager symposium. It is participated by the people directly and indirectly affected by the project, especially the poor household, ethnic minorities, and women representatives. The symposium mainly introduces attendees the construction status of the Project and main contents on environmental protection and
social risks, listens to their opinions and suggestions on project construction, environmental protection and social risks prevention.

Questionnaire sample has covered different type of main stakeholder groups, and paid special attention to investigation to women, ethnic minorities, poor household, and other vulnerable groups. Questionnaire adopts the cluster sampling method and distributes with equal distribution principle. Carry out 200 questionnaires in each project county, select 2 project towns from each project county, and select 1 village from each project town, and send 100 questionnaires to each village. See Appendix 8 (EA Questionnaire) and Appendix 9 (SA Questionnaire) for main contents of questionnaire.

Interview: carry out in-depth interview in the area affected by the project, interview a certain proportion of women, ethnic minorities, and poor households, including certain proportions of low-income households, middle-income households, and high-income households. See Appendix 10 for the outline of interview with villager/poor household/women symposium for Management Project of Polluted Farmland in Hunan Province.

All the details of public participation, including date, place, participant, the proposed critical question, response and so on shall be recorded in the report of environmental management plan. Summary sheet of public participation in investigation process is designed as shown in Table 5-19.

Table 5-19 Summary Sheet of Public Participation

<table>
<thead>
<tr>
<th>Time</th>
<th>Form of public participation</th>
<th>Place</th>
<th>Participation object</th>
<th>Contents</th>
<th>Feedback to public opinions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

(2) Information disclosure

Information disclosure is an important requirement of World Bank's policy. The information needing disclosure includes at least: Description of project area, field investigation results, potential impact and suggested mitigation measures. The disclosure method may differ and include the poster, brochure, newspaper, TV, internet and villagers meeting. The draft of EMP shall be disclosed before the consulting activity in the public place that is convenient for the affected crowds and other stakeholders to access the information, to establish a meaningful consulting foundation. Information disclosure and consulting
mechanism will be planned and elaborated in the related safeguard documents.

Information of the Project is mainly disclosed by public notification on site and holding a symposium. Public notification on site is performed in the first public participation by posting the paper notification (see Appendix 7) in town government of project area, public notice board of village committee, and other crowded area. The second information disclosure is performed before basic completion and finalization of the EMP report draft, and at least 5 days before the symposium is held, by placing the EMP report draft in local PMO, post notification on site, and inform the public of the project's main contents, main environmental impacts and mitigation measures, as well as the place where the report draft is put, the hotline and contact, for the public to consult the report and give feedbacks. See Table 5-20 for information disclosure summary sheet.

**Table 5-20 Information Disclosure Summary Sheet**

<table>
<thead>
<tr>
<th>Disclosure time</th>
<th>Disclosure place</th>
<th>Disclosure form</th>
<th>Disclosure content</th>
<th>Organized by</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
6. Social assessment

6.1 Purpose to prepare the social assessment

The Purposes of SA are to identify social effects and social influences this project may bring, and come up with some useful solutions and advises to erase or reduce negative social effects during the project.

During the process of preparing the project, SA will take the method of participating, listen to the requests from different groups, and make sure benefiting as much related parties as possible, finally promoting the project area develop inclusively.

From primary identify of Social Risk, the content of this project would face the risks of involving immigrants, EM, and contaminated land. Hence, SA experts have made social management frame, implementing principles and methods to solve the possible risks, and provide to the affected groups with social protection.

6.2 SA Preparation

Based on the results of SA investigation, if income is decreased for part of local farmers, and cause huge social risks and negative influence, then SA experts should make assessment about the potential impacts on the affected groups, and make compensation plan according to the consulting results.

Based on the consultation among all experts and related groups, and by participating the assessment process, try to earn the understanding of affected groups and prepare a SA report. On the needs, the SA report should contain elements as follow:

- Basic information. Collect basic information of the families in the project area, and their planting structure, management model, family labors consistence, cost of planting, poverty degree, and women involvement, etc..

- Beneficiary groups. SA experts need to hold experts group meeting to recognize and analyze beneficiary groups in this project. By discussion among the experts, the related should be farmers, agricultural cooperatives, project village trustee, and related government department (agricultural, environmental and ethnical departments), the weak link (EM, the poor and women). SA experts should recognize them and do some research to realize their needs.
• Analyze on the EM. Based on the 4 standards of the definition of WB, the population percentage, location income and living styles, as well as their languages, culture, management and arrangement system. The essential part of recognition and analysis on EM should be: basic condition, both positive and negative influences, the beneficiary EM can gain and the method to participate, ways of protecting and adapting into their culture.

• Analysis on the poor and weak. By investigation to know the information of the weak and poor, including their living conditions, styles and poverty reasons. Analyzing their awareness of this project, approve level and both positive and negative influence on them.

• Social gender analysis. By investigation to know the information of women, including development condition in general and individually. Analyzing their awareness of this project, approve level and both positive and negative influence on them.

• Social influence and social risks analysis. Mainly taking questionnaire, interviewing and group talks to realize their awareness of this project, approve level and both positive and negative influence on them. Hereby making some ease measures. Combining the research data, analyze the social risks from immigrants, staff resettlement, farmers living and public sentiment.

• Public consultation, launch public consulting focus on the related groups. During the preparation stage, group meeting and questionnaire should start to earn the widely support and make framework documents that can make sure the consultation to the staff could work during the project.

• Risk controlling. Once confirmed the negative impacts on and risks to the affected groups, SA experts should try to avoid or erase or ease those affects in a maximum degree, or make suitable plan for compensation.

• Make reasonable compensation for affected people.

• Grievance redress mechanism

• Institutional arrangement

• Monitoring and evaluation

Before the confirmation of whether related projects or sub-projects are qualified to receive WB fund support, PMO needs to submit social risks report conducted by the sub-projects to WB 3 months in advance for checking. After approved, if detailed SA reports are needed, project institution need to submit SA to WB for checking, once approved, its sub-project can start.
6.3 Working procedure

Project's social assessment itself is relatively simple. Help to determine the stakeholders and optimize the project-related social problems, such as poverty, weak link, fairness, race and social gender, so as to establish the participation flow and opportunities and mechanisms for citizen engagement. For this project, the social consultants will finish the following social assessment practices:

- Prepare a short work plan and accept the review of project unit and World Bank. The work plan should include the project site investigation and consultation, as well as the scope of the problems to be discussed during consultation and the methods to be used (for example, the semi-structured interview outline and focus group discussion outline).

- Use the supporting data (the information provided in project documents, related literatures and government reports) to discuss with local authorities about the recognition of urban development strategy of local government, and the control plan of the polluted sites of this project; collect the social and economic statistics and the population statistical data, especially the composition of ethnic minorities in the project area, and determine the key stakeholders of the project.

- Provide training for the social assessment professionals and project personnel after determining the capacity difference of participants and organization in project preparation stage. The project staffs and professionals who receive training are predicted to be able to expand the social assessment range and design all sub-projects with participatory method.

- In the selected sampling pollution site, conduct sample investigation and consultation (adopting suitable participatory village assessment method) through field investigation, so as to collect the firsthand data for deep analysis, and guide the participation flow of project preparation stage. Particularly, be sure to emphasize the implementation of the free, preferential and well-informed consultation in ethnic minority community with the project as background, so as to fully understand their rights and interests and focuses during control of the polluted site.

- Conduct social analysis and assess the project impact and risk, and establish the public
participation mechanism for project management. Stakeholder analysis, beneficiary assessment and system analysis are the main methods to analyze the collected quantitative and qualitative data. Social analysis can finally transmit the key social process of interaction with project and the implementation of influencing factors to the project design and implementation, determine the method to minimize risks, and provide opportunities for local community to maximize the participation and discovery in the project.

- Based on the conclusion of social assessment, if the OP4.10 ethnic minority policy of World Bank is triggered, be sure to formulate the EMDP as required by this policy, and list it into the project safeguards documents disclosed in the project locality and the information center of the World Bank. Social assessment experts should screen in the initial preparation stage of the determined sub-project, according to the ethnic minority identification basis of World Bank, to determine whether there is ethnic minority in the project area or whether the ethnic minorities are collectively attached in the project area. According to the screening results, if the project area is found with presence of the ethnic minority as defined by World Bank IP term or the collectively attached ethnic minorities, the project management office should carry out social assessment to assess the positive and negative impacts on ethnic minority, and prepare an EMDP according to the results of social assessment; if the planned project sites can not be confirmed and therefore whether or not there is presence of the ethnic minority as defined by World Bank IP term, and project impacts on ethnic minority are uncertain at subproject preparation stage, be sure to formulate the EMDP framework for the particular subproject.

- Based on the conclusion of social assessment, if the OP/BP4.12 involuntary resettlement policy of World Bank is triggered, the resettlement action plan should be made as required by this policy or start a fully investigation for the requisitioned lands of the recent 2 to 3 years. Once the inevitable acquisition of land is determined in the project implementation, involuntary resettlement is necessary, and the standards for the acquired land are determined, the county project office shall start making the resettlement plan. Write the social assessment report, summarize the conclusion of social assessment and practice, and guide the project design and implementation activity to be consistent
with their social objectives.

7. Resettlement policy framework

7.1 Project Overview and Description of Objectives

7.1.1 Project Description

The project is "the use of World Bank loans in Hunan Province Integrated Pollution Control Project". Implementation time is 6 years, that is 2017 to 2022 years. The selection of participating counties and the implementation of the project are confirmed by year.

7.1.2 Project objectives and content

The objective of the project is to conduct risk factor analysis and assessment of heavy metal contaminated farmland in Hunan Province. Drawing lessons from and introducing the risk management experience of farmland heavy metal pollution at home and abroad in the final selected project counties. The establishment of risk-based integrated management of farmland pollution mechanisms, which is demonstration and promotion of different farmland pollution risk classification under the level of targeted prevention. And, forming the integrated management model to achieve sustainable and safe production of farmland.

The contents of the project include the sustainable management of farmland pollution, agricultural environmental monitoring and management, project capacity building, project management and evaluation of the four sections.

(1) Sustainable Management of Farmland Pollution

Based on the finding of the farmland soil and the corresponding heavy metal content of agricultural products, the present situation of farmland pollution sources, the crop varieties and their cultivation and management measures to do the Risk assessment of farmland pollution. According to their respective soils, exogenous and management of risk levels to develop appropriate risk control measures. At the same time, according to farmland infrastructure, socio-economic conditions and farmers planting habits to develop different risk control measures and engineering measures. And the development of risk-based land management tools, the development of the province's agricultural risk maps, to guide the production of farming.

(2) Agricultural environmental monitoring and management

Setting up the agricultural environmental monitoring and early warning system. The project area for agricultural pollutant content of the survey, farmland pollutant input and output balance monitoring; Formulating the draft local regulations and technical standards for the management of farmland pollution prevention and control; Providing technical assistance to enterprises involved in
heavy metal emissions that have serious impact on pollution sources in the project area.

(3) Project capacity building

The project will be government officials, technical personnel training organization to improve project management capabilities; Training local farmers to improve the farmers' awareness of the serious health impacts of farmland and agricultural products, At the same time to improve the sustainable use of soil management technologies; Organizing and implementing a series of research projects to support the implementation of the project and optimization of technical measures; formulating a soil environmental protection action plan.

(4) Project Management and Evaluation

Constructing the Project management MIS system, as well as collecting of project implementation process of farmland environmental quality changes and other relevant information in order to establish of integrated management of farmland pollution evaluation system; Acquisition of the office equipment required by the project management agency, as well as the costs incurred in the daily management of the project, procurement, financial management and project supervision.

7.1.3 The purpose of Formulate resettlement policy framework

At present, the project is in the evaluation stage of the project. The activities of the project are basically carried out in the land within the project village. And, the land acquisition is not needed in the project activity. All the civil construction activities are carried out within the village. The land involved in the project is adjusted within the project village, As we all know, the construction facilities are also used by the villagers. In the first batch, three project counties were identified. The project areas and project activities identified in the three counties did not involve land acquisition and relocation, involving a small amount of land converted to crops, totaling 49 hectares. Among them, 15 hectares of sorghum, 21 hectares of flowers and trees, Bingtang orange 13 hectares, but specifically related to which farmers before the project assessment is uncertain. The change of crop may cause the impact of income of farmers living conditions in a short time. However, the project areas in other project counties have not yet been determined, and some villages in the implementation process may involve land acquisition and house demolition. There may also be a small number of villages that affect the livelihoods and incomes of some farmers or cooperatives due to shifting crops or fallowing or returning farmland. So the resettlement policy framework of the project is prepared.

The resettlement policy framework is designed to minimize the negative social impacts of involuntary resettlement; for those unavoidable impacts, the necessary mitigation measures will be identified and implemented in accordance with the Bank's relevant policy requirements and relevant
The resettlement policy framework establishes objectives, procedures, institutional frameworks and implementation arrangements for resettlement, as well as a mechanism for public participation and public complaint grievances to identify and manage potential adverse social impacts arising from the project activity.

If any land acquisition and resettlement problems occurred in the project area, the framework will be used as a guide for resettlement preparation and implementation.

### 7.2 Objectives of Resettlement, Definitions and Key Principles

This resettlement policy framework is based on OP4.12 of *Involuntary Resettlement* as shown in the operation manual of the World Bank issued by World Bank in December 2001, with the overall objectives as follows:

- Discuss all feasible project design schemes to avoid or minimize the involuntary resettlement as much as possible;
- If the resettlement is inevitable, the resettlement activities should be designed and implemented as a sustainable development scheme. Provide sufficient funds for displaced persons so that they can share the project benefits, and allow them to grasp the opportunity to plan and implement the resettlement plan through careful consultation with them;
- Provide assistance for displaced persons to improve their livelihood and living standards, at least to recover indeed to relatively high standard before resettlement or project.

**Terminology in relation to resettlement:**

- “Displaced persons” are those persons, due to the project activities, (1) whose living standards are adversely affected; (2) or whose ownership, rights or benefits to any house, and land (including homestead, farmland and pasture) or other movables or immovables are temporarily or permanently acquired or occupied; (3) or whose production capital is temporarily or permanently affected; (4) or whose operational, occupational, working or residential sites or habits are adversely affected; and the persons to be moved as included in the definition of “displaced persons”.
- “Resettlement cost” is defined as follows: for agricultural land, it refers to market value of the land with the same production potential or purpose near the affected land before the project or resettlement (calculated by the higher value of the two), plus expenses for acquisition of the affected land to be up to standard and all of registration and transfer taxes and fees. For housing and other buildings, it refers to market cost of materials required for
building a replacement building in similar or superior region and quality, or for repairing the affected building, plus cost for building materials transportation to construction site, labor cost and contractor’s expenses and registration and transfer taxes and fees. It is neither that depreciation value of property and residual value of materials are considered nor that project benefits are deducted from estimated value of affected property in the determination of resettlement cost. If the local law fails to specify the standard for full resettlement cost compensation, other measures will be taken to supplement such standard so that the resettlement cost standard can be reached. Such supplemental assistance is different from resettlement measure under other clauses in Paragraph 6 of the World Bank OP4.12.

“Land acquisition” refers to the case in which ownership, use right or access to the land is involuntarily lost due to implementation of project. It may cause a series of associated influences including loss of residence or other fixed assets (fences, wells, tombs or other buildings or improving infrastructure in connection with the land).

- “Resettlement” includes two aspects: first is capital compensation which means to provide various compensation expenses for affected persons in order to recover the productivity, income and living standard; second is technical compensation which means to provide agricultural anti-fouling production training for affected persons in order to improve the safety quality of agricultural products.

- “Deadline” is the date prior to which the ownership or use establishes eligibility as displaced persons for compensation or other assistance. It is defined in the resettlement plan, and generally coincides with census date of affected persons or announcement date of specific civil works causing demolition. And after it, any person in the project area will not be qualified for compensation or other assistance.

This policy framework is prepared based on the Operation Manual of World Bank Involuntary Resettlement (OP4.12), with the principle and objectives as follows:

- Minimize the acquisition of land and other property and corresponding resettlement;
- Before expiration of baseline survey date, the displaced persons are qualified for requiring recovery measures to help them improve or at least keep the living standards, income access ability and production level before project. Displaced persons’ lack of legal rights in asset loss shall not impede their rights to take resettlement measures.
- Resettlement measures offered include: (1) compensate for residence and other buildings according to replacement costs excluding depreciation or residual value; (2) replace with agricultural land with the same productivity and acceptable by the displaced persons; (3)
replace with housing and homestead of the same quantity and acceptable by the displaced persons; (4) provide resettlement subsidies in relocation and transition periods;

- If replacing the agricultural land, housing and homestead of displaced persons, the replacing land and housing shall be close to the replaced ones as much as possible;
- Minimize the resettlement transition period, and provide the recovery measures for displaced persons in the project sites before commencement date of resettlement;
- Negotiate with the displaced persons in a repeated way on acquisition plan of land and other property and recovery measures provided to secure the minimal disturbance.
- Maintain or improve the original production and living standards in village group;
- No matter when and where needed, resettlement and recovery funds and material resources must be ensured to be provided in time and in adequate amount. The budget for resettlement plan should include the unforeseeable expense;
- System and institutional arrangement shall ensure that property and resettlement can be designed, planned, consulted and implemented effectively and timely;
- Implementation of resettlement plan shall be supervised, monitored and evaluated in an effective and timely way.

### 7.3 Legal and Policy Framework for Resettlement

Any land acquisition and resettlement activities in the project are to be carried out within the framework of laws and regulations. The relevant laws, regulations and decrees mainly include the following:

1) **Laws and policies issued by Chinese national and central ministries and commissions**, e.g. *Decision of the State Council on Deepening the Reform and Rigidly Enforcing Land Administration*, *Notice of Ministry of Land Resources on Construction Regulations (for trial implementation) of High-standard Basic Farmland*, etc.

2) **Laws and policies of Hunan regional government**, e.g. *Notice of the People’s Government of Hunan Province on Adjusting the Compensation Standard for Land Expropriation of Hunan Province*, and *Measures for Rural Land Improvement of Hunan Province*.

3) **Relevant policies and regulations of the World Bank**, e.g. OP4.12 *Involuntary Resettlement* of operation policy of the World Bank.

The specific policy framework is shown below.

**Resettlement Policy Framework**
<table>
<thead>
<tr>
<th>Level</th>
<th>Policy Document</th>
<th>Effective Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Property Law of the PRC</td>
<td>October 1, 2007</td>
</tr>
<tr>
<td></td>
<td>Land Administration Law of the PRC</td>
<td>August 28, 2004</td>
</tr>
<tr>
<td></td>
<td>Decision of the State Council on Deepening the Reform and Rigidly Enforcing Land Administration (SC [2004] No.28)</td>
<td>October 21, 2004</td>
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<tr>
<td></td>
<td>Measures on Public Announcement of Land Acquisition (Decree No.10 of the Ministry of Land and Resources)</td>
<td>January 1, 2002</td>
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<tr>
<td></td>
<td>Regulations on the Protection of Basic Farmland (The State Council)</td>
<td>December 27, 1998</td>
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<tr>
<td></td>
<td>Notice of Ministry of Land Resources on Construction Regulations (for trial implementation) of High-standard Basic Farmland (GTZF (2011) No. 144)</td>
<td>September 24, 2011</td>
</tr>
<tr>
<td>Hunan province</td>
<td>Environmental Protection Regulations of Hunan Province</td>
<td>January 17, 1994</td>
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<tr>
<td></td>
<td>Regulations on Land Development and Consolidation of Hunan Province</td>
<td>November 30, 2006</td>
</tr>
<tr>
<td></td>
<td>Opinion of CPC, Hunan Provincial Committee, and the People's Government of Hunan Province on Promoting the Comprehensive Improvement of Rural Land</td>
<td>November 27, 2009</td>
</tr>
</tbody>
</table>
The aforementioned laws, regulations and policy documents form the basis for legal and policy framework for compensation and production and living recovery of the persons affected by land acquisition and resettlement. The key provisions of relevant laws and policy documents are as follows.

**Key provisions of the Property Law of the PRC:**

**Article 42**

In order to meet the demands of public interests, it is allowed to acquire lands owned collectively, premises owned by entities and individuals or other realties according to the statutory power limit and procedures.

When acquiring land owned collectively, it is required to, in accordance with law and in full amount, pay land compensation fees, placement subsidies, compensations for the above-ground fixtures of the lands and seedlings and other fees, arrange for social security fees for the farmers with land acquired, guarantee their livelihood and protect their lawful rights and interests.

When acquiring the premises owned by entities and individuals or other realties, it is required to compensate for demolition and acquisition in accordance with law and protect the lawful rights and interests of the owners of the acquired realties; when acquiring the individuals’ residential houses, it is required to guarantee the housing conditions of the owners of the acquired houses.

**Article 43**

Special protections are provided by the state for farm lands, the conversion of farm lands into

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<tr>
<th>Level</th>
<th>Policy Document</th>
<th>Effective Date</th>
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<td>Measures for Rural Land Improvement of Hunan Province (XGTZF [2014] No. 5)</td>
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construction lands is strictly restricted and the aggregate quantity of construction lands is under control. No one may acquire any land owned collectively with violation of the statutory power limit and procedures.

**Article 47**

In acquiring land, compensation should be made according to the original purposes of the land acquired. Compensation fees for land acquired include land compensation fees, resettlement fees and compensation for attachments to or green crops on the land. The land compensation fees shall be 6-10 times the average output value of the three years preceding the acquisition of the cultivated land.

The resettlement fee shall be calculated according to the number of agricultural population to be resettled. The number of agricultural population to be resettled shall be calculated by dividing the amount of cultivated land acquired by the per capital land occupied of the unit whose land is acquired. The resettlement fees for each agricultural person to be resettled shall be 4-6 times the average annual output value of the three years preceding the acquisition of the cultivated land. But the maximum resettlement fee per hectare of land acquired shall not exceed 15 times of the average annual output value of the three years prior to the acquisition.

 Whereas the land compensation fees and resettlement fees paid according to the provisions of the second paragraph of this article are not enough to maintain the original level of living, the resettlement fees may be increased with the approval of the people's governments of provinces, autonomous regions and municipalities. But the combined total of land compensation fees and resettlement fees shall not exceed 30 times the average output value of the three years prior to the acquisition.

**Article 57**

In the case of temporary using State-owned land or land owned by peasant collectives by construction projects or geological survey teams, approval should be obtained from the land administrative departments of local people's governments at and above the county level. Whereas the land to be temporarily used is within the urban planned areas, the consent of the urban planning departments should be obtained before being submitted for approval. Land users should sign contracts for temporary use of land with related land administrative departments or rural collective organizations or villagers committees depending on the ownership of the land and pay land compensation fees for the temporary use of the land according to the standard specified in the contracts.
Users who use the land temporarily should use the land according to the purposes agreed upon in the contract for the temporary use of land and should not build permanent structures. The term for the temporary use of land shall not usually exceed two years.

