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| Document of  The World Bank  **FOR OFFICIAL USE ONLY**  Report No: PAD1808  INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT  PROJECT APPRAISAL DOCUMENT  ON A  PROPOSED LOAN  IN THE AMOUNT OF US$100 MILLION  TO THE  PEOPLE’S REPUBLIC OF CHINA  FOR A  HUNAN INTEGRATED MANAGEMENT OF AGRICULTURAL LAND Pollution PROJECT  August 1, 2017  Environment and Natural Resources Global Practice  East Asia and Pacific Region |

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CURRENCY EQUIVALENTS

(Exchange Rate Effective November 30, 2016)

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| --- | --- | --- |
| Currency Unit | = | CNY |
| CNY 6.7 | = | US$1 |

FISCAL YEAR

|  |  |  |
| --- | --- | --- |
| January 1 | – | December 31 |

ABBREVIATIONS AND ACRONYMS

|  |  |
| --- | --- |
| AC | Agriculture Commission |
| AEM | Agricultural Environmental Monitoring |
| BCF  Cd  CPMUs | Bioconcentration Factor  Cadmium  County Project Management Units |
| DA | Designated Account |
| DOF | Department of Finance |
| DRC | Development and Reform Commission |
| ECOP | Environmental Code of Practice |
| EMP | Environmental Management Plan |
| EMS | Environmental Management System |
| EPB | Environmental Protection Bureau |
| EPD | Environmental Protection Department |
| ESIA  ESMF | Environmental and Social Impact Assessment  Environmental and Social Management Framework |
| ESMP | Environmental and Social Management Plan |
| FM | Financial Management |
| FSR | Feasibility Study Report |
| HPAO | Hunan Provincial Audit Office |
| HPFB | Hunan Provincial Finance Bureau |
| ICB | International Competitive Bidding |
| IFR | Interim Financial Report |
| IP  M&E | Indigenous People  Monitoring and Evaluation |
| MOA | Ministry of Agriculture |
| MOF | Ministry of Finance |
| MEP | Ministry of Environmental Protection |
| NCB | National Competitive Bidding |
| PDO | Project Development Objective |
| PIM  PLG | Project Implementation Manual  Project Leading Group |
| PMO | Project Management Office |
| PMP | Pest Management Plan |
| PMU | Project Management Unit |
| PP  PPMO | Procurement Plan  Provincial Project Management Office |
| PSC | Provincial Steering Committee |
| SA | Social Assessment |
| TEG | Technical Experts Group |
| TOR | Terms of Reference |

|  |  |  |
| --- | --- | --- |
| Regional Vice President: |  | Victoria Kwakwa |
| Country Director: |  | Bert Hofman |
| Senior Global Practice Director: |  | Karin Kemper |
| Practice Manager: |  | Iain G. Shuker |
| Task Team Leaders: |  | Wendao Cao, Qing Wang |

**CHINA**

**Hunan Integrated Management of Agricultural Land Pollution Project**

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| **PAD DATA SHEET** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *China* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Hunan Integrated Management of Agricultural Land Pollution Project (P153115)* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **PROJECT APPRAISAL DOCUMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| *EAST ASIA AND PACIFIC* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *0000009269* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Report No.: PAD1808 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **Basic Information** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project ID | | | | | | | | | | | EA Category | | | | | | | | | | | Team Leader(s) | | | | | | | | | | |
| P153115 | | | | | | | | | | | A - Full Assessment | | | | | | | | | | | Wendao Cao, Qing Wang | | | | | | | | | | |
| Financing Instrument | | | | | | | | | | | Fragile and/or Capacity Constraints [ ] | | | | | | | | | | | | | | | | | | | | | |
| Investment Project Financing | | | | | | | | | | | Financial Intermediaries [ ] | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | Series of Projects [ ] | | | | | | | | | | | | | | | | | | | | | |
| Project Implementation Start Date | | | | | | | | | | | Project Implementation End Date | | | | | | | | | | | | | | | | | | | | | |
| 07-Sep-2017 | | | | | | | | | | | 30-Jun-2023 | | | | | | | | | | | | | | | | | | | | | |
| Expected Effectiveness Date | | | | | | | | | | | Expected Closing Date | | | | | | | | | | | | | | | | | | | | | |
| 31-Oct-2017 | | | | | | | | | | | 31-Dec-2023 | | | | | | | | | | | | | | | | | | | | | |
| Joint IFC | | | | | | | |  | | | | | | | | | | | | | | | | |  | | | | | | | |
| No | | | | | | | |  | | | | | | | | | | | | | | | | |  | | | | | | | |
| Practice Manager/Manager | | | | | | | | Senior Global Practice Director | | | | | | | | | Country Director | | | | | | | | Regional Vice President | | | | | | | |
| Iain G. Shuker | | | | | | | | Karin Erika Kemper | | | | | | | | | Bert Hofman | | | | | | | | Victoria Kwakwa | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Borrower: People's Republic of China | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Responsible Agency: Hunan Provincial Agricultural Commission | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contact: | | | | | Deyuan Zhang | | | | | | | | | | | | Title: | | Director | | | | | | | | | | | | | |
| Telephone No.: | | | | | 8673188654819 | | | | | | | | | | | | Email: | | 3271457638@qq.com | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Project Financing Data(in USD Million)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [ X ] | Loan | | | [ ] | | | IDA Grant | | | | [ ] | | | Guarantee | | | | | | | | | | | | | | | | | | |
| [ ] | Credit | | | [ ] | | | Grant | | | | [ ] | | | Other | | | | | | | | | | | | | | | | | | |
| Total Project Cost: | | | | | | | | 111.94 | | | | | | | | | Total Bank Financing: | | | | | | | | 100.00 | | | | | | | |
| Financing Gap: | | | | | | | | 0.00 | | | | | | | | |  | | | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Financing Source** | | | | | | | | | | | | | | | **Amount** | | | | | | | | | | | | | | | | | |
| Borrower | | | | | | | | | | | | | | | 11.94 | | | | | | | | | | | | | | | | | |
| International Bank for Reconstruction and Development | | | | | | | | | | | | | | | 100.00 | | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | 111.94 | | | | | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Expected Disbursements (in USD Million)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fiscal Year | | 2018 | | | | 2019 | | | 2020 | | | 2021 | | | | 2022 | | 2023 | | 2024 | | | | 0000 | | | | 0000 | | | 0000 | |
| Annual | | 2.00 | | | | 5.00 | | | 15.00 | | | 20.00 | | | | 30.00 | | 20.00 | | 8.00 | | | | 0.00 | | | | 0.00 | | | 0.00 | |
| Cumulative | | 2.00 | | | | 7.00 | | | 22.00 | | | 42.00 | | | | 72.00 | | 92.00 | | 100.00 | | | | 0.00 | | | | 0.00 | | | 0.00 | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Institutional Data** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Practice Area (Lead)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Environment & Natural Resources | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Contributing Practice Areas** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Proposed Development Objective(s)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| The project development objective is to demonstrate a risk-based integrated approach to managing heavy metal pollution in agricultural land for safety of agricultural production areas in selected counties in Hunan. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Components** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Component Name** | | | | | | | | | | | | | | | | | | | **Cost (USD Millions)** | | | | | | | | | | | | | |
| Component 1: Demonstration of Risk-based Agricultural Land Pollution Management. | | | | | | | | | | | | | | | | | | | 71.11 | | | | | | | | | | | | | |
| Component 2: Strengthening Agricultural Environmental Monitoring and Management., | | | | | | | | | | | | | | | | | | | 3.07 | | | | | | | | | | | | | |
| Component 3: Capacity Development and Knowledge Distribution. | | | | | | | | | | | | | | | | | | | 16.23 | | | | | | | | | | | | | |
| Component 4: Project Management and Monitoring and Evaluation | | | | | | | | | | | | | | | | | | | 5.92 | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Systematic Operations Risk- Rating Tool (SORT)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Risk Category** | | | | | | | | | | | | | | | | | | | | | | | | | **Rating** | | | | | | | |