Key provisions of the Regulations on the Acquisition of Premises on State-owned Land and Compensation:

**Article 17** The compensation to be paid by the city and county people's governments that have made the decisions on house acquisition to the persons whose houses are to be acquired shall include:

1. The compensation for the value of the houses to be acquired;
2. The compensation for relocation and temporary resettlement arising from the house acquisition;
3. The compensation for losses arising from production and business suspension caused by the house acquisition.

City and county people's governments shall formulate the procedures for subsidies and incentives, and grant subsidies and incentives to the persons whose houses are to be acquired.

**Article 19** The compensation for the value of houses to be acquired shall not be less than the market price of the real estate comparable to the houses to be acquired on the date of the public notice of the house acquisition decisions. The value of the houses to be acquired shall be assessed and determined by real estate appraisal agencies with appropriate qualifications in accordance with the procedures for evaluating houses to be acquired.

Anyone who has objection to the value of the houses to be acquisition that has been assessed and determined may apply to the real estate appraisal agency for reassessment. Anyone who disagrees with the results of the review may apply to the real estate appraisal expert committee for appraisal.

**Article 20** Real estate appraisal agencies shall be selected by the persons whose houses are to be acquisition through consultation. If consultations fail, the same shall be determined by majority decision, random selection and other methods. The specific procedures shall be formulated by the authorities of provinces, autonomous regions and municipalities directly under the central government.

**Article 21** The persons whose houses are to be acquisition may choose monetary compensation or house property rights exchange.
If the persons whose houses are to be acquisition select house property rights exchange, city and county people's governments shall provide the houses to be used for property rights exchange, and, jointly with the persons whose houses are to be acquisition, calculate and settle the price difference between the values of the houses to be acquisition and the values of the houses to be used for property rights exchange.

**Article 22** If any relocation is caused by house acquisition, the house acquisition department shall pay relocation costs to the persons whose houses are to be acquisition. If any persons choose house property rights exchange, the house acquisition department shall, prior to the delivery of the houses to be used for property rights exchange, pay temporary resettlement costs or provide transitional houses to the persons whose houses are to be acquisition.

**Article 23** The compensation for any losses arising from production and business suspension caused by house acquisition shall be determined according to profits, duration of production and business suspension and other factors prior to the house acquisition.

**Article 25** The House Acquisition Departments and the persons whose houses are to be acquisition shall, pursuant to these Regulations, enter into compensation agreements with respect the compensation method, the compensation amount and payment terms, the location and area of the houses to be used for property rights exchange, relocation costs, temporary resettlement costs or transitional houses, losses arising from production or business suspension, period of relocation, methods and periods of transition and other matters.

If, after any compensation agreement is entered into, one party fails to perform its obligations set forth in the compensation agreement, the other party may file an action according to law.

**Article 26** If any House Acquisition Departments and any persons whose houses are acquisition fail to enter into compensation agreements within the time limit for contract execution specified in the acquisition compensation program, or the owners of the houses to be acquisition are uncertain, the House Acquisition Departments shall request the city and county people's governments that have made the decisions on house acquisition to make decisions on compensation in accordance with the acquisition compensation program and publish the same to the public in the areas of house acquisition pursuant to these Regulations.

If any person whose house is to be acquisition has objection to the compensation decision, such person may apply for administrative reconsideration or file an administrative lawsuit according to law.
**Article 27** In carrying out house acquisition, compensation shall be paid first before relocation.

**Article 28** If the persons whose houses are acquisition fail to apply for administrative reconsideration or institute administrative proceedings within the statutory time limit, and fail to relocate within the period set forth in the compensation decision, the city and county people's governments that have made the decisions on house acquisition shall petition the people's court for enforcement.

**Key provisions of the Decision of the State Council on Deepening the Reform and Rigidly Enforcing Land Administration:**

Improving measures of compensation for land acquisition. County-level and above local people’s governments shall take practical measures so that the standard of living of farmers affected by land acquisition is not reduced by land acquisition. Land compensation, resettlement subsidy and compensation for ground annexes and crops shall be paid in full and timely pursuant to law. If the land compensation and resettlement subsidy pursuant to the prevailing laws and regulations are insufficient to maintain the former standard of living of the farmers affected by land acquisition or to pay the social security expenses of farmers who lose all land due to land acquisition, the people’s governments of provinces, autonomous regions and municipalities directly under the Central Government shall approve an increased resettlement subsidy. If the sum of the land compensation and the resettlement subsidy pursuant to the prevailing laws and regulations are insufficient to maintain the former standard of living of the farmers affected by land acquisition, local people’s governments may pay a subsidy from the income from compensated use of state land. The people’s governments of provinces, autonomous regions and municipalities directly under the Central Government shall fix and publish the uniform annual output value standards or integrated land prices for land acquisition of all cities and counties, so that the same price applies to the same kind of land. For key construction projects of the state, land acquisition expenses must be listed in the budgetary estimate in full. Compensation Standards and resettlement measures for large and medium-sized water resources and hydro-power projects shall be otherwise stipulated by the State Council.

Resettling land-expropriated farmers properly. County-level and above local people’s governments shall take specific measures to guarantee long-term livelihoods of farmers affected by land acquisition. For projects with a stable income, farmers may become a shareholder using the right to use of land used for construction approved pursuant to law. Within the urban planning area, local people’s governments shall bring farmers who lose all land due to land acquisition into the urban employment system, and establish a social security system; out of the urban planning area, in
acquiring land collectively owned by farmers, local people’s governments shall reserve necessary arable land or arrange appropriate jobs for farmers affected by land acquisition within the same administrative area; farmers without land who do not have the basic living and production conditions shall be subject to non-local resettlement. The labor and social security authorities shall propose guidelines for the employment training and social security systems for farmers affected by land acquisition as soon as possible.

**Key provisions of the Guidelines on Improving Compensation and Resettlement Systems for Land Acquisition (Document No.238):**

Fixation of uniform AOV Standards: The province-level land and resources department shall fix minimum uniform AOV Standards for arable land of each county (city) within the province together with other departments concerned, and report to the provincial government for approval and implementation. Uniform AOV Standards may be fixed in consideration of land type, quality and grade, farmer investment, farm product price, etc.

Fixation of uniform annual output value multiples. The uniform multiple of annual output value for land compensation fees and resettlement subsidy shall be fixed within the statutory range so that land-expropriated farmers’ standard of living is not reduced; if compensation fees for land acquisition calculated from the statutory uniform multiple of annual output value are insufficient for land-expropriated farmers to maintain their former standard of living or insufficient to cover their social security costs, the multiple shall be increased appropriately with the approval of the province-level people’s government; if an aggregate multiple of 30 for land compensation fees and resettlement subsidy is still insufficient for land-expropriated farmers to maintain their former standard of living, the local people’s government shall allocate a certain proportion from the income from the compensated use of state-owned land for subsidization. For basic farmland occupied with lawful approval, the highest compensation rate announced by the local people’s government shall apply.

Fixation of composite land prices for land acquisition areas. Where conditions permit, the province-level land and resources authority may fix composite land prices for land acquisition for different counties and cities in the province together with other competent authorities, and report such prices to the province-level people’s government for approval, disclosure and implementation. Such prices shall be fixed in consideration of land type, output value, geographic location, farmland rating, per capita arable area, land supply-demand relationship, local economic level and minimum living security level of urban residents, etc.
Distribution of land compensation fees: Since land compensation fees are used mainly on households affected by land acquisition, land compensation fees shall be distributed within rural collective economic organizations reasonably. The detailed distribution measures shall be formulated by the provincial government. If all land of a village is acquired and the rural collective economic organization is cancelled, all land compensation fees shall be used for the production and livelihood resettlement of land-expropriated farmers.

Key provisions of Notice of the People’s Government of Hunan Province on Publishing the Compensation Standard for Land Expropriation of Hunan Province (XZF [2009] No. 43)

First, the compensation standard shall include the sum of land compensation and resettlement subsidy. For acquisition unit or personal housing and other immovables, crop compensation etc., the compensation standard prepared by cities and approved by the People’s Government of Hunan Province shall prevail. For state-owned agricultural land i.e. for farming, forestry, husbandry and fishing grounds recovered for non-agricultural construction land, the compensation standard for collective land of neighboring farmers shall be referred to.

Second, for acquisition of collective construction land, rural roads and ponds, the regional compensation standard shall be referred to.

Third, the People’s Governments of cities, counties and districts shall prepare the guidelines for allocation of land acquisition compensations on the basis of the principle that they will be mainly used for production and living of farmers whose land is acquired. The land acquisition expenses should be fully paid within 3 months from the date when the resettlement plan is approved. For social guarantee of farmers whose land is acquired, the relevant national and provincial provisions shall prevail.

Gap analysis on involuntary resettlement policies between the World Bank and Chinese domestic requirements

In general, there is no great difference between the World Bank’s operational guide OP4.12 and Chinese involuntary resettlement policy. Objectives and general procedures of them are consistent. Both of them are to avoid the involuntary resettlement or minimize the loss from involuntary resettlement in order to ensure long-term livelihood of displaced persons and recover the living standards of involuntarily displaced persons to the standards before resettlement. During implementation of involuntary resettlement, the World Bank’s and domestic policies shall be designed to provide resettlement compensation and resettlement, as well as supervision and evaluation. Some gaps also exist between these policies and are as follows:
Linkage coverage of involuntary resettlement impact scope. World Bank includes the scope of lending project and its linkage project in addressing involuntary resettlement. While the Chinese land acquisition and resettlement regulation does not have requirements for a project to cover its linkage project.

Compensation or legal and illegal structures and squatters, in general, only the affected legal structures and displaced person can be compensated under Chinese regulations. In contrast, under the World Bank requirements, whether the affected structure or displaced person (such as squatter) is legally recognized, should be compensated or receive other necessary resettlement assistance as appropriate.

In terms of compensation standard, the World Bank OP4.12 policy requires for compensation at full replacement cost or direct replacement of asset with assets for affected housing property and other assets. However, the World Bank also stipulates that if resettlement cost cannot be fully covered in accordance with the country domestic regulation, other necessary measures should be taken to reach level of full replacement cost. This policy does not allow depreciation of asset value and often leads to a higher compensation standards in its lending project than domestic projects.

Public’s participation. The requirements for participation and consultation of the Chinese government policies and regulations are very general. No Chinese government policies or regulations requires for the participation of affected people in resettlement planning, except in hydropower projects. In contrast, the Bank policy has very clear and specific requirements for information disclosure as a policy, and public people’s participation (esp. those affected people) in project design, resettlement planning, implementation, and monitoring and evaluation as well as grievance mechanisms. The Bank encourage project owner to prepare resettlement information leaflets and distribute them to the public, particularly the affected people.

**Measures to bridge the gaps between the World Bank’s and domestic policies:**

(1) In the implementation of this project, make sufficient understanding of any linkage project and any involuntary resettlement resulted from such project. In case of any involuntarily displaced persons therefrom, this resettlement policy framework shall also be observed and involuntary resettlement policy requirements of the World Bank and related mitigation measures of local government shall be adopted to resettle these persons;

(2) For definition of scope of affected people, whether the affected structure or displaced person (such as squatter) is legally recognized, should be compensated or receive other necessary resettlement assistance as appropriate.
(3) For compensation of affected persons, the compensation standard shall be no lower than the domestic standard, and livelihood recovery measures shall also be provided for affected persons;

(4) Encourage the public’s participation, and prepare the public’s participation measures, grievance and appeal mechanisms including creating the village-level organization for project, providing capacity construction for such organization, and helping the affected persons have the rights to acquire the project information and express the opinions and suggestions.

The above measures will be applied to the implementation of this project.

7.4. Preparation and Approval of the Resettlement Action Plan

Through close collaboration with the county-level PMOs of each sub-project, the PMO of Hunan Province shall prepare the resettlement plan (including guarantee and use of resettlement expenditure), which shall be submitted to the World Bank via provincial PMO for review and approval; meanwhile opinions of displaced persons shall be fully asked so that they will have an opportunity to participate in the design and implementation of resettlement plan.

When the number of affected population from the sub-project selected is more than 200, the PMOs shall be responsible for coordination with local government and the project employer, prepare a detailed resettlement action plan which shall be submitted to the World Bank via the PMO of Hunan Province; meanwhile opinions of displaced persons shall be fully asked so that they will have an opportunity to participate in the design and implementation of resettlement plan.

On the basis of OP 4.12 of Involuntary Resettlement, the resettlement plan will cover the following:

- General description of project.
- Objectives (i.e. main objectives of resettlement plan).
- Analysis of social and economic conditions in project areas, including investigation to general social and economic conditions of project areas, and analysis of social and economic conditions of potential displaced persons.
- Identification and analysis of potential social impact of project.
- Legal framework. Laws and regulations guiding the resettlement compensation and resettlement activities, and necessary legal steps and procedures.
- Qualification. Define the recognition standard for displaced person, and decide whether he or she is qualified for compensation or other resettlement assistance.
- Loss evaluation and compensation.
• Recovery measures of resettlement. Describe the compensation in cash and other resettlement measures.
• Selection, preparation and rearrangement of resettlement places.
• Supply of residence, infrastructure and social service.
• Environmental protection and management.
• Public’s participation and consultation, including consultation with displaced persons and village group where these persons are located.
• Assimilation of residents in resettled areas. Measures to reduce the impacts of resettlement on communities in any receiving places.
• Appeal and grievance mechanisms. Provide appeal procedures for any disputes from resettlement compensation.
• Organization and responsibilities.
• Implementation schedule.
• Cost and budget.
• Monitoring and evaluation.

At least 6 months from the commencement date of resettlement as estimated, the resettlement plan shall be completed. At least 3 months in advance before practical action, each plan shall be submitted to the World Bank for consideration, or the compensation, resettlement and recovery activities cannot be started. These activities shall be completed before commencement of civil contract.

When the number of affected population from the sub-project selected is no more than 200, and property loss is no more than 10 %, the PMOs shall go through close collaboration with the project employer, prepare the abbreviated resettlement action plan for such sub-project, which shall be submitted to the World Bank via external cooperation center; meanwhile opinions of displaced persons shall be fully asked so that they will have an opportunity to participate in the design and implementation of resettlement plan.

On the basis of OP 4.12 of *Involuntary Resettlement*, the abbreviated resettlement plan will at least cover the following:
• Detailed investigation to displaced persons, and assets valuation;
• Description of prepared compensation and other resettlement assistance;
• Communication with displaced persons in terms of acceptable alternative plan;
• Implemented institutional responsibility and grievance procedure;
• Monitoring and implementation arrangement;
• Schedule and budget.
By 4 months from the commencement date of resettlement as estimated, the abbreviated resettlement plan shall be completed. At least 3 months in advance before practical action, each plan shall be submitted to the World Bank for consideration, or the compensation, resettlement and recovery activities cannot be started. These activities shall be completed before commencement of civil contract.

7.5 Entitlements to Compensation and Resettlement

7.5.1 Eligibility for compensation

The compensation standard for land acquired by the project shall follow “all regions should establish dynamic adjustment mechanism for land acquisition compensation standard and adjust land acquisition compensation standard every 2 to 3 years in accordance with economic development level and increase of local per capita income to gradually improve land acquisition compensation level” prescribed in Notice of the Ministry of Land and Resources on further Improve Land Acquisition Management (26 Jun., 2010)

The purpose of resettlement plan is to secure that the lost property of displaced persons can be compensated for according to replacement prices, and to improve their living standards or at least make their income and living standards reach the standards before the implementation of the project. So it shall be secured that displaced persons qualified for compensation are fully identified, and compensation measures in the resettlement plan are supported and approved by displaced persons.

In general, under this project, it is unlikely to acquire land. But villagers in project areas are more likely to be affected by non-land economic losses and some small scale of temporary land occupation. Persons qualified for compensation (may) include the following:

Persons whose land is unused or converted due to heavy pollution: including villagers having official land use rights (class A); affected land tenants (class B). Wherein the displaced persons of class A shall have the right to obtain the replacement cost compensation, and displaced persons of class B shall have the right to obtain the crop and building loss compensation.

Persons whose income from new crop is less than before within a short period due to crop shifting: including farmers or cooperatives who have to abandon the original crops to replant the others due to the project and whose income from such new crop is less than before.

Persons affected by temporary land occupation: including short-term impacts of temporary land occupation, transitional cost related to displacement, or the implementation of the project on ground crops and attachments.
Persons who have lost their housing, other buildings and fixed assets: including persons having lost their housing and other buildings no matter whether they have the land use right or building permit before deadline.

7.5.2 Provisions on compensation measures

The displaced persons affected by this project will have the right to obtain the following compensation and recovery measures:

- Firstly, after land acquisition, the remaining collective land or current village land will be re-allocated by the village committee to collective members. In this case, if the house or building will become unsafe or its function become absent due to some part of land acquisition, the land should be fully acquired. The displaced persons are qualified for land re-allocation and benefits from investment into collective land compensation.

- According to the *Land Administration Law* and relevant laws, for those lands which cannot be re-allocated, the corresponding displaced persons must be identified; if the construction land is converted from agricultural land, the approval of agricultural land conversion should be handled.

- According to Article 47 of the *Land Administration Law*, in case of land acquisition, the compensation shall be provided according to original purpose of the land acquired. In case of arable land acquisition, the compensation shall include the land compensation, resettlement subsidy and compensation for ground attachments and crops. Wherein the land compensation is six to ten times of average annual output value of three years before the acquisition, and the resettlement subsidy shall be calculated according to agricultural population to be resettled. Such population shall be calculated by dividing the amount of arable land acquired by per capita amount of arable land in acquired unit before acquisition. The resettlement subsidy standard for each of agricultural population requiring resettlement shall be four to six times the average annual output value of three years before the acquisition. However the maximum resettlement subsidy for each hectare of arable land acquired shall not exceed fifteen times the average annual output value of three years before the acquisition.

- If the land compensation and resettlement subsidy are insufficient to recover the living standards of displaced persons, the People’s Government of corresponding cities and counties can use the income from the income of the use of state-owned land for compensation;

- The land compensation and resettlement subsidy paid to the village committee (of the village where the land is affected) or displaced persons shall be used for (1) expanding the area of arable land if the land can be utilized; (2) improving the agricultural production by irrigation, or
improving the agricultural operation etc.; (3) developing the non-agricultural income based on the existing activities. Any damaged crops and fruit trees of displaced persons shall be compensated for.

- The low income, damaged crops and land recovery of displaced persons affected by temporary land occupation, and damaged infrastructures shall also be compensated for.

- If the displaced persons losing their agricultural land reach the local conditions to participate in the social insurance for land-lost farmers, they shall be incorporated into social insurance system for land-lost farmers.

- Timely and proper technical training should be provided for displaced persons in order to improve their agricultural/non-agricultural skills and earning capacity.

Secondly, the following compensation shall be provided for demolishing housing and aground attachments of displaced persons: provide the replacement housing of the same value; provide the compensation by full replacement costs; reconstruct or recover the facilities and services (e.g. road, water, electricity, telephone, cable TV, school, etc.); subsidy for transition period should be sufficient to remove the property or obtain the temporary housing.

- Patterns of community organization appropriate to the new circumstances are based on choices made by the displaced persons. To the extent possible, the existing social and cultural institutions of the displaced persons and any host communities are preserved and the displaced persons’ preferences with respect to relocating in preexisting communities and groups are honored.

- **Preparation of subsidy plans for affected farmers and organizations**

  In addition to compensation for land, green crops, attachments and tress transplanting of local residents due to the construction of the project as arranged in the resettlement subsidy, this section also states the subsidy plan for loss from replanting or fallow resulted from the project activities.

  **Implementation process**

  The compensation plans for affected farmers and organizations shall set the specific implementation schedule for compensation activities to be developed, and wherein the compensation plan for the farmers shall be prepared in advance through sufficient consultation with farmers and reviewed by the relevant functional department, provincial PMO and the World Bank. At the implementation stage of the project, the PMO shall implement the compensation plan, pay attention to needs and suggestions of women by information disclosure and public participation, and take measures to increase the positive benefit and reduce the negative benefit of the project.
**Compensation types**

According to the relevant governmental provisions, the compensation items mainly include cost subsidy, production subsidy and risk subsidy.

1. **Cost subsidy.** It is mainly used for increase of material cost and labor cost due to use of lime spraying, flooding irrigation, low-cadmium variety, organic fertilizer, green manure planting, leaf retarder, soil conditioner and deep ploughing for the project.

2. **Production subsidy.** It is mainly used for increase of production inputs due to crop shifting of the project e.g. replanting of cotton, orange candy, sorghum, grapefruit and flower and seedling.

3. **Risk subsidy.** It includes three parts: lost output subsidy due to change of agronomic technique; subsidy when the product failing to meet the standard and entering food sales market; subsidy for income decrease due to restructuring.

**Determination of compensation standards**

1. Confirm the compensation for increased materials e.g. lime, retarder, seed by market prices.

2. Prepare the compensation for additional labor inputs by RMB 90 and RMB 150 per day. Prepare the compensation for work requiring simple labor skills e.g. weeding, water pumping by RMB 90 per day; prepare the compensation for work requiring complex labor skills e.g. lime spraying, deep ploughing by RMB 150 per day.

3. Prepare the compensation for products failing to reach standard within the transition period of the project due to land pollution, which thus cannot enter the foods market, and potential output reduction due to repair by RMB 700 per mu (as grains that cannot enter the foods market can only be used as bio-materials, and prices of bio-materials are generally 1/3 less than purchase prices of grains, prepare the compensation by 1/3 of one-season output value; prepare the compensation for potential output loss due to technical repair by 1/20 of one-season output value).

4. Adopt one-time subsidy for restructured production inputs. For replanting of orange candy or navel orange, it is RMB 1,000 per mu, for replanting of sorghum or cotton, it is RMB 900 per mu, for replanting of grapefruit, it is RMB 1,150 per mu, and for replanting of flower and seedling, it is RMB 1,650 per mu.

5. Prepare the subsidy for lost benefit from crop shifting according to growth years of crops. For replanting of annual crops, it is RMB 450 per mu per year, and for replanting of crops of two years above, it is RMB 900 per mu per year until the year when there is harvest.

**Vulnerable groups**
Vulnerable groups involved in the Project include the elderly, the disabled and woman-headed households, should be identified and consulted in the census.

The compensation and resettlement terms for all affected persons apply to these groups. In addition, vulnerable groups will receive extra assistance to ensure that their income and livelihoods are restored or improved as a result of project implementation.

**Ethnic minorities**

Resettlement of ethnic minorities is particularly complex and may have significant adverse impacts on their identity and cultural survival. For this reason, the borrower should explore all viable alternative project designs to avoid physical displacement of these groups. When it is not feasible to avoid such displacement, preference is given to land-based resettlement strategies for these groups that are compatible with their cultural preferences and are prepared in consultation with them. Project PIUs should ensure ethnic minority’s participation in consultation and that communicate in ethnic minority language or plain language, to improve social equality awareness of PMO and related township planning and management staff, to strengthen inclusivity of the project. Meantime, executor should do a good work of compensation and recovery measures for ethnic minority migrant.

The RAPs prepared should include an entitlement matrix for the APs. See Appendix13.

**7.6 Implementation Procedures**

The RAP should include all detailed implementation schedules. Compensation payment and other necessary restoration measures (in cash or otherwise) must be completed before land acquisition. If full compensation is not paid or necessary assistance measures are not available before land acquisition, a transition subsidy should be provided. In addition, the following basic legal procedures should be followed during land acquisition, property demolition and resettlement.

**7.6.1 General procedures of land acquisition and property demolition on collective land**

Regulations on the Implementation of the Land Administration Law of the PRC Article 20 of the Regulations on the Implementation of the Land Administration Law of the PRC stipulates that land acquisition for the purpose of urban planning within the range of urban land for construction specified in the master plan for land utilization shall be carried out as follows:
(1) The municipal or county people's government shall draft farmland conversion programs, arable land replenishment programs and land acquisition programs according to the annual land utilization plan, and submit them to competent people’s governments level by level in batches.

(2) The competent department for land administration of a competent people's government shall examine farmland conversion programs, arable land replenishment programs and land acquisition programs, give opinions, and submit them to the competent people’s government for approval; an arable land replenishment program shall be approved by the people’s government approving the corresponding farmland conversion program together with such farmland conversion program.

(3) Approved farmland conversion programs, arable land replenishment programs and land acquisition program shall be implemented by the municipal or county people's government, and land shall be provided for specific construction projects.

Regulations on the Implementation of the Land Administration Law of the PRC Article 25

Municipal, county people's government of the locality whose land has been acquired shall, upon approval of the land acquisition plan according to law, organize its implementation, and make an announcement in the village (township), hamlet whose land has been acquired on the approval organ of the land acquisition, number of the approval document, use, scope and area of the acquired land as well as the Standards for compensation of land acquisition, measures for the resettlement of agricultural personnel and duration for processing land acquisition compensation.

Persons with land ownership and use rights of the acquired land should, within the duration prescribed in the announcement, go to the competent department of people's government designated in the announcement to go through the registration for land acquisition compensation on the strength of land ownership certificates.

The competent departments of municipal, county people's governments shall, on the basis of the approved land acquisition plan and in conjunction with the departments concerned, draw up land acquisition compensation and resettlement plan, make an announcement thereof in the village (township), hamlet wherein the acquired land is located to solicit the views of the rural collective economic organizations and peasants on the acquired land. The competent departments of land administration of municipal, county people's governments shall, upon approval of the land acquisition compensation and resettlement plan submitted to the municipal, county people's governments, organize its implementation. Where a dispute arises over the compensation Standards, coordination shall be carried out by local people's government above the county level; where coordination has failed, arbitration shall be resorted to by the people's government that approved the land acquisition. Land acquisition compensation and resettlement dispute shall not affect the implementation of the land acquisition plan.
Payment of various expenses for land acquisition should be effected in full within 3 months starting from the date of approval of the land acquisition and resettlement plan.

7.6.2 General procedure of property acquisition on state-owned land

According to the Regulations on the Acquisition of Houses on State-owned Land and Compensation Therefore, the following general procedure should be followed when properties on state-owned land are acquired for the Project:

1. Making a decision of property acquisition according to legal conditions and procedures;
2. Issuing an announcement of property acquisition and an announcement of withdrawal of the right to use state-owned land;
3. Selecting a qualified appraisal agency for appraisal, and disclosing the appraisal result;
4. Entering into a compensation agreement for property acquisition;
5. Disclosing compensation information and establishing acquisition files;
6. Demolishing acquired properties and transferring to land acquisition;

7.6.3 General procedure of land acquisition

According to the Emergency Notice of the State Council on Rigidly Enforcing Land Acquisition and Demolition and Practically Maintaining the Legal Rights and Interests of Mass (GBFMD [2010] No. 10), we shall strictly perform the relevant procedures, timely notify the mass before land acquisition, ask for their opinions, and by observing the principle of voluntary resettlement, properly settle the reasonable requirements of mass and do not make forced demolition if the procedure is illegal, compensation is not in place, living conditions of displaced persons are not secured and emergency plan is not prepared, with the specific procedure as follows:

1. Application for land use by land user
2. Proposal of land acquisition plan
3. Check for land acquisition
4. Review and approval for land acquisition
5. Announcement of land acquisition plan
6. Preparation of acquisition compensation plan
7. Announcement of acquisition compensation and resettlement plan
8. Implementation of compensation and resettlement
9. Issuance of construction land approval
7.6.4 Arrangement of organizational structure

To ensure smooth implementation and expected results of resettlement, a vertical organizational structure should be established in project implementation to effectively implement the approved resettlement plan and RPF as required. The provincial PMO will take overall responsibility to coordinate and oversee the RPF/RAPs implementation, including management and supervision, training and capacity building, and preparation of project progress report based on the reports and monitoring information from each project county/district, etc. Each county/district PMO will take respective responsibility for their own RPF/RAP implementation, including hiring qualified social/resettlement experts for social and resettlement monitoring, supervising implementation of the mitigation measures together with related local authorities and stakeholders, promoting good practice of resettlement and social development. Each project PMO at provincial and county/district level will assign a dedicated social staff to coordinate social safeguards work, together with related local government departments, project towns and affected villages handling local land acquisition and house demotion. See figure 6.1 for resettlement organization arrangement of the project.
7.7 Resettlement Budget and Arrangements

PMOs, local governments or project employer will bear all the expenses in relation to land acquisition and resettlement. Any resettlement plan corresponding with this resettlement policy framework must include estimated cost and budget. At the planning stage of resettlement, no matter whether a person is identified as displaced person, capital is timely in place and sufficient, the persons affected by the land acquisition and demolition shall have the right to obtain the compensation or take other appropriate mitigation measures. For the above reasons, budget for resettlement plan should include unforeseeable fee, which is generally 10% of total resettlement budget and used for unforeseeable resettlement expense.

The compensation standards in the resettlement plan provide the basis for calculation of the compensation. The compensation should be fully paid to individuals or collectives losing their land or other property, and shall not be deducted for any reason. The resettlement plan should describe the operation procedure of compensation capital to affected villages or villagers. The basic principle is that the capital flow must be as direct as possible to minimize the intermediate links.

For specific preparation of resettlement budget, collect the annual output value, annual output and planting times of original crops as well as area of transformed land, and discrimimately calculate the acquisition compensation standards according to pollution degrees of soil so as to determine the corresponding resettlement budget.

If the project has needs for land acquisition during implementation, compensation standard shall refer to the latest standard.

7.8 Information Disclosure and Public Participation

At the preparation stage of resettlement policy and the preparation and implementation stages of resettlement plan, participation of displaced persons and consultation with public shall be quite emphasized. The objects involved in public’s participation include governmental departments of all levels, expert team, affected village collective and population.
By use of social and economic investigations, social impact evaluation and investigation etc., widely publicize and introduce the project resettlement policy by all means and ask the various affected population for opinions. Through wide public’s participation, coordination and communication, local government, affected village collective and population have fully understood the potential project impact, resettlement policy and income recovery plan.

PMOs and local resettlement implementation organizations at all levels can use the following procedures and methods to encourage the affected persons to participate and negotiate:

(1) Publicize the basic information of the project, and attract the affected persons to participate in the project actively

Introduce the basic information of this project by posting notices, broadcast television, network media and investigation and symposium so that displaced persons will have sufficient recognition and understanding of this project. Such information mainly includes land pollution control objectives; impacts of farmland pollution control project; compensation standards, amount and resettlement policy; feedback and appeal approaches of displaced persons etc.

(2) Hold the public consultation meetings

The department in charge of acquisition and demolition shall irregularly organize the affected persons to hold the consultation meeting according to practical situation of the acquisition and demolition. Representatives of vulnerable groups, in particular women, minorities shall be invited, with their number no less than 30 % of total participants. And the department shall publicize the construction contents, progress and resettlement policy by television, broadcast, newspaper and network etc.

(3) Hold the hearings

Focusing on the alternative crops and planting technique, expected compensation and difficulties of displaced persons, the displaced persons shall first give their opinions fully. Then the community shall rank the concentration degrees of needs, opinions and suggestions through discussion, analysis, and vote and publicize the discussion results.

(4) Publicize the resettlement plan

After hearing and consultation with consultation experts, PMO shall prepare the draft and final version of resettlement plan and publicize them to the displaced persons and public in the project area. The publicity places generally include public library, activity room for villagers in affected village committee, governmental public information website etc., and the language shall be
commonly understood. The draft shall be publicized before reporting to the World Bank for approval. Then the final version shall be publicized with the approval of the World Bank. The resettlement plan publicized mainly includes lost property; compensation standards; compensation amount and resettlement policy; rights and interests of displaced persons; feedback and appeal approaches etc.

7.9 Grievance Redress Procedure

Secure the interests of displaced persons affected by the project, and establish smooth approaches to achieve the interests, both of which are main purposes of resettlement. In the process of resettlement, various problems may occur. To solve them on a timely and effective manner and guarantee smooth resettlement and appeal approaches on land acquisition and resettlement for displaced persons, the following appeal procedure is prepared in this project:

- Stage I: Oral or written appeals might be delivered to the village committees of related community organizations funded by the project if displaced person is neither satisfied with resettlement plan or the implementation of the plan. If oral appeals are delivered, the village committees should make a written record. The villages committees or project funded community organizations in the project sites should respond to the appeals as appropriate within two weeks.

- Stage II. The displaced person may appeal orally or in a written way to the township government that governs the village where the displaced persons reside if this person is unsatisfied with the village committees' decision and response at stage I. If oral appeals are delivered, the township government should respond the appeals within 2 weeks and make a written record.

- Stage III: the displaced person may appeal to the county PMO if this person is unsatisfied with the town or township government’s decision, and the county PMO should respond to the appeals within 2 weeks; the displaced person may appeal to the provincial PMO if this person is unsatisfied with the county/city-level decision, and the provincial PMO should respond to the appeals within 2 weeks.

- Stage IV. If the displaced person is not satisfied with the PMO's decision, they can appeal to the civil court in accordance with the civil procedure law.

The group of displaced persons may appeal against any aspect in the project construction. The above appeal approaches will be told to the displaced persons in the project area through meeting and other methods so that these persons will fully understand that they have the right to appeal.

Related organizations should adhere to following principles in redressing appeals and grievances:
1) Related organizations of the project delegate specific staff to take care of appeal letters and arrange specific staff to consolidate and record oral responses, and demand for effective reply to appeals and grievances at each level within two weeks;

2) All organizations handle appeals and grievances of affected people and reasonable expenditures involved shall be paid through government matching funds of the project. 

3) The appeal procedures shall keep effective during all construction phase of the project, to ensure that affected people could deal with related problems using the mechanism. Approaches for appeal and grievance will be informed to displaced person through public meeting and resettlement information booklets distributed. Meantime, appeal and grievance process will be published among affected population through media.

4) During execution of resettlement action plan, land acquisition organizations should carefully register and manage grievance document and results and should report to PMO in written document on a monthly or quarterly basis as required. PMO shall conduct periodic review on handling and registration of grievances. To completely record grievances of affected population and results, PMO shall develop affected population grievance and appeal redress registration form. See appendix 3 for sample of resettlement grievance and appeal redress registration form.

7.10 Monitoring and Evaluation

7.10.1 Basis of Monitoring and Evaluation:

(1) Laws and regulations of China and Hunan Province on resettlement and land reclamation; (2) the World Bank’s business guide (OP/BP4.12); (3) legal documents in direct relation to the project e.g. resettlement plan approved both by the World Bank and project employer.

7.10.2 Principles of Monitoring and Evaluation:

(1) Regularly and irregularly investigate, understand and evaluate the implementation of resettlement action plan; (2) carry out correct data collection and analysis to ensure correctness of monitoring and evaluation results; (3) scientifically, objectively and fairly evaluate the implementation of resettlement plan; (4) make timely report to the project employer and the World Bank so that they can know about the progress of the project and make scientific decision.
7.10.3 Monitoring and Evaluation institutional arrangements

(1) Internal monitoring and evaluation: it is implemented by PMO. For this, a top-to-bottom internal supervision mechanism is established, and implementation of resettlement action plan is understood and evaluated and two progress reports are formed each year and submitted to the World Bank.

(2) External monitoring and evaluation: it is entrusted by PMO to independent institutions or social and resettlement consultation experts through public bidding. The resettlement implementation activities of the project are given one to two external monitoring and evaluation each year until the objectives of the plan are fully achieved. Certainly the monitoring and evaluation organizations shall have enough professional qualifications, at least including ① having more than 8 years of experience in resettlement, with priority given to those having working experience in the World Bank and Asian Development Bank; ② being approved in the social assessment field.

7.10.4 Contents of Monitoring and Evaluation:

Internal monitoring shall generally cover the following:

(1) Organization. Setup and job divisions of resettlement implementation and related organizations and staffing, executive capacity and effect of these organizations.

(2) Resettlement policies and compensation Standards: enactment and implementation of resettlement policies; practical implementation of compensation Standards for different types of losses, with particular stress on if the compensation Standards in the RAP are complied with, and the reason for any difference;

(3) Implementation schedule of land acquisition, demolition and resettlement activities.

(4) Resettlement budget and use.

(5) Productive employment arrangement of displaced persons. Main resettlement method and population of rural displaced person, resettlement of vulnerable groups (ethnic minorities, family of women, old people’s family, the disabled etc.), reclamation of temporary land, and resettlement effect etc.

(6) Housing reconstruction and living arrangements of displaced persons. Resettlement method and trend of rural displaced persons, homestead arrangement and allocation, housing rebuilding form, “three supplies and one leveling” of homestead, compensation payment, provision of public facilities (water, electricity, road, commercial network etc.), removal etc.
(7) Grievance, appeal, public participation, consultation, information disclosure and external monitoring.

(8) Handling of resettlement issues raised.

(9) Existing problems and solutions.

External M&E will be conducted by an agency independent of the project owner and the resettlement implementing agencies, and having resettlement M&E capabilities. External M&E should usually cover the following:

(1) Resettlement agencies: monitoring the setup, division of labor and staffing of the project owner and the resettlement agencies, and capacity building and training activities of the resettlement agencies through investigation and interview; evaluating the appropriateness thereof through comparison with the RAP;

(2) Resettlement policies and compensation Standards: studying the main policies for resettlement implementation, and evaluating the appropriateness thereof through comparison with the RAP; verifying the implementation of the compensation Standards for different types of losses (especially major losses such as permanent land acquisition and property demolition) through sampling, and evaluating the appropriateness thereof through comparison with the RAP;

(3) Progress of resettlement implementation;

(4) Resettlement costs and budget;

(5) Resettlement by production and employment: evaluating the production and employment resettlement of the displaced persons, and the implementation of the income restoration program through sampling survey and the follow-up monitoring of typical displaced households;

(6) Housing rebuilding and livelihood resettlement of the displaced persons: conducting analysis and evaluation through sampling survey;

(7) Restoration of the income, production level and standard of living of the displaced persons: learning the income sources, amount, structure and stability, and expenditure structure and amount of typical displaced households through baseline survey before land acquisition and property demolition, and sampling survey and follow-up monitoring thereafter, evaluating the level of fulfillment of income restoration and other resettlement objectives through a comparative analysis; analyzing and evaluating the level of fulfillment of income and standard of living restoration objectives of the displaced persons through comparison in residential conditions, traffic, public facilities, community environment, culture, amusement and economic activities, etc.;
(8) Grievances and appeals: monitoring the appeal channel and procedure for the displaced persons, main grievances and handling thereof through literature review and sampling survey;

(9) Public participation, consultation and information disclosure: monitoring public participation and consultation activities, and the effectiveness thereof, the preparation, issue and feedback of the resettlement information booklet, and information disclosure activities and the effectiveness thereof during resettlement implementation through literature review and field investigation;

(10) Handling issues proposed in the Memorandum of the World Bank Mission and the last resettlement M&E report;

(11) Conclusion and suggestions: summing up resettlement activities and draw to a conclusion and make recommendations; tracking existing issues until they are solved.

8. Employee resettlement plan framework

8.1 Purpose for preparing employee resettlement plan framework

The main purpose of employee resettlement is to identify the various social impacts and social risks that may arise from the project, and to propose measures and recommendations to eliminate or minimize the negative social impacts and increase the positive social impact arising from the implementation of the project.

In the process of project preparation, a participatory approach is adopted to listen to the demands and needs of different interest groups, and benefit more stakeholders and promote the inclusive department of the project area.

After preliminary identification of social risks, the project construction may cause overall relocation of enterprise due to cut-off of pollution sources, and may have the risk of unemployment. As a result, the project's policy framework and corresponding principles and guidelines are formulated to guide the employee resettlement activities and provide social protection for employees in the affected enterprise.

8.2 Preparation of employee resettlement plan

According to the screening results, due to relocation of enterprises and the possibility of unemployment or transfer of the employees, the potential influence of the project on the employees in the affected enterprise should be evaluated, and according to the social evaluation and public consultation results, the employee resettlement plan should be formulated.

Based on the results of the social evaluation and the consultation with the staffs and workers,
the PMO determines if the affected enterprise worker groups give support to the project. And if they provide support, the Recipient shall prepare a detailed employee resettlement report or social assessment report, and according to the demands, these reports shall cover the following:

- Information summary. Collect basic information on the affected enterprises (see Annex 5), as well as the age, education level, skills, training, sources of livelihood, employment patterns of their workers, etc.;
- Legal framework. Review the legal, regulatory and institutional frameworks applicable to the project size and social protection of employees;
- Identification of project potential impact;
- Public consultation and consultation. Carry out adequate public consultation for the workers in the affected enterprises, and win extensive support during the project preparation period; ensure that the framework documents are fully consulted with the affected enterprise workers during the project implementation period;
- Resettlement plan. After identifying the negative influence of the affected enterprises, prepare appropriate action plan to avoid and minimize or mitigate these influences or give compensatory measures;
- The cost estimates and financing plans for the enterprise employee resettlement plan;
- The employee complaint procedure of affected enterprises for the project implementation;
- Time schedule
- Institutional arrangement
- Monitoring and evaluation.

Before identifying whether the relevant projects or subprojects are eligible for the World Bank's assistance, the PMO shall submit to the local government commitment on staffs and employee resettlement policy framework of the subproject to the World Bank three months prior to the implementation of the project for its review. After approval, the relevant projects or sub-projects can be started. The approved employee resettlement plan must be publicized through local newspapers and government websites before implementation.

8.3 Regulations and Laws Frameworks

Law of the People's Republic of China (effective as of July 1, 2011). In the actual implementation of the project, the latest policies shall prevail.

**Basic rights of laborers:** Laborers shall have the right to be employed on an equal basis, choose occupations, obtain remuneration for their labor, take rest, have holidays and leaves, obtain protection of occupational safety and health, receive training vocational skills, enjoy social insurance and welfare, and submit applications for settlement of labor disputes, and other rights related to labor as stipulated by law. The State shall take various measures to promote employment, develop vocational education, lay down labor standards, regulate social incomes, perfect social insurance system, coordinate labor relationship, and gradually raise the living standard of laborers. (Articles 3 and 5, Labor Law of the People's Republic of China)

Laborers shall, through the assembly of staff and workers or their congress, or other forms in accordance with the provisions of laws, rules and regulations, participate in democratic management or consult with the employing units on an equal footing about protection of the legitimate rights and interests of laborers. (Articles 8, Labor Law of the People's Republic of China)

**Promotion of Employment.** The State shall create conditions for employment and increase opportunities for employment by means of the promotion of economic and social development. Local people’s governments at various levels shall take measures to develop various kinds of job-introduction agencies and provide employment services. Laborers shall not be discriminated against in employment, regardless of their ethnic community, race, sex, or religious belief. (Articles 10-13, Labor Law of the People's Republic of China)

The State encourages various types of enterprises to provide more job opportunities by creating new industries or expanding business operation within the scope as prescribed by laws and regulations. The State develops both domestic and foreign trade as well as international economic cooperation, thus to develop more channels for employment. When people's governments at or above the county level make arrangements for government investment or decide on major construction projects, they shall pay attention to playing the role of such investment or projects in promoting employment and providing more job opportunities. The State implements the fiscal policies which are favorable for the promotion of employment, increases the input of funds and improves employment environment in order to increase employment. The State establishes a sound unemployment insurance scheme to ensure the basic living standards of the unemployed in accordance with law and to promote their re-employment. The State encourages enterprises to provide more job opportunities and to support the unemployed and the disabled in finding job. The State adopts financial policies favorable for promotion of employment, creates more channels for
financing small and medium-sized enterprises, and encourages financial institutions to improve financial services, by giving such enterprises increased support to loans and providing, within a given period of time, small loans, etc. to support persons who start undertakings independently. The State applies an employment policy whereby to make overall plans for both urban and rural areas, establishes a sound system under which to provide equal job opportunities for both urban and rural residents and give guidance to the surplus agricultural workers in their effort to find other jobs in an orderly manner. People's governments at all levels shall make overall plans for the employment of the new-arising workforce in cities and towns, of the surplus agricultural workers in other jobs, and for the re-employment of the unemployed. People's governments at all levels shall take measures to gradually improve and implement the labor and social insurance policies adapted to such flexible employment as part-time jobs, in order to provide assistance and services for the persons who look for flexible employment. Local people's governments at all levels and the relevant departments shall give better guidance to the unemployed in starting self-employed businesses, and provide them with policy consultation, vocational training, instructions on how to start a business and other services. (Articles 11-24, Law of the People's Republic of China on the Promotion of Employment)

Labor safety and health. The employing unit must establish and perfect the system for occupational safety and health, strictly implement the rules and standards of the State on occupational safety and health, educate laborers on occupational safety and health, prevent accidents in the process of work, and reduce occupational hazards. Facilities of occupational safety and health must meet the standards stipulated by the State. (Article 52 and 53, Labor Law of the People's Republic of China)

**Occupational training.** The State shall take various measures through various channels to expand vocational training undertakings so as to develop professional skills of laborers, improve their skills, and raise their employment capability and work ability. People’s governments at various levels shall incorporate the development of vocational training into the plans of social and economic development, encourage and support all enterprises, institutional organizations, societies and individuals, where conditions permit to sponsor all kinds of vocational training. The employing unit shall establish a system for vocational training, raise and use funds for vocational training in accordance with the provisions of the State, and provide laborers with vocational training in a planned way and in the light of the actual situation of the unit. (Articles 66, 67 and 68 of Labor Law of the People's Republic of China)