| 1. Political and Governance | | | | | | | | | | | | | | | | | | | | | | | | | Low | | | | | | | |
| 2. Macroeconomic | | | | | | | | | | | | | | | | | | | | | | | | | Moderate | | | | | | | |
| 3. Sector Strategies and Policies | | | | | | | | | | | | | | | | | | | | | | | | | Moderate | | | | | | | |
| 4. Technical Design of Project or Program | | | | | | | | | | | | | | | | | | | | | | | | | Substantial | | | | | | | |
| 5. Institutional Capacity for Implementation and Sustainability | | | | | | | | | | | | | | | | | | | | | | | | | Substantial | | | | | | | |
| 6. Fiduciary | | | | | | | | | | | | | | | | | | | | | | | | | Substantial | | | | | | | |
| 7. Environment and Social | | | | | | | | | | | | | | | | | | | | | | | | | Substantial | | | | | | | |
| 8. Stakeholders | | | | | | | | | | | | | | | | | | | | | | | | | Substantial | | | | | | | |
| 9. Other | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |
| **OVERALL** | | | | | | | | | | | | | | | | | | | | | | | | | Substantial | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Compliance** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Policy** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Does the project depart from the CAS in content or in other significant respects? | | | | | | | | | | | | | | | | | | | | | | | | | | Yes | | [ ] | | No | | [ X ] |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Does the project require any waivers of Bank policies? | | | | | | | | | | | | | | | | | | | | | | | | | | Yes | | [ ] | | No | | [ X ] |
| Have these been approved by Bank management? | | | | | | | | | | | | | | | | | | | | | | | | | | Yes | | [ ] | | No | | [ ] |
| Is approval for any policy waiver sought from the Board? | | | | | | | | | | | | | | | | | | | | | | | | | | Yes | | [ ] | | No | | [ X ] |
| Does the project meet the Regional criteria for readiness for implementation? | | | | | | | | | | | | | | | | | | | | | | | | | | Yes | | [ X ] | | No | | [ ] |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Safeguard Policies Triggered by the Project** | | | | | | | | | | | | | | | | | | | | | | | **Yes** | | | | | | **No** | | | |
| Environmental Assessment OP/BP 4.01 | | | | | | | | | | | | | | | | | | | | | | | **X** | | | | | |  | | | |
| Natural Habitats OP/BP 4.04 | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | **X** | | | |
| Forests OP/BP 4.36 | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | **X** | | | |
| Pest Management OP 4.09 | | | | | | | | | | | | | | | | | | | | | | | **X** | | | | | |  | | | |
| Physical Cultural Resources OP/BP 4.11 | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | **X** | | | |
| Indigenous Peoples OP/BP 4.10 | | | | | | | | | | | | | | | | | | | | | | | **X** | | | | | |  | | | |
| Involuntary Resettlement OP/BP 4.12 | | | | | | | | | | | | | | | | | | | | | | | **X** | | | | | |  | | | |
| Safety of Dams OP/BP 4.37 | | | | | | | | | | | | | | | | | | | | | | | **X** | | | | | |  | | | |
| Projects on International Waterways OP/BP 7.50 | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | **X** | | | |
| Projects in Disputed Areas OP/BP 7.60 | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | **X** | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Legal Covenants** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Institutional Arrangements | | | | | | | | | | | | | **X** | | | | | |  | | | | | | | | CONTINUOUS | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section I.A: Provisions requiring the maintenance of Steering Committees at the provincial, prefecture (Xiangxi) and county level, as well as Project management offices at the provincial, prefecture (Xiangxi) and county levels. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Annual Work Plans | | | | | | | | | | | | | **X** | | | | | |  | | | | | | | | Yearly | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section I.B.1: Provision requiring the submission of the final annual work plans to the Bank. (January 31) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Project Implementation Manual | | | | | | | | | | | | | **X** | | | | | |  | | | | | | | |  | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section I.B.2: Provision requiring the Project to be carried out in accordance with the Project Implementation Manual. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Safeguards Instruments | | | | | | | | | | | | | **X** | | | | | |  | | | | | | | | CONTINUOUS | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section I.D: Provision requiring the Project to be carried out in accordance with the Environmental and Social Management Framework, the Environment and Social Management Plans, the Pest Management Plan, the Resettlement Policy Framework (and any Resettlement Action Plans prepared thereunder), the Ethnic Minorities Planning Framework (and any Ethnic Minorities Development Plans prepared thereunder), and the Employee Resettlement Plan Framework. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Dam Safety Report | | | | | | | | | | | | | **X** | | | | | |  | | | | | | | | Yearly | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section I.D.8: Provision requiring the submission of a written report of findings and recommendations for any remedial work or safety measures necessary to upgrade the Project Reservoirs to an acceptable standard of safety, including an action plan to address the findings and recommendations thereof, to be prepared by a dam safety expert for the Project having experience and qualifications in the relevant technical fields, acceptable to the Bank, and under terms of reference, including a time-table and adequate budget for its activities, satisfactory to the Bank, to, inter alia: (a) inspect and evaluate the status of the Project Reservoirs, their appurtenances, and their performance history; and (b) review and evaluate operation and maintenance procedures of the Project Reservoirs. (March 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Demonstration Sub-projects | | | | | | | | | | | | | **X** | | | | | |  | | | | | | | | CONTINUOUS | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section I.F.1: Provision requiring the Project Counties to: (a) select the sites for the Demonstration Sub-projects, in accordance with the criteria set forth in the Project Implementation Manual; (b) prepare a Demonstration Plan, and thereafter implement the Demonstration Sub-project, in accordance with the Demonstration Plan; and (d) prepare and furnish to the Bank no later than six (6) months after the completion of each Demonstration Sub-project, a completion report under terms of reference satisfactory to the Bank, outlining the activities undertaken under the respective Demonstration Sub-project. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Output-based Subsidies | | | | | | | | | | | | | **X** | | | | | |  | | | | | | | |  | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section I.F.2: Provision requiring the Project Counties to provide output-based subsidies to communities under an implementation agreement, on terms and conditions approved by the Bank and set out in the Project Implementation Manual. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | | | | | | **Recurrent** | | | | | | **Due Date** | | | | | | | | **Frequency** | | | | | |
| Mid-term review | | | | | | | | | | | | |  | | | | | | 30-Jun-2020 | | | | | | | |  | | | | | |
| **Description of Covenant** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Agreement, Schedule, Section II.A.2: Provision requiring Hunan to furnish to the Bank a mid-term review report for the Project, summarizing the result of the monitoring and evaluation activities carried out from the inception of the Project, and setting out the measures recommended to ensure the efficient completion of the Project and the achievement of the objectives thereof during the period following such data. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Conditions** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Source Of Fund** | | | | | | | | **Name** | | | | | | | | | | | | | | | | | **Type** | | | | | | | |
|  | | | | | | | |  | | | | | | | | | | | | | | | | |  | | | | | | | |
| **Description of Condition** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **Team Composition** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Bank Staff** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | **Role** | | | | | | | **Title** | | | | | | **Specialization** | | | | | | | | **Unit** | | | |
| Wendao Cao | | | | | | | | Team Leader (ADM Responsible) | | | | | | | Senior Agriculture Economist | | | | | |  | | | | | | | | GFA02 | | | |
| Qing Wang | | | | | | | | Team Leader | | | | | | | Senior Environmental Specialist | | | | | |  | | | | | | | | GEN03 | | | |
| Yuan Wang | | | | | | | | Procurement Specialist (ADM Responsible) | | | | | | | Senior Procurement Specialist | | | | | |  | | | | | | | | GGO08 | | | |
| Yi Dong | | | | | | | | Financial Management Specialist | | | | | | | Sr Financial Management Specialist | | | | | |  | | | | | | | | GGO20 | | | |
| Meixiang Zhou | | | | | | | | Safeguards Specialist | | | | | | | Social Development Specialist | | | | | |  | | | | | | | | GSU02 | | | |
| Nina Queen Irving | | | | | | | | Team Member | | | | | | | Senior Program Assistant | | | | | |  | | | | | | | | GEN2A | | | |
| Peter Leonard | | | | | | | | Safeguards Advisor | | | | | | | Regional Safeguards Adviser | | | | | |  | | | | | | | | OPSES | | | |
| Xieli Bai | | | | | | | | Team Member | | | | | | | Program Assistant | | | | | |  | | | | | | | | EACCF | | | |
| Ximing Zhang | | | | | | | | Safeguards Specialist | | | | | | | Sr Dams Spec. | | | | | |  | | | | | | | | GWAGP | | | |
| Yiren Feng | | | | | | | | Safeguards Specialist | | | | | | | Senior Environmental Specialist | | | | | |  | | | | | | | | GEN2A | | | |
| Yunqing Tian | | | | | | | | Team Member | | | | | | | Program Assistant | | | | | |  | | | | | | | | EACCF | | | |
| **Extended Team** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Name** | | | | | | | | **Title** | | | | | | | | | **Office Phone** | | | | | | | | **Location** | | | | | | | |
| Paul Romkens | | | | | | | | Environmental Quality and Food Safety Expert | | | | | | | | |  | | | | | | | |  | | | | | | | |
| Xueming Liu | | | | | | | | Senior Economist | | | | | | | | | 18910523096 | | | | | | | |  | | | | | | | |
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| **Locations** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Country** | | | **First Administrative Division** | | | | | | | **Location** | | | | | | | | **Planned** | | | **Actual** | | | | **Comments** | | | | | | | |
| China | | | Hunan | | | | | | | Hengyang | | | | | | | | **X** | | |  | | | |  | | | | | | | |
| China | | | Hunan | | | | | | | Yongxing | | | | | | | | **X** | | |  | | | |  | | | | | | | |
| . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Consultants (Will be disclosed in the Monthly Operational Summary)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Consultants Required ? | | | | | | | | Consultants will be required | | | | | | | | | | | | | | | | | | | | | | | | |