People's governments at or above the county level shall encourage and support various types of vocational colleges and schools, vocational skills training institutions and employing units to, in
accordance with law, provide pre-employment training, on-the-job training, re-employment training and training for starting undertakings, and shall encourage the workers to participate in various forms of training. Local people's governments at or above the county level and the relevant departments shall, in light of the market demand and the trend of industrial development, encourage enterprises to do a better job in vocational education and training and give them guidance in this endeavor. The State takes measures to establish a sound labor reserve system. Local people's governments at or above the county level shall provide a certain period of vocational education and training to the graduates from junior and senior middle schools who need to find jobs, in order to enable them to acquire the relevant vocational qualifications or the skills of certain professions. Local people's governments at all levels shall encourage and support employment training, help the unemployed to improve their vocational skills and increase their employability and their capability of starting undertakings. The unemployed who participate in such training shall, in accordance with relevant regulations, be entitled to receive the training subsidies provided by the governments. Local people's governments at all levels shall make arrangement for and give guidance to the rural workers who go to cities for employment to participate in skill training in this respect, and encourage various types of training institutions to provide skill training to such rural workers to increase their employability and capability of starting undertakings. (Articles 46-50, Law of the People's Republic of China on the Promotion of Employment)

Labor disputes. Where a labor dispute takes place between the employing unit and laborer, the parties concerned may apply for mediation, arbitration or take legal proceedings according to law, or may seek for a settlement through consultation. Where a labor dispute takes place, the parties involved may apply to the labor dispute mediation committee of their unit for mediation; if the mediation fails and one of the parties requests for arbitration, that party may apply to the labor dispute arbitration committee for arbitration. Either party may also directly apply to the labor dispute arbitration committee for arbitration. If one of the parties is not satisfied with the adjudication of arbitration, the party may bring the case to a people’s court. (Articles 77 and 79, Labor Law of the People’s Republic of China)

Unemployment insurance. An unemployed person meeting the following conditions may collect unemployment insurance compensation from the unemployment insurance fund: the employing entity and the unemployed person has paid the unemployment insurance premiums for one year before the person becomes unemployed; the unemployed person unintentionally terminates the employment; the unemployed person has gone through the formalities for unemployment registration and is seeking employment. (Article 45, Social Insurance Law of the People's Republic of China)
If the employing entity and the unemployed person have paid the insurance premiums for one year or more but less than five years before the unemployed person becomes unemployed, he/she may collect unemployment insurance compensation for at most 12 months. If the cumulative premium payment period reaches five years but is less than ten years, the unemployment insurance compensation may be collected for at most 18 months. If premiums have been paid for more than ten years, the unemployment insurance compensation may be collected for at most 24 months. If the person becomes unemployed again after re-employment, the premium payment period will be calculated all over again, the period for the collection of unemployment insurance compensation this time together with the period during which unemployment insurance compensation may be collected but have not been collected for previous unemployment shall, in aggregate, be no more than 24 months. (Article 46, Social Insurance Law of the People's Republic of China)

**Employment assistance.** People's governments at all levels shall establish a sound employment aid system and, in their support and assistance, give priority to the persons who have difficulty in finding jobs, by means of exemption and deduction of taxes and fees, discount interest loans, etc. The public welfare jobs which are created through government investment shall first be offered to the persons who have difficulty in finding jobs and meet the requirements of such jobs. Local people's governments at all levels shall improve their service in respect of employment aid at the grass-roots level, place emphasis on assisting the persons who have difficulty in finding jobs and offer them employment services and aid related to public welfare jobs that are suited to them. People's governments at all levels shall take special supportive measures to promote the employment of disabled persons. Diversified forms of employment shall be carried out to expand the range of public welfare posts, create job opportunities, and ensure that at least one member is employed in each urban family that needs employment. The State encourages the cities to open up to resources exploitation and the independent industrial and mining areas to develop industries that meet market demand and guide people to find jobs in these industries. (Articles 52-57, Law of the People's Republic of China on the Promotion of Employment)

**Protection of rights and interests of women.** Females shall enjoy equal rights as males in employment. It shall not be allowed, in the recruitment of staff and workers, to use sex as a pretext for excluding females from employment or to raise recruitment standards for the females, except for the types of work or posts that are not suitable for females as stipulated by the State. (Article 13, Labor Law of the People's Republic of China)

The employing unit shall not revoke its labor contract with a female laborer when she is in pregnancy, childbirth, or breast-feeding period. (Article 29, Labor Law of the People's Republic of China)
The State shall provide female workers and juvenile workers with special protection. It is prohibited to arrange female workers to engage in work down the pit of mines, or work with Grade IV physical labor intensity as stipulated by the State, or other work that female workers should avoid. Female workers during their menstrual periods and during the period of breast-feeding their babies less than one year old shall not be arranged to engage in work high above the ground, under low temperature, or in cold water or work with Grade III physical labor intensity as stipulated by the State. Female workers pregnant for seven months or more shall not be arranged to extend their working hours or to work night shifts. (Articles 58, 59, 60, 61 and 63, Labor Law of the People's Republic of China)

Where an employing unit encroaches upon the legitimate rights and interests of female and juvenile workers in violation of the stipulations of this Law on their protection, the labor administrative department shall order it to make corrections, and impose a fine. If harms to female and juvenile workers have been caused, the unit shall assume the responsibility for compensations. (Article 95, Labor Law of the People's Republic of China)

### 8.4 Implementation process

Specific implementation schedule for all the activities should be proposed in the employee resettlement plan and the employee resettlement scheme should be formulated in advance, then submitted to the workers’ meeting (including the women workers representatives) for deliberation and adoption, and then reviewed by the relevant functional departments, the foreign cooperation center and the World Bank before implementation. During the project implementation phase, the PMO is responsible for the implementation of the employee resettlement plan. Through the information disclosure and public participation, the PMO will focus on the needs and suggestions of the enterprise workers, especially the female workers, and take relevant measures to enhance the positive benefits and mitigate the negative impacts.

### 8.5 Main resettlement measures

**Resettlement of laid-off employees**

Termination of contract: after an agreement is reached through full consultation, the labor contract can be terminated. If no agreement is reached on alteration or termination of the labor contract after consultation with the employee, the labor contract can be terminated by giving the employee himself thirty days' prior written notice, or an extra month's wage.
Payment of economic compensation: the economic compensation shall be paid to the laid-off employee according to the number of years he/she has worked for the sub-project employer by the rate of one month's salary for each full year he worked. If he has worked for more than six months but less than one year, the time shall be calculated as one year; and if he has worked for less than six months, he shall be paid half of his monthly salary as economic compensation. The monthly salary is calculated by the employee’s average monthly wage for the 12 months prior to the revocation or termination of the labor contract. Economic compensation can be paid after the work is handed over.

Payment of salary: after terminating the labor relation with the laid-off employee, the sub-project employer shall pay in full the confirmed staff wage, raised fund, and medical expenses in arrears. The economic loss caused by the employee himself to the sub-project employer, can be deducted from his wage, but the balance after deduction shall not be lower than the local administrative region's standard on minimum wages.

Transfer of social insurance account and personal file: the sub-project employer shall issue a certificate of revocation or termination of the labor contract at the time of its revocation or termination to the laid-off employee, and shall, within 15 days, undergo the formalities for the transfer of the employee's personal file and social insurance account.

**Resettlement of the personnel applying for unemployment insurance in social insurance institute**

Urban employees

Sub-project employer shall promptly issue certificates of termination or dissolution of labor relation for the laid-off employees with the intention of getting the unemployment insurance benefits, inform persons concerned of the rights to enjoy unemployment insurance benefits and submit name lists of the aforesaid personnel to social insurance agencies for record within 7 days of the termination or dissolution of the labor relation. The laid-off employees shall undergo promptly registration with designated social insurance agencies on the basis of the certificates of termination or dissolution of labor relation issued by their work units, and apply for unemployment insurance benefits within 60 days since the date of termination or dissolution of labor relation. If the laid-off employee moves among the area where overall planning is conducted, the social insurance credentials are to be moved together. The laid-off employee with social insurance credentials moved may carry the supporting documents issued by the agency where the unemployment insurance credentials are moved out, to get the unemployment insurance benefits in the agency where the unemployment insurance credentials are moved in.

Personnel with agricultural household register
For the laid-off personnel with agricultural household register, if they have worked for 1 year continuously and this unit has purchased the unemployment insurance for them, the sub-project employer shall apply to the social insurance agency for full payment of living subsidies to them according to their working hours.

**Resettlement of the staff who seek for self-employment in social insurance institute**

If the laid-off employees are people with difficulties in finding jobs, including the female employees with over 40 full years of life, male employees with over 50 full years of life, and the moderately or severely disabled at legal labor ages, and they desire to apply for the Business License for an Individually-owned Unit of Industry and Commerce, the sub-project employer may guide them to apply for social insurance allowance for self-employment in the social insurance institute, after terminating labor relations with them, and paying the economic compensation.

**Resettlement of special personnel (employees with industrial injuries, and employees in their pregnancy, maternity leave or lactation period)**

If the laid-off employees with industrial injuries voluntarily propose in written form to dissolve or terminate labor relations with the employing unit, the sub-project employer shall pay the work-related injury medical allowance and a disability employment allowance in a lump sum, take back and deliver the Industrial Injury Certificate to agencies to go through formalities for termination of industrial injury insurance relationship, and terminate the labor relation according to law.

Sub-project employer shall negotiate with the employees who are sick and in their medical period, who are not injured in work, who are in their pregnancy, maternity leave or lactation period, and who have been working for the employing unit continuously for 15 years in full and is less than 5 years away from the statutory retirement age, to terminate labor relations, and pay the economic compensation according to law. Without agreement upon consultation, the labor relation shall not be terminated illegally.

**Resettlement of temporary employees**

Project enterprise needs to establish the labor protection and compensation system, and provide temporary employees with the reasonable working conditions, wages, social benefits and compensation or equal to those for the official employees, to safeguard their rights and interests.

**8.6 Verification/Approval of employee resettlement plan**

Employee resettlement plan shall conform to China's legal procedures. a) Layoff of less than 20 employees shall be submitted by the employing unit to the employee representative meeting or employee meeting, and timely published to all employees, to fully take their advices, win over their understanding and support of the resettlement plan; b) Needing to cut employment by more than 20
persons, or by less than 20 persons, which, however, accounts for more than 10% of the total number of the enterprise's employees, the employing unit shall take the opinions of trade union or all employees, and submit the employee resettlement plan to local administration of social security before the layoff. All sub-project employee resettlement plans shall be submitted to local PMO, FECO and World Bank for prior review and obtaining no objection.

8.7 Resettlement fund and resource

Each employee resettlement plan shall include the detailed compensation cost, which includes the living expenses for early retirement inside the economic compensation, the social insurance expenses and special employee expenses in arrears. The fund for employee resettlement plan comes from the enterprise, but the government is responsible for free training and employment assistance.

9. Ethnic minority plan Framework

9.1 Main purpose, overall objective and specific objective

The Ethnic minority plan framework (EMPF) of the Project is prepared according to China’s national and regional laws and regulations, and World Bank’s IP policy OP4.10.

If there are ethnic minorities meeting the definition of the IP term of World Bank OP 4.10 in project area, the project should take measures to maximize their social and economic benefits, minimize or avoid the negative impacts on their unique production, living habit, and cultural custom.

The overall objective is to realize the harmonious development of society and economy in ethnic minority area through treatment of polluted land, improve the agricultural production conditions in ethnic minority area, increase the income of ethnic minority villagers, participate in equally and benefit from the Project.

There are three specific objectives: (1) reduce the negative impacts on production and living habit of ethnic minorities; (2) increase the enthusiasm and capacity of ethnic minority people’s participation in the project; (3) promote the development of society and economy in ethnic minority area, increase people’s income, and benefit them from the Project equally.

In this project, of all the first three pilot counties and district and the rest candidate counties, only Yongding district which is located in western part of Hunan Province is a Tujia Minority Autonomous county. Yongding district has a total permanent population of 446,000; sixteen ethnic minorities, including Tujia, Bai and Miao enjoy a total population of 363,000 which accounts for
81.4% of the total population; the ethnic minorities mainly include Tujia with a population of 359,000, accounting for 80.5% of total population. Specifically the project area in Yongding district involves 12 project villages with a total population of 18,457, including ethnic minority population of 15,744. In the ethnic minorities, Tujia has a population of 15,544 which takes up 84.22% of total population; Bai has a population of 187 people which takes up 1.01% of total population; Miao has a population of 13 people which takes up 0.07% of total population. There are no other ethnic minority autonomous counties under the project. Tujia minority in China has been well integrated with the majority Han people, they speak Mandarin Chinese, have no significant difference from Han people in living and production approaches and customs. Tujia minority does not fit the Bank OP 4.10 IP term requirements and did not trigger the Bank IP policy in previous Bank invested projects. Through initial social screening, it is unlikely to have presence of IP in project areas.

9.2 Procedures

After submitting project proposal, each project county will determine the project area, and each project area will determine the project site. After selecting the project area, each project county should invite the social assessment (SA) expert to screen social risks of all project sites, and make SA as needed. According to the SA results, if the selected project area has the ethnic minority that meets the IP definition of World Bank IP policy, a detailed EMDP should be prepared.

- SA. Based on the unlimited and prior informed participation and consultation with the affected ethnic minority, obtain the understanding and wide support of project from minority community, and assess the potential positive and negative impacts of the project, the field survey and consultation, and main findings at project design stage. Identify the key stakeholder of the project, and consult about the project preparation, implementation, and other stages. Propose the measures and action plan to mitigate negative impacts, according to SA results.

- Free, prior and informed consultation should be done with ethnic minority and its community through various culturally appropriate forms. These can include group meeting, field study at village level, interview and questionnaire. At group meeting, the projects involving ethnic minorities will be analyzed, compared, and classified, according to the ethnic minorities involved by SA, agricultural production, and farmers cooperative organization, around the features of ethnic minorities, rural and agricultural production conditions, planting industry, breeding industry, orchard industry, poverty, possible land acquisition and resettlement involved by the project. The ethnic minority villager group meeting will be mainly participated by various farmers, ethnic minorities, women, and representatives of other vulnerable groups in project area. Carry out a special
questionnaire to each project village, to focus on the village’s understanding and support degree of the Project, and basic view and demand of the project.

Identification of ethnic minority. Identification of the ethnic minorities involved in project area is based on the 4 criteria to identify and define the ethnic minorities in World Bank’s operation policy OP4.10: (1) they belong to specific cultural community in their own opinion which is also recognized by others; (2) they are collectively attached to the ancestral territory and its natural resources; (3) they have traditional culture, economy, social and political organizations which are different from the mainstream society; (4) they have their own language differing from main language or official language. Mainly identify with field survey method, data acquisition, and literature consulting.

- Investigation on society and economy. As required by World Bank’s policy for ethnic minority development, make sure to fully understand the social and cultural features of the possibly involved ethnic minority, and analyze them before project implementation. Analyze the ethnic group’s governance structure and system, religion, cultural adaptation, language, means of livelihood, gathering region, cultural characteristics, custom and habits.

- Social impact analysis. Before the project starts, always analyze the positive and negative effects of project implementation on social development of ethnic minority through SA, especially formulate measures to mitigate the negative effect.

9.3 Law and policy framework

The EMDP of the Project is prepared based on the laws and regulations on ethnic minorities of the People’s Republic of China, rules of Hunan Province, and World Bank’s policies on ethnic minorities. The main policies include relevant China’s laws and regulations, rules of Hunan Province, regional development planning, national support policy, and World Bank’s policies on ethnic minorities.


- Regional development plan: Outline of the 13th Five-Year Plan for National Economic and Social Development of Hunan Province (2016-2020), Several Preferential Policies of the People’s

- World Bank’s policies on ethnic minorities: World Bank’s Operation Policy (OP4.12) and World Bank’s Procedures (BP4.10).

### 9.4 Basic contents of EMDP

According to the findings and the results of World Bank’s SA, unlimited and prior informed consultation, SA group will determine whether the affected minority community has given wide support of the project, and formulate the basic framework of EMDP.

#### 9.4.1 Basic outline

a) A summary of the information of the legal and institutional framework applicable to the ethnic minorities, and baseline information of the demographic, social, cultural, and political characteristics of the ethnic minority communities;

b) A summary of the social assessment;

c) A summary of results of the free, prior, and informed consultation with the affected ethnic minority communities that was carried out during project preparation as OP4.10 required and that led to broad community support for the project;

d) A framework for ensuring free, prior, and informed consultation with the affected ethnic minority communities during project implementation;

e) An action plan of measures to ensure that the ethnic minority groups receive social and economic benefits that are culturally appropriate, including, if necessary, measures to enhance the capacity of the project implementing agencies;

f) When potential adverse effects on ethnic minority groups are identified, an appropriate action plan or measures to avoid, mitigate, or compensate for these adverse effects;

g) The cost estimates and financing plan for the EMDP;

h) Timeline for implementation;

i) Institutional arrangements

j) Accessible procedures appropriate to the project to address grievances by the affected ethnic minority communities arising from project implementation. When designing the grievance procedures, the project entity takes into account the availability of judicial recourse and customary dispute settlement mechanisms among the ethnic minority groups; and

k) Mechanisms and benchmarks appropriate to the project for monitoring, evaluating, and reporting on the implementation of the EMDP. The monitoring and evaluation mechanism should
include arrangements for the free, prior, and informed consultation with the affected ethnic minority communities.

### 9.4.2 Main measures to mitigate the negative impacts

According to SA and suggestions from consultation with community, the Project should follow the compensation and resettlement measures for land acquisition, and also pay attention to the implementation of measures to mitigate social risks in ethnic minority area:

- Through multiple forms of propaganda and education, raise the ecological and environmental consciousness of ethnic minorities, and transform the agricultural production and cultivation methods causing pollution.
- Perform the unlimited and prior informed participation and consultation in the affected minority community, determine the measures to avoid or mitigate negative impacts, and compensate reasonably according to relevant national policies.
- Provide ethnic minorities with practical technology training, venture capital support, and other encouragement and preferential policies. Meanwhile, effectively protect farmer’s right of use and handling of the contract land, according to central policies.
- Through demonstration, promotion, and establishment of village-level land management committee in project villages and towns, ensure minority community and farmers to equally participate in project planning, design, implementation, and quality supervision and acceptance, operation, management, monitoring and evaluation.

### 9.4.3 Financing arrangement

According to the measures and actions in EMDP, ensure the smooth implementation of the plan. The Project design mainly includes the following costs in implementing the EMDP as and when required:

- Expense for treatment of heavy metal in land;
- Expense for land compensation and resettlement if any;
- Expense for construction of public facilities for treatment of heavy metal in land;
- Expense for project-driven production technology training of ethnic minority farmers;
- Other expenses for other project activities, such as consultation, development of ethnic organizations, costs for monitoring and evaluation of EMDP.

These expenses should be listed in the project financing arrangement, according to feasible and SA results.
9.5 Public participation and information disclosure

Before project implementation, the unlimited, prior, wide and deep consultation results should be formed with the ethnic people in project area. Therefore, the questionnaire, household survey, and group meeting should be adopted for consultation with ethnic minorities in project demonstration village and in the ethnic minority area involved by the Project. Social assessment shall be done for every subproject of each project county, ethnic minority development plan shall be prepared and disclosed to the public if the Bank OP 4.10 is triggered.

According to the results of SA and community consultation, this framework is to ensure extensive consultation and informed participation of local EM groups during project implementation through the following rules of consultation and measures.

- Strengthen the roles of Villagers’ Representative Assembly (VRA): There are often quite a lot of households in the project villages. It is usually not feasible to hold the All Villagers’ Convention (AVC) to consult upon the specific affairs. If it could be convened, it would be difficult to reach the consensus. Therefore, VRA could be delegated as the representatives of various EM groups, gender, households and sub-villages to discuss and consult upon the project plan and management, form the draft and submit it to AVC or each sub-village to discuss, revise and approve it by voting.

- Strengthen the representativeness of VRA: Increase the number of VRs, to have it reach the ratio of 1:5 – 15 households stipulated by the Law. The quota of VRs are allocated to each sub-village, among whom women should occupy at least 1/3. The number of VRs of each EM group and the poor should be in proportion with their number of households, and the EM with few households should also have the quota. It is better to have the VRs of EM groups, women and the poor elected by themselves respectively.

- When the regular election of VC is held, attention should be paid to the stipulation of the Law to ensure each EM group including the one with few population have their members to be elected.

- In the villages without supervision institute established, the Village Affair Supervision Committee (VASC) should be elected either by VRA or AVC. The composition should also refer to VC, having members from every EM, and the member should not be the one of VC or their relatives as the Law stipulated.
In the aspect of bylaw/regulations and consultation rules:

- Measures should be formulated in the regulations for project management at village level, farmer’s cooperative and other organizations, to ensure the representative proportion of the sub-villages with poorer condition, EM groups, women and the poor.

- The rules and procedures need to be formulated for the discussion and consultation of VRA. For examples, it is necessary to the VRs of EM, women, the poor and the others split to have own group discussions, and ensure the use of EM languages and writing. In the plenary, the voices of the marginalized should be protected, and listened to and considered carefully. It should be tried to reach consensus through democratic deliberation but not voting with the majority rule so as to ensure each EM group, women and the poor exert their democratic rights of being informed, participation, expression, making decision, supervision, etc., equally get benefit, and participate in the whole process of project planning, implementation, management, M&E and the development of farmer’s cooperatives and other organizations.

- Increase VRA’s representatives and strengthening its roles of consultation, formulation of schemes for AVC to make decision which should be supported or agreed by the majority (more than two thirds) of villagers or villager representatives.

9.6 Organization

The Project’s organization consists of provincial, county, village, and elementary village-level organizations. Especially take the construction of village-level organization seriously.

9.7 Grievance redress mechanism

During project preparation and implementation, diversified and effective complaint channels should be established for the project, to timely know the impacts and solve the problems brought by project to the affected farmers from ethnic minorities and other stakeholders, and ensure the demands of the affected groups on information disclosure, and wide community participation. This mechanism should follow the same GRM set in the RPF, see section 7.9 of this ESMF.

9.8 Monitoring and evaluation

To ensure that EMDP is effectively implemented and reaches the expected objective, its implementation should be monitored and assessed.
9.8.1 Monitoring and evaluation method

Monitoring and evaluation adopt the combined methods of field survey, sample survey, computational analysis, and overall expert assessment.

· Field survey integrates points and spheres to investigate the EMDP implementation progress, capital implementation, effect, organization and management comprehensively;

· Perform sample survey to certain proportion of ethnic minority families in project-benefited area and effect area. Sample survey adopts the classification and random sampling methods for fixed point tracking investigation of typical ethnic minority sample families.

· Apart from literal data, also notice to collect pictures, sound recording, video recording, material, and other data to establish public participation and result

9.8.2 Monitoring and evaluation indicators

The Project’s EMDP will mainly monitor and evaluate the beneficial degrees of the ethnic minority from the Project, including:

· Ethnic minority population receiving project training, the proportion of women;

· The proportion of the complaints handled within 2 weeks;

· Payment status of compensations;

· Improvement degree of ethnic minority’s farming skills;

· Whether measures to mitigate risk are in place;

· Quantity of village-level organizations, participation status in project design and implementation, and proportion of ethnic minorities in these organizations;

· Number and proportion of ethnic minority beneficiaries in ethnic minority project area.

9.8.3 Monitoring and evaluation organization

Internal monitoring of EMDP is implemented by PMO, and external monitoring is mainly implemented by the experienced independent third party, entrusted by PMO. Through internal and external monitoring, check the implementation progress and process of EMDP.
Perform internal monitoring of ethnic minority semiannually, and external monitoring annually, and prepare the internal and external monitoring reports respectively for World Bank to review.

The reports will be submitted by PMO to World Bank; external monitoring report will be prepared by the hired independent Monitoring and evaluation organization, and submitted annually to PMO and World Bank on time.

10. Public consultation and information disclosure

Public consultation and information disclosure is a two-way communication between project party and public, and crucial for decision improvement, with the purpose:

- Release the information on project to the project area and the public focusing on the project, to let the public know the main conditions of the project, construction and operation features, and environmental problems associated with the project;
- Help the assessment personnel to find problems, and confirm that all the significant environmental problems caused by the project have been analyzed and assessed in the related report;
- Confirm the feasibility of environmental protection measures, and implementation of optimization measures.

Public consultation and information disclosure can reflect public opinions directly, to enable decision-making body to timely find potential problems, modify and improve the design proposal, and solve the problems fed back by the public fundamentally, to strive for optimized unification of the project in environmental, social, and economic benefits. Environmental and social safeguard documents (such as EA, resettlement plan, SA/EMDP), public participation and information disclosure shall be performed in proper time and open place, in the form and language easy to be understood by the population affected by the project. Especially ensure the population affected by project to have enough time and opportunity to contact drafts of the documents.

Both resettlement action plan and social assessment report shall describe the measures taken or to be taken, so as to ensure the full participation of affected groups. All resettlement action plan, social assessment report and ethnic minority development plan shall carry out consultation and participation according to the steps of public participation. All documents shall be announced according to the policies of World Bank, and shall be archived or announced according to domestic requirements on the relevant archives. Public participation must go through implementation of the whole plan and the whole process of external monitoring.
10.1 Public consultation and information disclosure during project preparation

10.1.1 Identification of stakeholders

To enable the public consultation to objectively reflect the public's opinions on the Hunan Integrated Management of Contaminated Agricultural Land, and make the public participation full of representation and emphasis, the ESMF has determined the following objects for public consultation and information disclosure:

(1) The population affected by project: farmers, agricultural cooperative, and so on in project area;

(2) Relevant government department and management department, including PMOs of all project counties, agriculture department, environmental protection department, water conservancy department, livestock sector, quality and technical supervision department, safety supervision department, poverty relief office, civil affairs bureau, human resources and social security bureau, land bureau, and housing expropriation office of project area;

(3) Related experts.

10.1.2 Public consultation and information disclosure ways

(1) Public participation of environmental assessment

- The first round of EA public participation

The first round of EA and public participation is in the preliminary stage of project area survey, and aims to determine the scope of environmental and social problems, get the public know the general information of Hunan Integrated Management of Contaminated Agricultural Land, and provide consultation for public concern. After EA outline is completed, project information is published for the first time in project area of each sub-project county, by posting documents in bulletin board of village committee or the place crowded with people in project area, and other conspicuous location. The publicized information includes project profile, name and contact information of implementation unit and EA unit, main scope and items to solicit public opinions, main proposal mode of public opinions. The first round of EA and public participation is mainly performed by symposium, expert consultation meeting, and in-depth interview.

Symposium mainly includes: 1) related government department and management department symposium, which is participated by government leader, and personnel of agriculture department, environmental protection department, water conservancy department, livestock sector, quality and
technical supervision department, safety supervision department, poverty relief office, civil affairs bureau, human resources and social security bureau, land bureau, and housing expropriation office. 2) Rural cadre symposium. In each project town and village, hold the symposium participated by township cadres, responsible person of agrotechnical station, and village cadres. 3) Villager symposium, attended by the people directly and indirectly affected by the project, especially the poor household, ethnic minorities, and women representatives. The symposium mainly introduces attendees the construction status of the Project and main contents on environmental protection and social risks, listens to their opinions and suggestions on project construction, environmental protection and social risks prevention.

Expert consultation meeting refers to soliciting experts' opinions on certain problems by holding a meeting.

In-depth interview includes: 1) in-depth interview with PMO of project county. Carry out in-depth communication with relevant personnel of PMO of Sub-project County, to learn about the project area of the project county, and the demands of farmers and other affected population in project area. 2) Expert interview. Consult with experts about specific problems to solicit their opinions.

- The second round of EA public participation

The second round of EA and public participation is performed after ESMF draft is completed, and it will mainly hold a symposium to inform all stakeholders of the Project's potential environmental impacts and the adopted mitigation measures, to obtain their opinions and suggestions, and inform the public of the complaint channel for the environmental problems on the Project.

(2) Public participation of social assessment

- The first round of public participation for social assessment

In preparation stage of the project, community consultation method mainly adopts the three basic forms of group meeting, field survey at village level and door-to-door questionnaire survey.

- The second round of public participation for social assessment

Construction of the project requires that all members of the village, village committee, project owner, project office, village project management team and other stakeholders to participate in construction and monitoring of the project through village meeting, village representative meeting and village project management team meeting etc.

10.1.3 Public participation

(1) Public participation in environmental assessment
1) Public participation in the first information disclosure

- On-the-spot publicity

On-the-spot publicity was finished in the first public participation (September 2015), it is mainly about posting the paper publicity (see Appendix 7) on the town government with project, publicity column of village committee and other crowded areas:

The content of the publicity is as follows:
① General situation of construction project;
② Working procedure and main content of the evaluation;
③ The scope of soliciting public opinion and the main items;
④ Contact information, including the address, postal code, telephone, fax numbers, contacts, E-mail and so on of construction units and evaluation organization of environmental impact.

- On-the-spot visit of project area

On-the-spot survey and visit of the project areas of three project counties were implemented in September 2015, to know the current situation of local agriculture, listen to the opinions of agricultural competent department on the projects; know the basic situation of local industrial and mining enterprises, the water quality of irrigation water source, current situation of the safety of agricultural products, the application of farmyard manure and chemical fertilizer, the situation of rice planting and surrounding heavy metal pollution sources and so on, and listen to the opinions of related personnel of government-related competent departments, farmers, villagers and agricultural cooperative in project area and so on on the projects.

- Symposium

In September 2015, public participation symposium was held in the first batch of project counties such as Hengyang, Yongxing and Yongding district in Zhangjiajie, farmers in project area, staffs of rural cooperatives, the agriculture, environmental protection, water conservancy, safety supervision, rear poultry, quality supervision and other government-related competent departments, county project office and environmental assessment team in the project county were participated in the conference. The scene photos of the symposium are seen in 9-1. County project office and environmental assessment team have introduced the project in the symposium, then participants had an informal discussion about construction content, environmental impact issues and mitigation measures of the project, and they raised questions about project implementation content, related environment issues and so on. County project office and environmental assessment team answered the related questions one by one, and participants filled in the questionnaire form of public opinion in
earnest. The host places, participants, content and other statistics of all symposiums are seen in Table 9-1.

- Experts consulting conference

On October 27, 2015, the experts consulting conference was held in Hunan Normal University, participants including project expert group, provincial project office, feasibility study, environmental assessment team and social assessment team. Technical plans of the project were discussed in the conference, and expert opinions on the disposal of excessive rice, project monitoring plan, the prevention of the secondary pollution of the environment and bottom sludge pollution of irrigation water were solicited. On December 23, 2015, the second experts consulting conference was held in Hunan agricultural university, participants including project expert group, provincial project office, feasibility study and environmental assessment team, and expert opinions on the evaluation of heavy metal contaminated farmland, technical plans over single pollution of other four heavy metals except cadmium and compound polluted farmland were solicited in the conference.

2) Public participation in the second information disclosure

- Symposium

In January 2016, the second public consultation symposium was held in the first batch of project counties such as Hengyang, Yongxing and Yongding district in Zhangjiajie, participants mainly including the principal members of county project office of project county, farmers in project area, agricultural cooperative, village cadres, environmental assessment team and social assessment team, to have a further communication with village cadres, farmers, agricultural cooperatives and other interest related parties, and seek fopinions on mitigation measures of the possible environmental and social problems in the project implementation. In May 2016, symposiums of all alternative project counties were held in the Agriculture Committee of Hunan Province, participants including provincial project office, principal members of the project office of 16 alternative project counties, feasibility study, social assessment team and environmental assessment team, opinions on technical plans of project implementation and mitigation measures of environmental and social problems were solicited from 16 alternative project counties. In July 7, 2016, consulting conference of all alternative project counties were held, participants mainly including the principal members of provincial project office, principal members of the project office of 16 alternative project counties, feasibility study, social assessment team and environmental assessment team and the conference solicited opinions from all project counties over project environment and social management framework.

- Experts consulting conference
In April 2016, experts consulting conference was held in the Agriculture Committee of Hunan Province, participants including experts from agricultural, environment protection, plant diseases and insect pests fields, and provincial project office, feasibility study, environmental assessment team, key issues of the project implementation were discussed in the conference, opinions on integrated pollution problem, rice straw disposal, excessive rice disposal and other problems were solicited from experts.

- Deep interview

From July to August in 2016, the deep interview with 16 alternative project counties was implemented, opinions on the adjustment of cropping pattern, subsidy standard, subsidy methods, purchase and subsidy of excessive rice in heavy polluted area were solicited from all project counties.

- Online publicity

The date of online publicity is November 7, 2016, publishing on the website of the Agriculture Committee of Hunan Province, the website is:

The screenshot of online publicity is as follows:

(2) Public participation in social assessment

1. Group meeting at county level

County and city project office of the project shall invite governmental county magistrate/ mayor
in charge and Agricultural Development Office, Environmental Protection Bureau, Civil and Religious Bureau, Water Conservancy Bureau, Agricultural Bureau, Poverty Alleviation Office, Women’s Federation and other relevant departments involved with the project as well as township leaders in charge and business backbone to participate in the group meeting. The group meeting shall firstly conduct analysis, comparison and type division on project villages involved with ethnic minority according to agricultural production, farmer cooperative organization and other aspects of contents involved with social assessment, by surrounding terrain and landform, ethnic category / proportion / living characteristics, agricultural production conditions in rural areas, planting industry, breeding industry, forestry and fruit industry, poverty and whether there is any national material and cultural resources, as well as according to land acquisition and resettlement etc. which may be involved with the project. For every project, the county shall hold a county level group meeting. The social assessment survey team has totally held 3 county level symposiums in the first batch of projects.

2. Field survey at village level

The social assessment survey team has totally held 18 villager group meetings in the first batch of projects, in which there are 6 villager group meetings, 6 poor household group meetings, and 6 women group meetings. Through interviewing with rural cadres, analyze the differences between village groups and farmers and determine the representatives in all respects to participate in community consultation, so as to ensure that ethnic minority, poor households and women can participate in social assessment and community consultation process as well as exercise informed, participation, expression, decision making and other democratic rights, and ensure that these groups can equally participate in the project and obtain benefits.

1) Project publicity and community mobilization

At the beginning, social assessment consultation experts and project personnel of social assessment work team shall introduce overall goal of the project to participants, introduce the significance and practice of conducting social assessment and ethnic minority community consultation, and introduce the relevant policy requirements of World Bank and policy intentions of the government on village level development, ethnic minority development and poverty alleviation, so as to mobilize enthusiasm of the representatives to participate in the project, and make publicity to the broad masses through them.

2) Villager group meetings

The main participants of villager group meetings are various types of farmers, ethnic minority, women and other vulnerable group representatives (proportion of such representatives is not less
than 40%) of the project area. The main purposes of group meetings are to understand cognitive assessment of villagers to the project and countermeasure analysis for possible negative effects.

3) Rural village cadre interview

The social assessment expert team has totally held 6 rural village cadre group meetings in the first batch of projects. Members of village two committees, villager group leader, women’s conference director and women group leader shall participate in rural village cadre interview. Firstly, social assessment work team shall introduce the goals and contents of the project, and the significance and practice of carrying out social assessment. Then they shall be divided into groups and participatory tools shall be used for deep interview.

- Draw community resource diagram;
- Conduct farmer type division;
- Draw living seasonal calendar for farmers.

3. Door-to-door questionnaire survey

The social assessment survey team has totally held 18 villager group meetings in the first batch of projects, For the 3 project counties in the first batch, a total of 632 questionnaires have been distributed, and 604 valid questionnaires have been collected, in which there are 199 questionnaires from Hengyang County, 209 questionnaires from Yongxing County and 196 questionnaires from Yongding District. Every project village shall be surveyed with specialized questionnaire, focusing on understanding cognitive level to the project, understanding level to specific contents of the project, support willingness to the project and participation degree as well as basic views and aspirations to the project for farmers in the village. Questionnaire survey objects shall be mainly sideline or full-time farmers, and survey objects shall be chosen according to the relevant standards of World Bank. However, in the process of field survey, it is found that Taiyuan Township and Xidu Town selected in Hengyang County and Xiangyindu Town selected in Yongxing County have done relatively well in land transfer work, the land is relatively concentrated, and the number of farming households is less. In order to ensure that the farmers will occupy a high proportion, making the data more representative, the survey team has increased the number of survey village and survey questionnaire in Taiyuan and Xidu selected in Hengyang County and Xiangyindu Town selected in Yongxing County according to the actual situation, and the corresponding sample sizes are distributed according to the matching principle.

10.1.4 Public participation and activity summary
<table>
<thead>
<tr>
<th>Time</th>
<th>Form</th>
<th>Place</th>
<th>Participant</th>
<th>Main contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 2015</td>
<td>Symposium</td>
<td>Zhangjiajie Yongding Bureau of Agriculture</td>
<td>Relevant government authorities of agriculture, environmental protection, water conservation, safety supervision, livestock, quality monitoring in Yongding District, Zhangjiajie, county PMO, and EA team</td>
<td>Learn about the local agriculture and take the advice of local agriculture authority on project; learn about the basic situation of local industrial and mining enterprises, water quality of local irrigation water sources, safety of local agricultural product, application of local farmyard manure and chemical fertilizer, and take the advice of government authority on project. Agriculture department reflects that some farmland has high pH, say 6-7 in Yongding District. Environmental protection department reflects that the slag heap produced by mining of nickel-molybdenum ore in project area may pollute farmland. Currently environmental protection bureau has handled the slag.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Post the notice</td>
<td>Project area in Yongding District, Zhangjiajie</td>
<td>-</td>
<td>The publicized information includes project profile, name and contact information of implementation unit and EA unit, main scope and items to solicit public opinions, main proposal mode of public opinions.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Symposium</td>
<td>Project area in Yongding District, Zhangjiajie</td>
<td>Related personnel from PMO of Yongding District, Zhangjiajie, village committee and farmers of project area, rural credit cooperatives, county PMO, and EA team</td>
<td>Consult about local situation of the project, learn about situation of local agriculture, application of local farmyard manure and chemical fertilizer, and farmer's opinions on the project.</td>
</tr>
<tr>
<td>September 2015</td>
<td>On-site visit</td>
<td>Project area in Yongding District, Zhangjiajie</td>
<td>Farmers in project area, rural credit cooperatives, EA team</td>
<td>Learn about rice planting and surrounding pollution sources of heavy metals. Farmers are very enthusiastic about the project. There are slag heaps produced by mining of nickel-molybdenum ore in project area, and they may pollute farmland. Currently environmental protection bureau has handled the slag, but there are a few waste residues on mountain, and may still cause pollution. Some farmland has changed to plant grapefruits.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Symposium</td>
<td>Agricultural Bureau of Hengyang County</td>
<td>Relevant government authorities of agriculture, environmental protection, water conservation, safety supervision, livestock, and</td>
<td>Learn about the local agriculture and take the advice of local agriculture authority on project; learn about the basic situation of local industrial and mining enterprises involving heavy metals, water quality of local irrigation water sources, safety of local agricultural</td>
</tr>
<tr>
<td>Time</td>
<td>Form</td>
<td>Place</td>
<td>Participant</td>
<td>Main contents</td>
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<tr>
<td>September 2015</td>
<td>Post the notice</td>
<td>Project area in Hengyang County</td>
<td>quality monitoring in Hengyang County, provincial PMO, county PMO, and EA team</td>
<td>product, application of local farmyard manure and chemical fertilizer, and take the advice of government authority on project.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Symposium</td>
<td>Project area in Hengyang County</td>
<td>Related personnel from PMO of Hengyang County, village committee and farmers of project area, rural credit cooperatives and surrounding residents, provincial PMO, county PMO, and EA team</td>
<td>The publicized information includes project profile, name and contact information of implementation unit and EA unit, main scope and items to solicit public opinions, main proposal mode of public opinions.</td>
</tr>
<tr>
<td>September 2015</td>
<td>On-site visit</td>
<td>Project area in Hengyang County</td>
<td>Farmers in project area, rural credit cooperatives, EA team</td>
<td>Consult about local situation of the project, learn about situation of local agriculture, application of local farmyard manure and chemical fertilizer, and farmer's opinions on the project. Farms are seen to feed pigs with slag as feed additive in Hengyang County, use of such pig manure as organic fertilizer will cause heavy metal pollution to farmland.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Symposium</td>
<td>Agricultural Bureau of Yongxing County</td>
<td>Relevant government authorities of agriculture, environmental protection, water conservation, safety supervision, and quality monitoring in Yongxing County, provincial PMO, county PMO, and EA team</td>
<td>Learn about the local agriculture and take the advice of local agriculture authority on project; learn about the basic situation of local industrial and mining enterprises involving heavy metals, water quality of local irrigation water sources, safety of local agricultural product, application of local farmyard manure and chemical fertilizer, and take the advice of government authority on project. Relevant departments introduce about the pollution of heavy metals in farmland of Yongxing County, and think that current pollution of heavy metals is serious, and discuss about the difficulties and key points for project implementation.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Post the notice</td>
<td>Project area in Yongxing County</td>
<td>-</td>
<td>The publicized information includes project profile, name and contact information of implementation unit and EA unit, main scope and items to solicit public opinions, main proposal mode of public opinions.</td>
</tr>
<tr>
<td>September 2015</td>
<td>Symposium</td>
<td>Project area in Yongxing County</td>
<td>Related personnel from PMO of Yongxing County, village committee and farmers of project area, rural credit cooperatives and</td>
<td>Consult about local situation of the project, learn about situation of local agriculture, application of local farmyard manure and chemical fertilizer, and farmer's opinions on the project.</td>
</tr>
<tr>
<td>Time</td>
<td>Form</td>
<td>Place</td>
<td>Participant</td>
<td>Main contents</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------</td>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>September 2015</td>
<td>On-site visit</td>
<td>Project area in Yongxing County</td>
<td>surrounding residents, provincial PMO, county PMO, and EA team</td>
<td>Visit the farmland in project area, to learn about the basic situation of local industrial and mining enterprises involving heavy metals.</td>
</tr>
<tr>
<td>October 27, 2015</td>
<td>Experts consultation meeting</td>
<td>Hunan Normal University</td>
<td>Project experts team, provincial PMO, feasibility study, SA and EA teams</td>
<td>Discuss technical proposal for the project, and explore disposal of the rice exceeding standard, the project monitoring plan, how to prevent secondary risk, and the sediment pollution of irrigation water</td>
</tr>
<tr>
<td>December 23, 2015</td>
<td>Experts consultation meeting</td>
<td>Hunan Agricultural University</td>
<td>Project experts team, provincial PMO, feasibility study and EA teams</td>
<td>Discuss about the technical proposals for pollution assessment of the farmland polluted by heavy metals, by single one of the 4 heavy metals except Cd, and the farmland with combined pollution</td>
</tr>
<tr>
<td>May, 2016</td>
<td>Symposium</td>
<td>Provincial agricultural committee</td>
<td>Leading members of provincial PMO, and county PMO of 16 project counties, feasibility study, SA, and EA teams</td>
<td>Learn about the agricultural development of each project county, heavy metals pollution of soil, and quality safety of agricultural products, and seek advice from PMO of each project county on project implementation.</td>
</tr>
<tr>
<td>January, 2016</td>
<td>Symposium</td>
<td>Project county</td>
<td>Leading members of project county PMO, SA and EA teams</td>
<td>Communicate further with village cadres, farmers, agricultural cooperatives, and other stakeholders in project area, and seek advice on measures to mitigate the possible environmental and social problems produced in project implementation.</td>
</tr>
<tr>
<td>July 7, 2016</td>
<td>Symposium</td>
<td>Changsha</td>
<td>Leading members of provincial PMO, and county PMO of 16 project counties, feasibility study, SA, and EA teams</td>
<td>EA unit introduced the possible environmental impacts of the project, and the mitigation measures taken by EMP, and asked advice from each project county and PMO on the environmental and social safeguard documents for the project.</td>
</tr>
<tr>
<td>April, 2016</td>
<td>Symposium</td>
<td>Provincial agricultural committee</td>
<td>Experts on agriculture, environmental protection, and pest, provincial PMO, feasibility study, SA and EA teams</td>
<td>The experts discussed about the key points and difficulties during project implementation, such as combined pollution, rice straw handling, sediment pollution of irrigation water, and handling of rice exceeding standard.</td>
</tr>
<tr>
<td>July-August 2016</td>
<td>Interview</td>
<td>-</td>
<td>Leading members of PMO of 16 project counties, and SA team</td>
<td>Discuss about the adjustment of the planting mode for heavily polluted area, determination of subsidy and subsidy criteria, and purchase subsidy for the rice exceeding standard.</td>
</tr>
<tr>
<td>November 7, 2016</td>
<td>Online publicity</td>
<td>-</td>
<td>-</td>
<td>Files of environmental and social safeguard</td>
</tr>
</tbody>
</table>
Public survey activity field photos:
1) Symposium

a. Symposium of the relevant competent departments in the government of Yongding District (date: September 2015; place: Agricultural Bureau of Yongding District)

b. Symposium of the relevant competent departments in the government of Hengyang County (date: September 2015; place: Agricultural Bureau of Hengyang County)
c. Symposium of the relevant competent departments in the government of Yongxing County (date: September 2015; place: Agricultural Bureau of Yongxing County)

d. Villager symposium in Hengyang County (date: January 5, 2016; place: Taijiu Village in Taiyuan Township)

e. Poor household symposium in Hengyang County (date: January 5, 2016; place: Taijiu Village in Taiyuan Township)
f. Women symposium in Hengyang County (date: January 5, 2016; place: Taijiu Village in Taiyuan Township)

g. Villager symposium in Yongxing County (date: January 7, 2016; place: Shihu Village in Huangni Township)

h. Poor household symposium in Yongxing County (date: January 7, 2016; place: Shihu Village in
Huangni Township)

i. Women symposium in Yongxing County (date: January 7, 2016; place: Shihu Village in Huangni Township)

j. Villager symposium in Yongding District (date: January 9, 2016; place: Guojiaxi Village in Sancha Township)
k. Poor household symposium in Yongding District (date: January 9, 2016; place: Guojiaxi Village in Sancha Township)

l. Women symposium in Yongding District (date: January 9, 2016; place: Guojiaxi Village in Sancha Township)

m. Work conference on Hunan Integrated Management of Contaminated Agricultural Land (date: May 19, 2016; place: Provincial Agriculture Commission)
n. Work conference on Project County Hunan Integrated Management of Contaminated Agricultural Land (date: July 7, 2016; place: Changsha)