# STRATEGIC CONTEXT

## Country Context

1. Food security and safety have been at the forefront of the Chinese Government agenda and lie at the heart of its agricultural policy. Over the past decades, China has successfully fed its population of 1.3 billion people with less than 7 percent of the world’s arable land. Grain production (paddy rice, wheat, and corn) increased for 12 years successively, reaching 572 million tons in 2015. However, China faces severe resource and environmental constraints and has now reached a critical juncture in its capacity to maintain national food security and safety targets. Widespread air, water, and soil pollution with heavy metals due to rapid industrialization, combined with lax environmental enforcement, have left vast areas of the countryside polluted. Considering the spatial variations of grain production, about 13.9 percent of grain production is affected by heavy metal pollution in agricultural lands.[[1]](#footnote-1) Heavy metal contamination of soil may pose risks and hazards to humans and the ecosystem through direct ingestion or contact with contaminated soil, exposure to contaminants entering the food chain, drinking of contaminated groundwater, reduction in food quality affecting trade, and reduction in land usability for agricultural production causing food insecurity.
2. The Chinese Government, aware of the serious socioeconomic and health risks resulting from soil pollution, carried out China’s first national soil pollution survey.[[2]](#footnote-2) The survey results indicate that the overall percentage of sample points exceeding the screening threshold in the country is estimated at 16.1 percent, involving 19.4 percent of agricultural land. More than 80 percent of the surveyed pollution points result from inorganic toxins, with the top three heavy metal contaminants identified as cadmium (Cd), nickel (Ni), and arsenic (As). In early 2011, the Ministry of Environmental Protection (MEP) issued an Integrated Prevention and Control of Heavy Metal Pollution 12th Five-Year Plan,[[3]](#footnote-3) the first national plan for addressing heavy metal pollution. The key guiding principle of the plan is to prevent new pollution, control pollution sources (cleaner production), and remediate contaminated water and land. The MEP is also making great efforts to include a Soil Pollution Prevention and Control Law in the legislation plan of the National Congress, which is expected to be issued in 2017 or 2018. A long-awaited State Council Soil Pollution Prevention and Control Action Plan (Soil Ten Provisions) was finally issued on May 31, 2016. The Action Plan requires that 90 percent of contaminated farmland be made safe by 2020, with an increase to 95 percent by 2030. It also requires ascertaining areas of polluted farmlands by the end of 2018 and clarifying distribution and risks of major industrial contaminated sites by the end of 2020. It aims to establish a soil environmental baseline database by the end of 2018 and set up soil environment quality monitoring points in all counties by the end of 2020. The Action Plan also specifies which ministry should take the lead and which should participate in specific efforts.
3. The newly amended Environmental Protection Law, which was adopted in April 2014 and came into effect on January 1, 2015, requires that economic and social development be coordinated with environmental protection and encourages studies on the impact that environmental quality causes on public health. It says that the country should establish and improve a national soil pollution investigation, risk assessment, and remediation system and set up and strengthen a national public health monitoring and risk assessment system. It also says that the public has the right to access information related to environmental quality, monitoring data, pollution incidents, and so on and the environmental protection agencies should disclose this information and improve public participation procedures.