2) Questionnaire survey field photo

a. Questionnaire survey field in Hengyang County (date: August 7, 2015; place: Taijiu Village in Taiyuan Township)
b. Questionnaire survey field in Yongxing County (date: August 10, 2015; place: Shihu Village in Huangni Township)

c. Questionnaire survey field in Yongding District of Zhangjiajie (date: August 9, 2015; Guojiaxi Village in Sancha Township)

1) Expert consultation meeting

Technical Expert Consultation Meeting for Project A (time: April 20, 2016, place: provincial agricultural committee)

**Figure 9-1 Public Investigation Site**

### 10.1.5 Summary of public participation opinions and feedbacks

<table>
<thead>
<tr>
<th>Category</th>
<th>Public opinion</th>
<th>Feedback on ESMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>General opinions on</td>
<td>Strengthen protection of ecological environment</td>
<td>Measures to mitigate environmental impacts are proposed.</td>
</tr>
<tr>
<td>construction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9-2 Summary Sheet of EA Public Participation Opinions and Feedbacks
<table>
<thead>
<tr>
<th>Category</th>
<th>Public opinion</th>
<th>Feedback on ESMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>period</td>
<td>Site selection of project area</td>
<td>Strictly follow the principle for site selection of project area in EMP to prevent the simultaneous pollution and control.</td>
</tr>
<tr>
<td></td>
<td>Hope to provide technical supports and training</td>
<td>Develop the detailed technical specifications, and organize training of agricultural technology provider and field school. Arrange experts to be responsible for management by project area, and provide local farmers with training on relevant technical knowledge.</td>
</tr>
<tr>
<td></td>
<td>Strengthen propaganda to farmers, to win their largest support</td>
<td>The project will strengthen communication with farmers by posting notice, holding symposium, and other means of public participation and information disclosure, to make farmers clearer about the significance of the Project, meanwhile learn about farmers' demands for the project, and strive for obtaining farmers' largest support.</td>
</tr>
<tr>
<td></td>
<td>How to safeguard the health of liming personnel</td>
<td>The liming personnel shall be well protected, wear protective suits and mask to ensure their personal security.</td>
</tr>
<tr>
<td></td>
<td>Many Tujia and Bai people are blended in the project area</td>
<td>According to related policies of World Bank and local situation, the project proposes to develop the EMDP framework.</td>
</tr>
<tr>
<td></td>
<td>Management mechanism</td>
<td>The project will establish trans-departmental and 4 levels of management mechanism, such as province, county, town, and village.</td>
</tr>
<tr>
<td>General opinions on operation period</td>
<td>Expect the reconstruction of tractor road</td>
<td>The reconstruction of tractor road is inclined in the project construction scheme.</td>
</tr>
<tr>
<td></td>
<td>Expect the reconstruction of the current irrigation facilities</td>
<td>The dredging reconstruction of channels with excessive sediment is proposed in the project construction scheme; the separation of irrigation and drainage is implemented in the flood irrigation and flood drainage area.</td>
</tr>
<tr>
<td></td>
<td>Hope to handle the rice exceeding standard uniformly, and give suitable subsidy</td>
<td>The project will perform unified purchase to the rice exceeding standard, and the purchase standard is developed according to relevant policies of Hunan Province.</td>
</tr>
<tr>
<td></td>
<td>Tailings dam</td>
<td>The project will hire World Bank's experts on dam safety to assess the dam safety, develop the dam safety action plan, and take corresponding measures for dam safety and reinforcement when necessary.</td>
</tr>
<tr>
<td></td>
<td>Can larger proportion of project input be arranged? Like cleaning and diversion, and irrigation water purification works</td>
<td>The project will design the construction scheme according to situation of project area. If the irrigation water in project area is polluted, the project will set up the front reservoir, ecological intercepting ditch, and other irrigation water purification works.</td>
</tr>
</tbody>
</table>
|          | Secondary pollution of agricultural inputs, such as lime, chemical fertilizer, and organic fertilizer | The project will develop a comprehensive monitoring plan to strengthen monitoring and supervision of agricultural inputs, and try to lower the risk of secondary pollution brought by
**10.2 Public consultation and information disclosure during project implementation**

After the test results of agricultural products for each year are known during project implementation, each sub-project county will hold a field survey meeting of public participation, and directly inform the relevant farmers and rural cooperative of the general information on the project and test results of agricultural products. If the heavy metals in agricultural products exceeds standard severely, PMO will purchase them uniformly and dispose them safely by the subsidy policies developed in project implementation scheme. Meanwhile, collect the opinions and suggestions of farmers, rural cooperatives, and other stakeholders in project areas, and develop corresponding strategies or measures for improvement in follow-up implementation of the project.

**10.3 Brief summary of public participation**

Through the information collected by all means, project counties generally know the Project, and support implementation of the project without opponent; agree in the site selection of project area; think that project construction improves people's quality of life, promotes sustainable development of society, and is good for people's health; hope the project to be implemented as soon as possible, with guaranteed quality, more support and training in technology, protect environment, and bring social, environmental and economic benefits soon. Each stakeholder expresses their own
concern, opinion, and requirement, which have been fully considered when analyzing the environmental and social impacts and developing the mitigation measures, including those for their concern and requirements. They are satisfied with mitigation measures for environmental impacts of the project.

10.4 Grievance redress mechanism

(1) The establishment and composition of institutions

For the better maintenance of the local environmental quality condition and the interests of the surrounding residents, the county project office established the leading group of complaint acceptance of environmental impact. The group leader is held by the person in charge of the county project office as a concurrent post, the leading group of grievance acceptance consists of complaint acceptance office, it is located in the county project office, and the telephone, fax, address, E-mail of the complaint acceptance institution are published on the notice board and so on, so that the affected people can lodge an appeal on any environmental and social issues at any time.

Besides, our appeal and grievance system is relatively complete, the appeal channels are very smooth, different government departments such as the environment protection agency, the civil service and finance bureau have specialized letters and visits office and letters and visits bureau. The public can also lodge an appeal directly to letters and visits office and letters and visits bureau.

(2) Grievance and appeals process

Detailed procedures of handling grievance are as follows:

1) Grievance Uptake and Receipt

When the affected people think their rights have been infringed in any way, they can complain to complaint acceptance office in written form or oral form, if it is the oral complaint, the staff of the complaint acceptance office will make a detailed record on it.

2) Grievance Sorting, Processing, Investigation and Action

The content of the complaints are sorted and selected, the origin and the influence and the relevant responsible parties of the complaint events are investigated by the complaint acceptance office. Based on the above findings, the further action, the time arrangement of the implementation of the action, measures of relieving and solving the influence of the event will be confirmed by the appeal acceptance institution, at the same time, the preventive measures that prevent this kind of events happening again is proposed, the channel of the complaint content is confirmed and connected.

Environment problems: after the complaint is received, the treatment opinion is submitted
within two weeks by the complaint acceptance office, if complainant is not satisfied with the opinion of the complaint acceptance office, the complaint in written form to the environment protection agency of relevant counties and cities is allowed within one month after the treatment opinion is received, the treatment opinion will be carried out within statutory time by the environment protection agency of relevant counties and cities. If the complainant is still not satisfied with the treatment opinion of the environment protection agency of relevant counties and cities, he can complain to the superior competent department of environmental protection after receiving the treatment opinion.

Social problems: the first phase: the affected people can complain to the village committee, community residents committee or township government and subdistrict office in the form of oral complain or written protest. The village committee/ residents committee or village level and township government/subdistrict office where the farmers belong to should keep a written record of the oral complaint and give a clear reply within two weeks. The second phase: if the affected people is still not satisfied with the treatment in the first phase, he can propose the oral or written protest to the villages and towns after receiving the treatment; if it’s the oral protest, the treatment and written record should be carried out by the townships and towns. The treatment decisions should be carried out by townships and towns within two weeks. The third phase: if the immigrants are not satisfied with the decision of the townships and towns, they can lodge an appeal to the complaint acceptance office of county project office. The county/district project office should make a decision within two weeks. The fourth phase: if they are still not satisfied with the decision of the county/district project office, it is allowed to lodge an appeal to the county project office after the decision of the project office is received. The provincial project office should make a decision in two weeks. The fifth phase: if the complainant is not satisfied with the treatment of the provincial project office, after the decision of the provincial project office is received, it is allowed to sue in the civil court according to the civil procedure law. If the affected people is not satisfied with the decision in the second phase, after the decision is received, it is allowed to appeal to the administrative organ that has jurisdiction for arbitration step by step according to Administrative Procedure Law OF THE PEOPLE'S REPUBLIC OF CHINA. If the affected people is still not satisfied with the arbitration, it is allowed to sue in the civil court according to the civil procedure law after the arbitration is received.

3) Monitoring and Tracking Grievance

Regularly review feedback received, cases resolved and GR trends in project management meetings.

4) Communication for Effective GRMs
Present GR processes on project websites. Include a line inviting feedback on all project publication/communication material.
### Appendix 1 Environmental and Social Safeguards Screening Sheet

PMO will screen the application of all sub-projects by using this form.

#### Table 1 Screening Checklist for World Bank Environmental and Social Safeguards

<table>
<thead>
<tr>
<th>Screening item</th>
<th>Yes</th>
<th>No</th>
<th>Description</th>
<th>If yes the launched policies of World Bank</th>
<th>If yes the needed document</th>
</tr>
</thead>
<tbody>
<tr>
<td>I ENVIRONMENTAL AND SOCIAL IMPACTS</td>
<td></td>
<td></td>
<td></td>
<td>OP 4.01 Environmental assessment</td>
<td></td>
</tr>
<tr>
<td>Does the influence of subproject need to be treated carefully, a variety of or unprecedented significant adverse environmental impact? (note: significant adverse environmental impact refers to the influence that meets any of the following conditions)</td>
<td></td>
<td></td>
<td></td>
<td>If there is a ‘yes’ in the answers of the following questions, the subproject is Project A, all project counties are prepared ESIA (ESMP)</td>
<td></td>
</tr>
<tr>
<td>The subproject is located in or near the environment sensitive areas (such as forests, grasslands, rivers and wetlands), social protection areas (national parks, nature reserves, world heritage sites, etc.), or ecological protection zone.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Is there any drinking-water source protection area in the project area?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there any industrial pollution source of heavy metal emission in the surrounding and upstream of the project impact and assessment scopes?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the project area involve producing areas of excessive heavy metal rice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>OP 1.04</td>
<td>OP 1.05</td>
<td>OP 4.04 Natural habitats</td>
<td>OP/BP4. 36 Forests</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>---------</td>
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<td>--------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>4</td>
<td>Is the impact area larger than project site area, and is the irreversible and significant adverse environmental impact?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Does the subproject involve significant changes or degeneration of natural habitats? ---- Does the subproject involve the ecosystem of important environmental sensitive areas such as national forest park, nature reserves at all levels, wetlands, endangered species?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Does the Sub-Project has the potential to have impacts on the health and quality of forests or the rights and welfare of people and their level of dependence upon or interaction with forests?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Does the Sub-Project aim to bring about changes in the management, protection or utilization of natural forests or plantations?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Is the Sub-Project located in, or in the vicinity of, recognized cultural heritage sites?</td>
<td></td>
<td></td>
<td></td>
<td>OP/BP4. 11 Physical cultural property</td>
</tr>
<tr>
<td>9</td>
<td>Is the Sub-Project designed to support the management or conservation of physical cultural resources?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Is there a new reservoir dam built for this subproject, or rely on the existing reservoir dam or dams under construction?</td>
<td></td>
<td></td>
<td></td>
<td>OP 4.37 Safety of Dams</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Answer</td>
<td>Reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Does the Sub-Project involve construction of a large dam (15 m or higher) or a high hazard dam?</td>
<td>10 to 15 meter high dams are considered high hazard dams if they:</td>
<td>OP/BP 4.09 Pest Management Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- have special design complexities, e.g. unusually large flood handling requirements;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- are located in a zone of high seismicity;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- have foundations that are complex and difficult to prepare;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- retain toxic materials.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Is there any tailing pond in the subproject area or the upstream of the project area?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Does the subproject involve the purchase of pesticides?</td>
<td>OP 4.12 Involuntary Resettlement</td>
<td>Resettlement Action Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Will the implementation of the subproject cause changes in pest management?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Does the subproject require land acquisition (public or private, temporary or permanent) for development needs?</td>
<td>OP 4.12 Involuntary Resettlement</td>
<td>Resettlement Action Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Does the subproject cause house demolition (including operating and non-operating) due to the development?</td>
<td>OP 4.12 Involuntary Resettlement</td>
<td>Resettlement Action Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Is anyone prohibited from using informal economic resources (such as pastures, fishing places and forests)?</td>
<td>OP 4.12 Involuntary Resettlement</td>
<td>Resettlement Action Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Does the subproject cause involuntary migration of individuals or families?</td>
<td>OP 4.12 Involuntary Resettlement</td>
<td>Resettlement Action Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Does the subproject cause temporary or permanent loss of crops, fruit trees and facilities?</td>
<td>OP 4.12 Involuntary Resettlement</td>
<td>Resettlement Action Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Is the subproject likely to have adverse effects on tribal communities or disadvantaged groups living in the areas?</td>
<td>OP 4.10 Ethnic minority Plan</td>
<td>Ethnic Minority Development Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Do members of these groups in the areas benefit from the project?</td>
<td>OP 4.10 Ethnic minority Plan</td>
<td>Ethnic Minority Development Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Category</td>
<td>Code</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Is there any ethnic minority community in the project areas and likely to be influenced by the subproject?</td>
<td>Ethnic minority Development Plan</td>
<td>OP 4.10 Ethnic minority</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Does the subproject involve the international watercourses?</td>
<td>Mismatch condition</td>
<td>OP/BP7.50 Projects in International Waterways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Does the subproject involve the disputed areas:</td>
<td>Mismatch condition</td>
<td>OP/BP7.60 Project in Disputed Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Does the project cause unemployment of workers?</td>
<td>Worker re-employment plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Does the project cause job-transfer of workers?</td>
<td>Job-transfer training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Does the project cause revenue decrease of workers?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### VII Aboriginal People
Basic information of the sub-project

<table>
<thead>
<tr>
<th>Sub-project name</th>
<th>Sub-project No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project unit</td>
<td>Sub-project location</td>
</tr>
<tr>
<td>Cost estimate</td>
<td>Scheduled date of commencement</td>
</tr>
</tbody>
</table>

Brief description of sub-project (including farmland soil, crops pollution status, and surrounding potential pollution source):

Summary of screening results:

Signature Form for Screening Personnel and Reviewer:

Name: ________________________________

____________________________________

Duty and date: ________________________________

Signature of PMO director:

____________________________________

PMO will save a copy of this form and relevant documents, submit a copy to World Bank, and submit the third copy to provincial government authority when necessary.
## Appendix 2 Potential Environmental/ Social Impacts of Project and Mitigation Measures

<table>
<thead>
<tr>
<th>No.</th>
<th>Project activity</th>
<th>Description of project</th>
<th>Potential social and environmental influence</th>
<th>Mitigation measures</th>
<th>Environmental and Social Safeguards tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Risk-based farmland management demonstration</td>
<td>According to monitoring program requirements, monitor the selected four project areas in a densified manner (monitoring point density of 30-50mu for mountain, 50-100mu for contiguous flat area; monitoring of heavy metal content in soil, and agricultural product; monitoring of heavy metals content in sediment, monitoring of irrigation water quality and heavy metal content, etc.). According to the monitoring data, assess the level of risk, and determine the comprehensive risk control measures program.</td>
<td>- Sprinkling is conducted in the project area and samples are sent to a qualified testing laboratory for analysis and monitoring. During the process of chemical analysis, there may be waste liquid and solid wastes, which are handled by the testing laboratory according to the national management standard, therefore, the environmental impact is very low.</td>
<td>The waste liquid and solid waste generated in the testing laboratory shall be treated safely.</td>
<td>ECOP</td>
</tr>
<tr>
<td>1.1</td>
<td>Intensive monitoring and risk rating assessment</td>
<td>Based on the analysis of valid data such as rice, endogenous and exogenous agricultural pollutions, and agricultural production management, the project will adopt targeted risk management and control measures. For details, see 2.1 to 2.4.</td>
<td></td>
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</tr>
<tr>
<td>1.2</td>
<td>Comprehensive risk control measures</td>
<td>County-level engineering measures of the 15 projects contain 2 electric pumping stations, channel project spanning 346.01 kilometers, 115 sedimentation tanks, ecological interception ditch spanning 8.2 kilometers and farm track spanning 67.33 kilometers. (Sedimentation tank is 2 * 2 * 1.0 m in designing size. It adopts C20 cast-in-place concrete for pool wall 120 mm in thickness and C20 cast-in-place reinforced concrete 120 mm in thickness.)</td>
<td>- As the small-scale civil construction activity, the project is located around the agricultural land and there is no environmentally sensitive area surrounding the project. The size of the project is very small. There are no more than 5-10 project construction workers, it is unnecessary to build construction camps, and the project does not involve land acquisition, demolition, ESIA(ESMP); RPF</td>
<td>Sprinkle water to reduce dust; Reasonable scheduling of construction; Construction machinery should meet the national health protection standards; Monitor dredging of sediment in the irrigation channel, and if the sediment does not exceed the level-2 standard, it can be used for land leveling and backfilling, but if</td>
<td></td>
</tr>
<tr>
<td>1.2.1</td>
<td>Engineering measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
200 thickness. Elevation distance from the bottom of the pool is at least 300 mm. Ecologically interception ditch is transformed based on the original drainage ditch. It mainly includes transformation of ditch bottom and ditch wall and building of interception dam. The furrow bank consists of cellular cement board with well-distributed holes. Normally a cement board is 60cm * 50 cm * 5 cm (length * width * thickness) in its specification with interval between neighboring holes being 20 cm. The bottom also consists of cellular cement boards. The bottom is flat in layout. The cross section of the ditch is shaped trapezoid. It is installed with meso-position and bottom-level drain holes. Water level of the interception section can be categorized into three states namely draining, half-full and spillover. The interception dam is around 70 cm in height).

<table>
<thead>
<tr>
<th>1.2.2</th>
<th>Agronomic measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-yield rice variety control, optimizing field water management (flooding irrigation), soil acidification conditioning (pH), application of organic manure, application of soil passivator, adjustment of planting structure, straw and other measures.</td>
<td></td>
</tr>
</tbody>
</table>

- All agronomic measures are carried out in farmland, not involving land acquisition, relocation and ethnic minorities.
- Irrigation of paddy rice during grain filling and heading can reduce the uptake of heavy metals by rice.
- Application of lime can adjust the soil pH, reducing crop absorption of heavy metals. However, excessive application of lime may cause soil compaction. If lime is not applied, the health of the lime applicator may be affected if no protective measures are taken.
- Application of soil inactivator can reduce the activity of heavy metals in soil.
- Based on the soil monitoring results, set the application rates of lime, organic fertilizer and soil inactivator according to soil characteristics and risk degree of different project areas.
- Select agricultural lime for application, which must be accompanied by evidence issued by the authority for the key indicators of product quality. Lime requires calcium oxide content of 70%. In application of lime, the operating personnel must wear protective clothing and be sure to withdraw windward (grade-4 and above wind power, lime should not be applied); The passivating agent applied must be an agricultural agent registered in the ECOP for agronomic measures.

If the soil exceeds the level-3 standard, the soils are sent to the close landfill, provided that due diligence on landfill should be conducted.

[ECOP for Agronomic Measures](#)
### Application of organic manure

- Application of organic manure can improve the physical and chemical properties of soil, but the application of unqualified organic fertilizer may bring the secondary heavy metal pollution to farmland soil.

- Adjust the social impact of planting structure.

- Removal of heavy metals from straw from farmland is beneficial to reducing the heavy metals in farmland soil. Potential Environmental Impacts of Straw Disposal Site. Social influence.

### Adjust the social impact of planting structure.

- Advocate the use of commercial organic fertilizers, select the commercial organic fertilizer which has already been tested in the field and determining the safety of the product through the secondary pollution assessment, and has already been registered; and the heavy metal content of the commercial organic fertilizer shall comply with the standard "Organic Fertilizer" (NY 525-2012).

- Straw is removed for covering orchards and forest.

### Potential environmental impacts of the disposal of packaging of agricultural inputs.

- Timely removal and recovery of packaging of agricultural inputs; which are sent to the local specialized agricultural inputs packaging recovery units;

- Carry out monitoring of diseases and insect pests

- Training of agro-technical personnel and farmers on pest and disease control knowledge;

### 1.2.3 Pest management

Promote the clean agricultural production, encourage farmers to increase organic fertilizer, reduce the use of chemical fertilizers by scientific application of pesticides, implement specialized prevention and green control of crop diseases and pests, and promote low-toxicity and low-residue efficient pesticide and modern plant protection machinery.

- Facilitate reducing the amount of chemical pesticides; promote agricultural, physical, biological control measures and low-toxicity and low-residue chemical pesticides, which is conducive to ecological and environmental protection in the project area. Potential environmental impacts of the disposal of packaging of agricultural inputs.

### 1.2.4 Other measures

(1) **Selection of variety**

- Based on the recommendation list of variety of rice for emergency with low cadmium accumulation in Hunan province, conduct research on technology that is safe for and suitable for production of rice in the project area, reasonably select variety of rice in the project area, confirm the cadmium accumulation

- No environmental influence.

- Social influence
### 202

<table>
<thead>
<tr>
<th>No.</th>
<th>Control of beyond-standard rice</th>
<th>Control beyond-standard rice</th>
<th>Control of heavy metal contamination as a result of reuse of residuals after use of beyond-standard rice, which risk is extremely low.</th>
<th>Risk of heavy metal contamination as a result of reuse of residuals after use of beyond-standard rice, which risk is extremely low.</th>
<th>Prepare the “Program for the Control and Control of Heavy Metals Abnormal Rice”.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>Control of beyond-standard rice</td>
<td>For the beyond-standard rice, implement the system in which specialized enterprises are arranged to purchase such rice as industrial grain and feed or for other industrial use. Such enterprises are entitled to acquisition subsidies, and subsidy is 200 Yuan/ton.</td>
<td>Risk of heavy metal contamination as a result of reuse of residuals after use of beyond-standard rice, which risk is extremely low.</td>
<td>Risk of heavy metal contamination as a result of reuse of residuals after use of beyond-standard rice, which risk is extremely low.</td>
<td>Risk of heavy metal contamination as a result of reuse of residuals after use of beyond-standard rice, which risk is extremely low.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Certification of place of origin of agricultural product</th>
<th>Entities obtaining certificates for pollution-free, green, and organic food are entitled to subsidy of 5,000/10,000/20,000 Yuan.</th>
<th>No adverse environmental influence.</th>
<th>No adverse environmental influence.</th>
<th>ESIA(ESMP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>Certification of place of origin of agricultural product</td>
<td>Entities obtaining certificates for pollution-free, green, and organic food are entitled to subsidy of 5,000/10,000/20,000 Yuan.</td>
<td>No adverse environmental influence.</td>
<td>No adverse environmental influence.</td>
<td>ESIA(ESMP)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Agricultural product brand building and promotion expenses</th>
<th>Encourage the project area to create the brand of agricultural products and promotion to enhance the economic value of the product</th>
<th>No adverse environmental influence.</th>
<th>No adverse environmental influence.</th>
<th>ESIA(ESMP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4)</td>
<td>Agricultural product brand building and promotion expenses</td>
<td>Encourage the project area to create the brand of agricultural products and promotion to enhance the economic value of the product</td>
<td>No adverse environmental influence.</td>
<td>No adverse environmental influence.</td>
<td>ESIA(ESMP)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Building, propagation and popularizing cost of agricultural product brands</th>
<th>Encourage the brand building, promotion and popularizing of agricultural products, so as to increase the economic value of products.</th>
<th>No adverse environmental influence.</th>
<th>No adverse environmental influence.</th>
<th>ESIA(ESMP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>Building, propagation and popularizing cost of agricultural product brands</td>
<td>Encourage the brand building, promotion and popularizing of agricultural products, so as to increase the economic value of products.</td>
<td>No adverse environmental influence.</td>
<td>No adverse environmental influence.</td>
<td>ESIA(ESMP)</td>
</tr>
</tbody>
</table>

1.3 Project supervision

<table>
<thead>
<tr>
<th>No.</th>
<th>Project supervision</th>
<th>The professional supervision institution shall be employed to supervise the</th>
<th>No adverse environmental influence.</th>
<th>No adverse environmental influence.</th>
<th>ESMP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>project.</td>
<td></td>
<td></td>
<td>ESMP</td>
</tr>
</tbody>
</table>

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202
## 2 Strengthening monitoring and management of agricultural environment

<table>
<thead>
<tr>
<th>2.1</th>
<th>Establishment of agricultural environment monitoring database and prewarning</th>
<th>Including 1 set of agricultural environmental monitoring and early warning software, 1 sampling inspection vehicle, and 2 sets of terminal computers.</th>
<th>Soft research and no adverse environmental influence.</th>
<th>ECOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>Risk-based farmland management tool and preparation of agricultural risk chart</td>
<td>Establish model based on monitoring data of component 1 to support risk management of farmland, and on the basis of effective combination of data and management tool, determine rating of risk of pollution of regional farmland and crops, and prepare agricultural production risk chart for the province.</td>
<td>Soft research and no adverse environmental influence.</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Development or issuance of local policy and standard</td>
<td>Developer promulgate local rules and regulations and technical standards related to such management as farmland pollution prevention and control and rehabilitation, and guide the project counties in comprehensive management of farmland pollution control</td>
<td>Soft research and no adverse environmental influence.</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>Sustainable investment and financing mechanism and ecological compensation mechanism</td>
<td>Study the sustainable financing mode and ecological compensation mechanism for the long-term farmland pollution management and soil health restoration action so as to ensure the sustainable agriculture development in Hunan province</td>
<td>Soft research and no adverse environmental influence.</td>
<td></td>
</tr>
</tbody>
</table>

## 3 Capacity building

| Foster the management and technical skill training and education | No adverse environmental influence. | |

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203
| No | Project management and evaluation | capacity of government officials; organize international and domestic investigation training; train environmental monitoring personnel and farmers, providing technical assistance to enterprises involved in heavy metal contamination with a total of 1021.44 person-months; carry out project concept and technology promotion activity by seminars and training, and share and publicize project experience and technology by use of video and printed information. |  |  |
| 4 |  | Provide technical assistance and training (procurement, finance, security policies, etc.) for project management personnel to improve their management capabilities; purchase office equipment required for project management, and to undertake expenses of routine project management, procurement and financial management. Carry out the project kick-off / completion seminars, and build Mis system; collect farmland environmental quality change and other relevant information and data during the project implementation, and monitor and evaluate the project implementation results. |  |  |  |  |
|  |  | ● No adverse environmental influence. |  |  |  |
Appendix 3 Contents of Sub-project ESIA

Abbreviations

1. Project profile
   1.1 Project background
   1.2 Similar project experience
   1.3 Purpose to prepare the framework
   1.4 Framework contents
   1.5 Environmental and social security process

2. Project profile
   2.1 Project objective
   2.2 Project Descriptions
      2.2.1 Sustainable management of farmland pollution
      2.2.2 Monitoring and management of agricultural environment
      2.2.3 Project capacity construction
      2.2.4 Project management

3. Framework of laws and regulations
   3.1 Legal and regulatory framework
   3.2 World Bank's safeguard policies and World Bank Group EHS Guidelines
      3.2.1 World Bank's safeguard policies and compliance analysis
      3.2.2 Analysis of project’s compliance with World Bank's EHS Guidelines
   3.3 Analysis of difference of China's national and local laws and regulations with World Bank’s safeguard policies

4. Environmental and social safeguard procedures
   4.1 Selection of sub-project counties
   4.2 Selection of project areas
   4.3 Alternative solution analysis
   4.4 Screening for potential environmental and social impacts
   4.5 Preparation of environmental and social assessment Outline
   4.6 Review of the Environmental and Social Assessment Outline by World Bank
   4.7 Preparation of the environmental and social safeguard documents
   4.8 Review and approval of the safeguard documents by Government and World Bank
   4.9 Implement, supervision, and reporting

5. Project EMP
5.1 Work objective

5.2 Working procedure
   5.2.1 Determine the project area to be selected
   5.2.2 Compare alternative solutions
   5.2.3 Determine the assessment scope
   5.2.4 Project area investigation
   5.2.5 Additional monitoring
   5.2.6 Due diligence
   5.2.7 Farmland soil assessment
   5.2.8 Farmland Risk Comprehensive Management and Control Measures
   5.2.9 Potential environmental and social impacts and mitigation measures
   5.2.10 Make pest control management plan
   5.2.11 Public participation and information disclosure

6. Social assessment
   6.1 Purpose to prepare the social assessment
   6.2 SA Preparation
   6.3 Working procedure

7. Resettlement policy framework
   7.1 Purpose to formulate the resettlement policy framework
   7.2 Objectives, definition and main principles of resettlement policy framework
   7.3 Preparation for resettlement action plan
   7.4 Law and policy framework of resettlement
   7.5 Implementation process
   7.6 Arrangement of budget

8. EMDP framework
   8.1 Main purpose, overall objective and specific objective
   8.2 Procedures
   8.3 Law and policy framework
   8.4 Basic contents of EMDP
      8.4.1 Basic outline
      8.4.2 Main measures to mitigate the negative impacts
      8.4.3 Fees arrangement
   8.5 Public participation and information disclosure
8.6 Organization
8.7 Complaint mechanism
8.8 Monitoring and evaluation
  8.8.1 Monitoring and evaluation method
  8.8.2 Monitoring and evaluation index
  8.8.3 Monitoring and evaluation organization
9. Public consultation and information disclosure
  9.1 Public consultation and information disclosure during project preparation
    9.1.1 Identification of stakeholders
    9.1.2 Public consultation and information disclosure ways
    9.1.3 Public participation and activity summary
    9.1.4 Summary of public participation opinions and feedbacks
  9.2 Public consultation and information disclosure during project implementation
  9.3 Brief summary of public participation
  9.4 Complaint mechanism
Appendix 1 Environmental Security Screening Table
Appendix 2 Contents of Sub-project ESMP
Appendix 3 Potential social security problem screening
Appendix 4 Outlines of social assessment
Appendix 5 Outline of EMDP
Appendix 6 Outline of resettlement action plan
Appendix 7 Notification of Environmental Impact Assessment
Appendix 8 Questionnaire of Public Opinions on EA
Appendix 9 Social assessment household survey questionnaire for “Integrated Management Project of Contaminated Agricultural land in Hunan Province”
Appendix 10 Resettlement appeal and complaint handling situation registration table
Appendix 11 Outline of interviews with village cadres of control project of polluted agricultural area in Hunan Province
Appendix 12 Outline of villagers/poor households/women group meeting on control project of polluted agricultural area in Hunan Province
Appendix 4 Outlines of social assessment

1. Introduction
   1.1 Project profile
   1.2 Project social assessment profile

2. Basic social-economic situation analysis of the project county
   2.1 Analysis of social-economic situation in Hunan Province
   2.2 Analysis of social-economic situation in each project county

3. Project stakeholders
   3.1 Identification of project stakeholders
   3.2 Cognitive analysis of stakeholders
   3.3 Demand analysis of stakeholders

4. Poverty analysis
   4.1 Analysis of poverty situation in the project area
   4.2 Analysis of cognition and demand of poverty group

5. Social gender analysis
   5.1 Analysis of women development status in the project area
   5.2 Analysis of women’s participation in agricultural activities
   5.3 Analysis of women group’s cognition and demand on the project
   5.4 Social gender action plan for various stages of project construction

6. Ethnic minority analysis
   6.1 General situation
   6.2 Customs and cultures of main ethnic minorities in the project area
   6.3 Identification of ethnic minorities in the project area
   6.4 Framework judgement formulation for EMDP

7. Social impact and risk analysis
   7.1 Social impact analysis
   7.2 Social risk analysis

8. Public participation and information disclosure
   8.1 Public participation and information disclosure principles of the project
   8.2 Stakeholder participation in preparation stage of the project
   8.3 Public participation in implementation stage of the project
8.4 Information disclosure

9. Conclusions and suggestions
   9.1 Conclusions
   9.2 Suggestions

10. Action plan of the project at social aspect
    10.1 Participation and consultation
    10.2 Mitigation measures and subsidy programs
    10.3 Budget estimation
    10.4 Time schedule
    10.5 Grievance redress mechanism
    10.6 Monitoring and evaluation
Appendix 5 Outline of EMDP

1. Project profile
   1.1 Project background
   1.2 Project Description

2. Objectives and goals
   2.1 Main objectives
   2.2 Overall goals
   2.3 Specific objectives

3. Formulation Procedure
   3.1 Social assessment
   3.2 Participation in consultation
   3.3 Ethnic minority identification
   3.4 Social, economic and cultural analysis
   3.5 Social impact analysis

4. Legal framework

5. Basic measures and contents
   5.1 Basic outline
   5.2 Compensation measures
   5.3 Cost arrangement

6. Public participation and information disclosure
   6.1 Participation in consultation
   6.2 Information disclosure

7. Organizational institution
   7.1 Overall organizational institution framework
   7.2 Village level organization and management institution

8. Appeal and complaint mechanism

9. Monitoring and evaluation
   9.1 Monitoring and evaluation agencies
   9.2 Monitoring and evaluation

10. Time schedule

11. Budget and funding sources
Appendix 6 Outline of resettlement action plan

1. Basic situation of the project
   1.1 Project background
   1.2 Project profile
   1.3 Project composition and resettlement impact
   1.4 Project preparation and progress situation
   1.5 Measures for reducing resettlement
   1.6 Identification of associated projects

2. Project impact
   2.1 Project impact survey
   2.2 Project impact scope
   2.3 Project impact situation
      2.3.1 Rural collective land acquisition
      2.3.2 Temporary occupation of collective land
      2.3.3 Demolition of rural residents housing
      2.3.4 Ground attachments and demolition appendages
      2.3.5 Affected population
      2.3.6 Affected vulnerable groups

3. Investigation and analysis of social and economic status
   3.1 Social and economic status of the project area
      3.1.1 Social and economic status of the affected city/district/county
      3.1.2 Social and economic status of the affected village
   3.2 Social and economic sampling investigation and analysis of the affected farmers
      3.2.1 Households affected by land acquisition
      3.2.2 Households affected by demolition

4. Legal framework and policy standards
   4.1 Policy framework
   4.2 Main principles
   4.3 Resettlement policy of the project
      4.3.1 Collective land acquisition and compensation and resettlement policy
      4.3.2 Demolition compensation and resettlement policy for rural residents housing
      4.3.3 Compensation and resettlement policy for vulnerable groups
      4.3.4 Compensation policy for the affected infrastructure and ground attachments

5. Compensation standard
   5.1 Compensation standards for collective land acquisition
   5.2 Compensation standards for demolition of rural residents housing
   5.3 Compensation standards for ground attachments and demolition appendages
   5.4 Other expense standards

6. Resettlement production and life recovery scheme
   6.1 Resettlement target
   6.2 Resettlement principles
      6.2.1 Principle of reducing resettlement as far as possible
      6.2.2 Equivalent compensation principle
      6.2.3 Focusing principle
   6.3 Collective land acquisition, resettlement and recovery
      6.3.1 Land acquisition impact analysis
      6.3.2 Analysis on the loss of family income
      6.3.3 Resettlement and recovery measures
6.4 Demolition and resettlement of rural residential housing
6.5 Resettlement and recovery plan of vulnerable groups
   6.5.1 Helping measures
   6.5.2 Training
   6.5.3 Employment
6.6 Ground attachment recovery plan
7. Institution and implementation progress
   7.1 Organizational institution implementation management
      7.1.1 Institutional settings
      7.1.2 Institutional responsibilities
      7.1.3 Institutional staffing
      7.1.4 Equipment configuration
      7.1.5 Training plan
   7.2 Implementation progress
8. Budget and sources of funds
   8.1 Capital budget
   8.2 Annual investment plan
   8.3 Resources and allocation
9. Public participation and appeal channel
   9.1 Implemented public participation and consultation
   9.2 Information disclosure
   9.3 Immigrant participation degree and willingness survey
   9.4 Public participation and feedback
   9.5 Information disclosure and public participation plan of the next step
10. Monitoring and evaluation arrangements
   10.1 Internal monitoring
      10.1.1 Implementation procedures
      10.1.2 Monitoring contents
      10.1.3 Internal monitoring contents
   10.2 External independent monitoring
      10.2.1 Independent monitoring agency
      10.2.2 Monitoring steps and contents
      10.2.3 Monitoring indexes
      10.2.4 External monitoring report
      10.2.5 Post assessment
11. Entitlement matrix
Appendix
Appendix 7 Notification of Environmental Impact Assessment

世界银行贷款湖南省污染农田综合治理项目
环境影响评价第一次公示

一、项目概要

根据湖南省对农业环境多年监测结果，沿江污染地带的重金属主要是镉、铅、汞、砷、铊，其中以镉污染尤为突出。基于这种严峻形势，为治理农产品产地重金属污染，提高农产品质量安全，保障人民生命健康，湖南省农业委员会拟利用世界银行贷款实施“湖南省污染农田综合治理项目”。

湖南省污染农田综合治理项目将采用整村推进的建设方式，即每个选定的项目县选择存在农产品产地土壤重金属污染的3-5个乡镇，每个乡镇选择4-6个自然村作为项目区，进行集中、全面综合管理。项目主要内容包括四个方面：农业污染土壤管理、可持续土壤管理实践、环境管理和农产环境监测，项目监测评价和管理。

衡阳市确定的项目区为南岳衡山及石门县石门县水磨田、北市镇北市河山片水磨田、衡山镇山片水磨田、西渡镇梅花村片水磨田和西渡镇新绣村片水磨田。

二、项目实施机构名称和联系地址

施工单位：湖南省农业委员会
地址：湖南省长沙市开福区教育路66号
联系人：刘燕
电话：0734-6811614

施工单位：衡阳县农业局
地址：衡阳市衡阳县西渡镇
联系电话：0734-8812810

三、承担项目环境影响评价工作的机构名称和联系地址

评价单位：湖南省农业科学院
地址：湖南省长沙市芙蓉区双福路99号
联系人：曾工
电话：0731-85259288

四、征求意见的主要范围和主要事项

（一）征求意见的范围：受建设项目影响的公民、法人或其他组织。

（二）征求意见的主要事项：
1. 对项目的了解程度及对项目环境影响的认识程度；
2. 公众了解项目情况后，从环保角度考虑，对该项目实施持何种态度；
3. 项目实施后可能产生的新的环境问题；
4. 对项目实施的接受程度；
5. 对项目的其它意见及要求。

五、公众提出意见的主要方式

公众可以在公众参与信息公布后，以信函或者按照有关公告要求的其他方式，向项目建设单位或者其委托的环境影响评价单位提出书面意见，信息公布时间为2016年1月5日至2016年1月20日。

施工单位：湖南省农业委员会
地址：湖南省长沙市芙蓉区双福路99号

2016年1月5日
## Appendix 8 Questionnaire of Public Opinions on EA

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Age</th>
<th>Nationality</th>
<th>Education</th>
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<thead>
<tr>
<th>Address</th>
<th>Occupation</th>
<th>Scale of operation (Retail investor/Large investor)</th>
<th>Income (poor household/non-poor household)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1. Do you know the Project?</th>
<th>Yes</th>
<th>I've heard of it</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. How did you know the Project information?</td>
<td>Bulletin board</td>
<td>TV/Newspaper/Network</td>
<td>Local resident</td>
</tr>
<tr>
<td>3. What's your attitude towards the Project?</td>
<td>Approve</td>
<td>Disapprove</td>
<td>I don't know</td>
</tr>
<tr>
<td>4. What's your view of the project site selection?</td>
<td>Reasonable</td>
<td>Unreasonable</td>
<td>I don't know</td>
</tr>
<tr>
<td>5. What influences do you think will the project construction bring to local economic development?</td>
<td>Promotion</td>
<td>Inhibition</td>
<td>No influence</td>
</tr>
<tr>
<td>6. Which aspect of local environment do you think will be influenced most by project construction?</td>
<td>Water environment</td>
<td>Atmospheric environment</td>
<td>Ecological environment</td>
</tr>
<tr>
<td>7. What's your opinion about the main environmental benefits of the Project?</td>
<td>Reduce pollution of agricultural soil</td>
<td>Improve quality of agricultural irrigation</td>
<td>Enhance the quality safety of agricultural products</td>
</tr>
<tr>
<td>8. What's the largest influence on your and local residents' benefits after project construction?</td>
<td>Increased income</td>
<td>Improved environment</td>
<td>Food security</td>
</tr>
<tr>
<td>9. Are you satisfied with present local</td>
<td>Yes</td>
<td>No</td>
<td>I don't know</td>
</tr>
<tr>
<td>Question</td>
<td>Options</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. What's your opinion about the main environmental problem?</td>
<td>Water pollution, Air pollution, Noise, Ecological damage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. What's your opinion about the main environmental problem on current farmland?</td>
<td>Heavy metal pollution, Pesticide pollution, Overfertilization, Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. What's the problem in agricultural production that you want to solve most?</td>
<td>Pollution of agricultural soil, Production technology, Product sales, Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. What changes do you think will project implementation bring to crop yield?</td>
<td>Improve, Reduce, No change, I don't know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. What changes do you think will project implementation bring to agricultural product quality safety?</td>
<td>Improve, Lower, No change, Improve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. How do you like local agricultural, water conservation, and irrigation facilities?</td>
<td>Perfect, Poor, There is no irrigation facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Have you mastered different skills on construction and maintenance of field irrigation system?</td>
<td>Yes, Roughly know, No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. If local field irrigation system construction is designed, do you want to participate in the whole process of project design, construction, and implementation?</td>
<td>Yes, No, I don't know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Have you participated in training of agricultural knowledge?</td>
<td>No, 1~ 2 times, 3~ 5 times, Over 5 times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. What's the type of Farmyard Composite and Formula Mixed</td>
<td>Mixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Option 1</td>
<td>Option 2</td>
<td>Option 3</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>your applied fertilizer?</td>
<td>manure</td>
<td>trace-element fertilizer</td>
<td>fertilization by soil testing</td>
</tr>
<tr>
<td>21. How do you choose the fertilizer and pesticide?</td>
<td>Recommended by agricultural technical personnel</td>
<td>Recommended by dealer</td>
<td>By experience (or recommended by neighbor)</td>
</tr>
<tr>
<td>22. How do you obtain fertilizer and pesticide?</td>
<td>Pesticide shop</td>
<td>Directly sold by manufacturer</td>
<td>Mobile vendor</td>
</tr>
<tr>
<td>23. What's your current basis for application amount of fertilizer and pesticide?</td>
<td>Ask the one who has used them</td>
<td>By experience</td>
<td>Label instruction</td>
</tr>
<tr>
<td>24. How do you determine the application times of fertilizer and pesticide?</td>
<td>By experience</td>
<td>Label instruction</td>
<td>Guided by agricultural technical personnel</td>
</tr>
<tr>
<td>25. How many times do you apply pesticide in each round of crops?</td>
<td>1~2 times</td>
<td>3~4 times</td>
<td>5~6 times</td>
</tr>
<tr>
<td>27. To ensure project to be implemented successfully, what's your opinion on next focus?</td>
<td>Propaganda and education</td>
<td>Training</td>
<td>Organization and implementation of Monitoring and evaluation</td>
</tr>
<tr>
<td>28. What's your opinion and suggestion on project construction and environmental protection?</td>
<td>May be proposed from environmental protection facility, training guidance, and fund subsidy.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 9 Social assessment household survey questionnaire for “Integrated Management Project of Contaminated Agricultural land in Hunan Province”

Dear friends,

Hello! In order to control the heavy metal pollution in agricultural product producing area, improve the quality and safety of agricultural products, ensure the life and health of people, Agricultural Committee of Hunan Province intends to implement the “Integrated Management Project of Contaminated Agricultural Land in Hunan Province”. To extensively collect the valuable suggestions of the masses for implementation of the project, we will carry out this social assessment survey entrusted by the project party. This survey will not involve personal identification information, all survey data will only serve the needs for implementation of the project, and we will conduct strict confidentiality on your information according to the relevant national laws and regulations, so please rest assured to answer them. Thank you for your support for the project and for our survey.

Agricultural Committee of Hunan Province
Social assessment survey team for the social assessment of “Integrated Management Project of Polluted Farmland in Hunan Province”

August 2015

I. Basic situation

County/District/City: Township/Street: Village/Community

1. Your gender:
   ① Male    ② Female

2. You are ___ years old. (Please fill in the specific figure on the line)

3. Your nationality is:
   ① Han    ② Tujia    ③ Miao nationality    ④ Dong    ⑤ Other (Please specify on the line)

4. Your education degree is:
   ① Primary school and below    ② Junior high school    ③ Senior high school/technical secondary school / vocational school    ④ University and above

5. Your marital status is:
   ① Unmarried    ② Married    ③ Divorced    ④ Remarried after divorce

6. Do you believe in religion?
   ① No
   ② Yes ➔ Your religion is (        )
   A Buddhism    B Taoism    C Islamism    D Catholicism    E Christianity
   F Others (Please specify on the line)
7. Your current physical health status is:
① Very good  ② Good  ③ General  ④ Not too good  ⑤ Very bad

8. Your political status is:
① Chinese communist party member  ② Democratic party member  
③ Communist youth league member  ④ Ordinary people

9. Do you serve or once serve as a village, township (town) and above cadre?
① 否
② Yes ———— You serve as ( )
A Village cadre  B Township (town) cadre  C Cadre of county level or above

10. Currently, are you engaged in work / labor with income?
① No ———— Which situation it belongs to?
A Manage household chores  B Study at school  C Unemployment  
D Retirement / Early retirement  E Lose work ability  
F Others  (Please specify on the line)
② Yes ———— Your occupation is:
A Farming  B Operating industry and commerce  C Work (place)  
D Others  (Please specify on the line)

11. How many people are there in your family?  persons (Please fill in the specific figure on the line)

12. Your family income status last year is:

<table>
<thead>
<tr>
<th>Total amount of annual income (10,000 yuan)</th>
<th>Agricultural income (10,000 yuan)</th>
<th>Non-agricultural income (10,000 yuan)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. Your family expenditure situation last year is:

<table>
<thead>
<tr>
<th>Total amount of annual expenditure (10,000 yuan)</th>
<th>Agricultural expenditure (10,000 yuan)</th>
<th>Living expenditure (10,000 yuan)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical expenditure (10,000 yuan)</td>
<td>Education expenditure (10,000 yuan)</td>
<td>Pension expenditure (10,000 yuan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. The main source of your annual family income last year is (Multiple choices):
① Income from planting and breeding industry  ② Work or wage income
15. Within the confines of your village, you think that your family economic status belongs to:

1. Very good  
2. Good  
3. General  
4. Poor  
5. Extremely poor

16. What is the main industry in your village (community)?

1. Mainly agriculture  
2. Mainly non-agriculture  
3. Agriculture and non-agriculture are basically equivalent  
4. Unclear

17. The distance between your village (community) and the county town (district)?

1. Within 5km  
2. 5 - 10km  
3. 11-20km  
4. Above 20km

18. Your overall assessment to the local economic and social development served by local county (or city, or district) government is:

1. Very satisfied  
2. Moderately satisfied  
3. General  
4. Not very satisfied  
5. Very unsatisfied

19. Your overall assessment to the local economic and social development served by local township (town) government is:

1. Very satisfied  
2. Relatively satisfied  
3. General  
4. Not very satisfied  
5. Very unsatisfied

20. Your overall assessment to the village economic and social development served by village branch and village committee is:

1. Very satisfied  
2. Moderately satisfied  
3. General  
4. Not very satisfied  
5. Very unsatisfied

II. Awareness and support willingness

21. The farmland heavy metal (such as cadmium, nickel and arsenic etc) pollution situation in your location is:

1. Very serious  
2. Relatively serious  
3. General  
4. Not very serious  
5. No pollution

22. The farmland heavy metal pollution situation in your location has lasted for:

1. 1-2 years  
2. 3-5 years  
3. 5-10 years  
4. Above 10 years  
5. Unclear

23. The development trend of farmland heavy metal pollution phenomenon in your location is:

1. More and more serious  
2. Better and better  
3. Maintain the status quo, neither worse nor better  
4. Unclear

24. The impact of farmland heavy metal pollution on the health of local people is:

1. Very large  
2. Relatively large  
3. General  
4. Relatively small  
5. No impact

25. The impact of farmland heavy metal pollution on the yield of local agricultural products is:

1. Very large  
2. Relatively large  
3. General  
4. Relatively small  
5. No impact
26. The impact of farmland heavy metal pollution on the quality of local agricultural products is:
① Very large  ② Relatively large  ③ General  ④ Relatively small  ⑤ No impact

27. The impact of farmland heavy metal pollution on the selling price of local agricultural products is:
① Very large  ② Relatively large  ③ General  ④ Relatively small  ⑤ No impact

28. Your opinion on local farmland heavy metal pollution is:
① Very worried  ② Relatively worried  ③ A little worried  ④ Not too worried  ⑤ Don’t mind

29. Have your township (town) once implemented other public welfare projects similar to “Safety and Quality Improvement Project for Producing Area of Agricultural Products”?
① No  ② Yes  Implementation effect of the project is (  )
   A Very successful  B Relatively successful  C General effect  D The effect is not very good  E The effect is very bad

30. Do you understand the “Safety and Quality Improvement Project for Producing Area of Agricultural Products”?
① Completely do not understand  ② Not too understand  ③ Understand a little  ④ Relatively understand  ⑤ Very understand

31. From which channel do you understand the “safety and quality improvement project for producing area of agricultural products”?
① Government publicity  ② Press media  ③ Project unit  ④ Folk information  ⑤ Never hear about

32. Generally speaking, do you think the “safety and quality improvement project for producing area of agricultural products” will be favorable to the development of local economy and society or not:
① Very favorable  ② Relatively favorable  ③ General  ④ Not too favorable  ⑤ Very unfavorable  ⑥ No comment since I have no idea about it

33. Generally speaking, your attitude to local implementation of the “safety and quality improvement project for producing area of agricultural products” is:
① Very supportive  ② Relatively supportive  ③ General  ④ Not too supportive  ⑤ strongly opposed  ⑥ No comment since I have no idea about it

III. Participating willingness and expectations

34. The crops mainly planted in your farmland currently are (Multiple choices)
① Rice  ② Vegetable  ③ Fruit  ④ Cotton  ⑤ Tea  ⑥ Others (Please specify)

35. According to demand of the project, if you are required to replant other crops, are you willing to do so?
36. According to demand of the project, if you are required to replant other crops, which crops are you willing to replant?
① Sericulture  ② Seedling and flower  ③ Watermelon (melon)  ④ Ramie  ⑤ Cotton  ⑥ Others (Please specify)

37. According to provisions of the project, reasonable compensation shall be made to the farmers who are willing to replant other crops which cannot obtain benefits in a short term, and in your opinion, the subsidy standard to the farmers who are willing to replant other crops shall not be less than ______ yuan/mu/year. (Please fill in the specific figure on the line)

38. According to governance demand of the project, if you are required to adjust farmland planting pattern (e.g. Change “rice+tobacco” to “rape+corn”), are you willing to do so?
① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

39. Does your rice apply direct seeding? (e.g. not to conduct breeding and transplanting, but directly sow seeds to the rice field)
① Yes  ② No

40. According to demand of the project, if you are required to change rice direct seeding to soft-disk throw-planting or mechanized-transplanting, are you willing to do so?
① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

41. According to demand of the project, if your farmland is required to be changed from shallow ploughing to deep ploughing, are you willing to do so?
① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

42. According to demand of the project, if your farmland is required to be changed from rotary tillage to plowing, are you willing to do so?
① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

43. According to demand of the project, if you are required to apply organic fertilizer or plant green manure and not to apply chemical fertilizer any more, are you willing to do so?
① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

44. According to demand of the project, if your farmland is required to lay fallow (government will make fallow subsidy), are you willing to do so?
① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

45. According to provisions of the project, reasonable compensation shall be made to the farmers who are willing to let farmland lay fallow, and in your opinion, the subsidy standard to the farmers who are willing to let farmland lay fallow shall not be less than ______ yuan/mu/year. (Please fill in the specific figure on the line)
46. According to demand of the project, if you are required to transfer land for a short term within 1-5 years (government will make land transfer subsidy), are you willing to do so?
   ① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

47. According to demand of the project, reasonable compensation shall be made to the farmers who are willing to transfer land for a short term within 1 - 5 years, and in your opinion, the subsidy standard to the farmers who are willing to transfer land for a short term within 1-5 years shall not be less than _______ yuan/mu/year. (Please fill in the specific figure on the line)

48. According to demand of the project, if you are required to retreat land permanently (government will make land retreat subsidy), are you willing to do so?
   ① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

49. According to demand of the project, reasonable compensation shall be made to the farmers who are willing to retreat land permanently, and in your opinion, the subsidy standard to the farmers who are willing to retreat land permanently shall not be less than _______ yuan/mu/year. (Please fill in the specific figure on the line)

50. According to demand of the project, if appropriate transformation and upgrading shall be made to the irrigation infrastructure of local farmland, such as irrigation and drainage ditch perfection, dangerous reservoir reinforcement, weir pond dredging, expansion and seepage prevention etc, are you willing to do so?
   ① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

51. According to demand of the project, if heavy metal contaminated straw treatment facilities shall be newly built in heavy metal contaminated area of farmland, are you willing to do so?
   ① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

52. According to demand of the project, if whole village and whole township in heavy metal highly contaminated area of farmland shall be conducted land transfer and contiguous development in a systematic way, are you willing to do so?
   ① Very willing  ② Relatively willing  ③ General  ④ Not too willing  ⑤ Very unwilling

53. If land transfer shall be conducted, which of the following land transfer ways do you prefer to choose?
   ① Renting (e.g.rent your farmland to project party, large grower or other agricultural operating entities, and you shall obtain rent)
   ② Buying shares (e.g.fix a price for operating right of your farmland to buy shares, set up a joint stock company, and you obtain profits according to shares. You can also participate in labor of the company, so as to obtain additional labor remuneration)
   ③ Shares + Cooperation (Set up a cooperative by taking land operating right as shares, and you obtain income according to land minimum guarantee and benefit bonus)
54. According to demand of the project, the project shall hire some farmers to participate in the construction of local project, are you willing to do so?
① Very willing ② Relatively willing ③ General ④ Not too willing ⑤ Very unwilling

55. If you are willing to participate in the labor of project party, in your opinion, the labor remuneration shall not be less than _______ yuan/person/day. (Please fill in the specific figure on the line)

56. According to demand of the project, the project shall conduct technical training on participating farmers, are you willing to participate in?
① Very willing ② Relatively willing ③ General ④ Not too willing ⑤ Very unwilling

57. If you are willing to participate in, in your opinion, the technical training subsidy shall not be less than _______ yuan/person/day. (Please fill in the specific figure on the line)

58. Are you willing as we will invite some local farmers to serve as working personnel of supervision according to project requirements?
① Very willing ② Relatively willing ③ General ④ Not too willing ⑤ Very unwilling

59. If you are willing to become a supervisory staff, in your opinion, the labor remuneration shall not be less than _______ yuan/person/day. (Please fill in the specific figure on the line)

60. In implementation process of the project, if your willingness and expectations are in conflict or disagreement with the project, which way do you wish to use to solve the conflict or disagreement? (Can make multiple choices)
① Reflect to village cadres ② Reflect to township government or a higher level government ③ Ask project party for solution ④ Quit, do not cooperate with project party any more ⑤ Find a group of people to solve with force ⑥ Others ⑦ (Please specify on the line)

61. Implementation of the project will be promoted mainly by relying on agricultural bureau of the county (city or district), are you confident that agricultural bureau of the county (city or district) can complete the project very well?
① Very confident ② Relatively confident ③ General ④ Not too confident ⑤ No confidence completely

62. After the project is completed, in your opinion, what positive influences it will have on the local (Can make multiple choices):
① Ensure the quality and safety of agricultural products ② Contaminated farmland can get effective governance and rational utilization ③ Increase the employment opportunities of local farmers ④ Improve the agricultural production skills of local farmers ⑤ Increase the income of local farmers ⑥ Others ⑦ (Please specify on the line)

63. Whether construction of the project have the following negative impacts on your
production and life? (Can make multiple choices):
① Reduce the actual income of farmers
② Increase the labor amount of agricultural production
③ Replanted crop products cannot be sold out
④ Construction will destroy the original vegetation, resulting in water and soil loss
⑤ Construction will cause road dust, vehicle exhaust, oil dripping and leaking and other environmental pollution
⑥ Construction work noise will affect the rest of farmers
⑦ Others (Please specify on the line)

64. The project will be implemented on the local; do you have any else good suggestions to ensure realization of the project goals? (Please write your valuable suggestions on the line)

It is the end here, thank you again for your participation and support! Wish you all the best!
### Appendix 10 Resettlement appeal and complaint handling situation registration table

<table>
<thead>
<tr>
<th>Complainant name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving unit</td>
<td>Place</td>
</tr>
<tr>
<td>Complaint contents</td>
<td></td>
</tr>
<tr>
<td>Required solution</td>
<td></td>
</tr>
<tr>
<td>Proposed solution</td>
<td></td>
</tr>
<tr>
<td>Actual handling situation</td>
<td></td>
</tr>
<tr>
<td>Complainant (signature)</td>
<td>Recorder (signature)</td>
</tr>
</tbody>
</table>

**Note:**

1. Recorder shall truthfully record the complaint contents and requirements of complainant.
2. Complaint process shall not be subject to any interference or obstacle.
3. Proposed solution shall be replied to the complainant within the prescribed time.
Appendix 11 Outline of interviews with village cadres of control project of polluted agricultural area in Hunan Province

I. Basic situation of project village (county) (Various departments shall make corresponding introduction from its management business scope and combined with the following topics)

1. Population (quantity, gender, nationality, religion, occupation, quantity and proportion of agricultural and non-agricultural population)
2. Natural resources (Land, forest and mineral etc.) owned by the village (county) and its utilization situation
3. Economic income, main source and its proportion of the village (county), and its ranking in the township
4. Composition of living pattern (agriculture, non-agriculture and animal husbandry) and its development situation
6. Development history and planning of the village (county)
7. Problems and present situation for infrastructure of the village (county)
8. Ecological environment situation and impact on life of local people etc
9. Composition and operation status for formal institutions and informal institutions of the village (county)
10. Experience of implementing similar projects in the village (county)

II. Ethnic minority (It is for the village with many ethnic minorities, and if without any ethnic minority or the proportion of ethnic minority is small, then this part can be ignored) (Various departments shall make corresponding introduction from its management business scope and combined with the following topics)

1. Type, population size, proportion and residence place of the ethnic minorities in the village (county)
2. Source of the ethnic minorities
3. Informal social organization of the ethnic minorities
4. Main natural resources owned by the ethnic minorities, and their custom and customary law for environmental protection
5. Economic development situation of the ethnic minorities
6. Belief situation of the ethnic minorities
7. Production and consumption situation of the ethnic minorities
8. Government assistance situation to the ethnic minorities
9. Exchange situation between the ethnic minorities (intermarriage)

III. Opinions of various departments:

County Government:
1. What impacts of land heavy metal contamination have on farmer’s life, village economy and agriculture in the county?
2. What investments the county has made at this aspect? What are the results? What are the experiences?
3. What control measures the county intends to take in the 13th Five-Year Plan?

Environmental Protection Bureau:
1. The basic situation of current soil heavy metal contamination in the county, including contamination source, contamination degree and contamination range.
2. What measures the county has taken to monitor soil heavy metal contamination currently?
3. The impacts of soil heavy metal contamination on farmers, including resident health and ecological environment.
4. What control measures the county has taken at the aspect of soil heavy metal contamination? What are the results?
5. What measures the county intends to take for soil heavy metal contamination in the 13th Five-Year Plan?

Agricultural Bureau:
1. What measures the county has taken to monitor the impacts of soil heavy metal contamination on crops, and what is the basic situation?
2. The impacts of soil heavy metal contamination on crops in the county, including impacts on yield and production value.
3. What measures the county has taken for soil heavy metal contamination, and what are the results?
4. What measures the county intends to take for soil heavy metal contamination in the 13th Five-Year Plan?

Finance Bureau:
1. What impacts soil heavy metal contamination have on economic development of the county?
2. What investments the county has made in controlling soil heavy metal contamination? What are the results?

3. What measures the county intends to take for soil heavy metal contamination in the 13th Five-Year Plan?

III. Opinions on the project (Various departments shall make corresponding introduction from its management business scope and combined with the following topics)

1. In your opinion, what benefits implementation of the project will bring to the village (county)?

2. In your opinion, what difficulties still exist in the process of implementing the project?

3. Whether the contaminated agricultural producing area governance project will have impacts on activities which have been carried out locally? If yes, what impacts will be caused?

4. Whether the village (county) has sufficient labor force to participate in the contaminated agricultural producing area governance project?

5. In your opinion, who will benefit most from the project?

6. In your opinion, which factors will affect implementation of the project (economy, management, technology, finance)?

7. What negative impacts the project will have on the local (society, culture, economy, and environment)?

8. What are the countermeasures for mitigating negative impacts of the project on the local?

9. Whether women and ethic minorities are willing to participate in the project?

(Note: The interview outline is also suitable for team interview or cadre interview of county level, interview topics can be increased or decreased according to the specific circumstances, and the purposes are to understand the background information of social, economic and cultural aspects in the project area as well as opinions of villagers and township cadres on the project)
Appendix 12 Outline of villagers/poor households/women group meeting on control project of polluted agricultural area in Hunan Province

I. Interview questions:

1. Do you know the project? When do you know, where do you know and what information do you know? What other information do you want to know?

2. In your opinion, your village is richer or poorer when compared with other villages in the county? If it is a poor village, what do you think the cause of poverty?

3. What is the loss situation of your family and the village caused by contaminated agricultural producing area and what is the recovery situation?

4. Do you agree or disagree with the project? If you disagree, please show the reasons.

5. What impacts will have on the production and life of your family after the project is implemented? (Positive and negative)

6. For the project, what are the problems you are most concerned about? List the problems and sort them by importance.

7. Who will benefit most from the project?

8. What suggestions do you have for the project? (Sort by acceptance degree)

9. What impacts construction of the project will have on existing natural environment of your village? What impacts will have on culture, historical heritage, religion and scenic spot of your village?

10. What impacts construction of the project will have on the production and life of women? What are their requirements and suggestions for the project? (Only ask women)

11. What impacts construction of the project will have on the production and life style as well as social customs and habits of your nationality? Do you have any suggestions for the project? (Only ask ethnic minorities)

II. Make diagram:

1. Make daily life diagram and four-season activity diagram according to genders.

2. Make daily trip diagram and daily communication diagram according to genders.

(Note: The interview outline is also suitable for door-to-door interview, and the interview outline is conducted on the basis of questionnaire survey)
### Appendix 13 Entitlement Matrix

<table>
<thead>
<tr>
<th>Type of impact</th>
<th>Affected people (APs)</th>
<th>Resettlement measure</th>
<th>Entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Land acquisition</td>
<td>Collective</td>
<td>Collective land</td>
<td>Full compensation will be paid to the village collective and used as resolved at village meeting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attachments</td>
<td></td>
</tr>
<tr>
<td>Farmers affected by land acquired</td>
<td>Land compensation fees and resettlement subsidy</td>
<td>Attachments and infrastructure</td>
<td>The AHs will receive full compensation for attachments and infrastructure, which will be restored elsewhere themselves.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Temporary land use</td>
<td>Full compensation will be paid and the temporarily occupied land will be restored to the original condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Young crops</td>
<td>The APs will receive full compensation for young crops.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social security</td>
<td>The APs may cover endowment insurance for LEFs, new-type rural insurance, endowment insurance for urban and rural residents, and endowment insurance for urban employees voluntarily.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>livelihood restoration</td>
<td>Free training and employment assistance measures</td>
</tr>
<tr>
<td>Property demolition and rebuilding</td>
<td>Proprietors of affected properties on rural collective land</td>
<td>Cash or house-for-house compensation</td>
<td>Cash compensation for affected property based on full replacement cost, moving subsidy and transition subsidy. New resettlement housing acceptable to affected people in location of site, size, quality and accessibility.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proprietors of affected properties on state-owned land</td>
<td>Cash compensation for the property based on the appraised market value, or offering resettlement housing at the displaced institution’s option;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Property tenants</td>
<td>Resettlement property of equivalent size, location and quality, and satisfactory to the displaced person, or cash compensation sufficient to purchase similar property. Plus resettlement moving subsidy and transition subsidy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Business operators and affected people</td>
<td>Affected tenants are adequately consulted, provided with compensation for all losses due to the termination of the lease and assistance in looking for another property.</td>
</tr>
<tr>
<td>Loss of non-residential buildings Property demolition and rebuilding</td>
<td>1) New operating plot or cash compensation at replacement cost; 2) cash compensation for business loss; 3) transitional support for loss of income; 4) moving subsidy</td>
<td>A new operating plot provided acceptable in size, location and operating conditions or Cash compensation at full replacement cost; Plus cash compensation for business loss, transitional assistance and moving subsidies.</td>
<td>Affected workers will receive compensation for lost wage income; unemployed workers will also enjoy skills training and reemployment assistance services.</td>
</tr>
<tr>
<td>Type of impact</td>
<td>Affected people (APs)</td>
<td>Resettlement measure</td>
<td>Entitlement</td>
</tr>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Vulnerable groups   | All                   | Training and employment               | 1) Jobs such as cleaning and waste collection will be offered;  
                                                2) They will have priority in receiving tourism services, tourism and non-farming job training.  
                                                3) They will have priority in job selection and receiving employment;  
                                                4) Enjoy minimum living standard allowance |
| Women               | All                   | Public participation and employment    | 1) Unskilled jobs, such as simple agribusiness, light material shipment, catering in construction sites and logistical jobs shall be offered;  
                                                2) The owners will organize training workshops for women, distribute instructions of the project cropping and management for contaminated farmland.  
                                                3) Women have the right to receive relevant information during resettlement, and have equal speaking and decision-making rights. Not less than 30% of participants in consultative activities should be women.  
                                                4) Women have the equal rights to sign LA compensation agreements and compensation as men.  
                                                5) Widely collect the related appeals of women in land reclamation, compensation and resettlement. |
| Ethnic Minority     | All                   | Public participation and employment    | ➢ Ensure ethnic-minority groups’ participation and consultation during project implementation with ethnic-minority group member in community organizations;  
                                                ➢ Comments of ethnic minorities are taken into consideration in land acquisition and demolition;  
                                                ➢ Ethnic minorities shall enjoy equal rights as the majority people do in compensation for land acquisition and demolition;  
                                                ➢ Ethnic minorities who have job willingness, especially ethnic-minority women, shall be given priority to choose job opportunities during project construction. |
<p>| Loss of attachments and other assets | Proprietors of attachments and other assets | Cash compensation based on replacement cost | Cash compensation based on replacement cost |
| Loss of infrastructure | Proprietors or management agencies of affected facilities | Funds provided for restoring the affected facility to the original condition and function, or money paid to competent authority for restoration | Infrastructure and services should be restored timely to avoid any adverse impact on the host community or entity, or money paid to competent authority for restoration. |</p>
<table>
<thead>
<tr>
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<th>Entitlement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>If cultural and religious buildings or worship sites are affected, monetary compensation based on full replacement cost and if reconstruction is required, new site and monetary compensation should be provided in full consultation with the affected community and residents, including religious leaders and the believers for worship sites.</td>
</tr>
</tbody>
</table>

Affected employees/workers/owners:
Compensation and resettlement should be offered according to actual situation in compliance with related government regulations and World Bank involuntary resettlement requirements.