## Sectoral and Institutional Context

1. **Heavy metal pollution in Hunan.** Hunan, the largest rice producer in China, produces about 10 percent of the nation’s rice from only 3 percent of its arable land, making a significant contribution to food security in China. However, Hunan Province is also well-known as a home of nonferrous metal, nonferrous metallurgy, chemical, and mining industries that account for more than 80 percent of the province’s industry. Safety of agricultural product area[[4]](#footnote-4) in Hunan, therefore, has been particularly affected by heavy metal contamination, mainly caused by industrial discharges of flu gas, wastewater and waste residue, and metal mine tailings. The quality of agricultural soil is further affected by overuse of agrochemicals and poor farming practices. In addition, severe air pollution (sulfur dioxide emission from fossil fuel combustion at power plants and other industrial facilities) increases the frequency of acid rain in Hunan, causing soil acidification,[[5]](#footnote-5) which in turn increases the chemical availability of heavy metals to be absorbed by plants.
2. The bulk of Hunan cropping is for rice and rice is especially susceptible to accumulation of Cd. Since 2011, with the support from the Ministry of Agriculture (MOA) and Ministry of Finance (MOF), Hunan Provincial Department of Agriculture (now Hunan Provincial Agriculture Commission [AC]) has carried out monitoring of heavy metal in soil in mining and industrial areas, polluted irrigation areas, and suburbs, especially along the Xiang River basin. The overall percentage of sample points exceeding the screening threshold of heavy metals in Hunan is estimated at 58 percent. An overview of heavy metal contamination in soil in Hunan is provided as below. There was a major food safety scandal in 2013 when Hunan’s rice that was sent to Guangdong was discovered to contain significant levels of Cd. This contamination is imposing enormous (yet poorly understood) economic and financial costs within Hunan (i.e. discounted prices to farmers and millers, accumulated public sector stocks which are disposed of at a loss, reduced trade and tourism).

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| --- | --- | --- | --- | --- | --- |
| **Heavy metals** | **Maximum concentration over national soil quality standard[[6]](#footnote-6) (times)** | **Sampling point exceeding standard (%)** | **Highly contaminated[[7]](#footnote-7) (%)** | **Medium-contaminated (%)** | **Low contaminated**  **(%)** |
| Cd | 109 | **19.7** | 0.8 | 1.3 | 17.6 |
| Pb | 6.6 | **4.0** | 0.1 | 0.4 | 3.6 |
| As | 5.4 | **8.7** | 7.4 | 0.9 | 0.5 |
| Cr | 0.5 | **0.2** | — | — | 0.2 |
| Hg | 15.4 | **4.5** | 0.2 | 0.4 | 4.0 |

1. **Ongoing efforts in Hunan.** Hunan Provincial Government issued an Implementation Program for Heavy Metal Pollution Control in Xiang River[[8]](#footnote-8) Basin (2012–2015)*,* a first ever program ratified by the State Council, aiming to address agricultural land pollution in Hunan. The leading agency for this program is the provincial Environmental Protection Department (EPD) and the total budget was RMB 50 billion, coming from national and local governments and enterprises. The Hunan EPD has inspected and monitored all industries discharging heavy metals. Some enterprises have been ordered to close or improve their waste treatment to meet the emission and discharge standards, and some contaminated sites have been treated. Since 2014, the MOA, in collaboration with the Ministry of Finance (MOF), has allocated RMB 1.2 billion annually (will reach RMB 2 billion in 2017) for heavy metal pollution control in agricultural lands in Hunan, focusing on the cities of Changsha, Zhuzhou, and Xiangtan (about 170,000 ha). This activity is led by the Hunan AC. Progress has been made to reduce Cd concentrations in crops in demonstration areas. In July 2015, the MEP, in collaboration with the MOF, approved another RMB 2.8 billion for prevention and control of heavy metal pollution in 30 cities (11 in Hunan).
2. **Challenges.** The national government has invested a large amount of funds for managing heavy metal pollution in agricultural lands in an economically, environmentally, and socially sustainable way. However, this is very challenging because of existing legal, institutional, technical, informational, and financial constraints.
3. China has yet to enact a national law encompassing soil pollution prevention and control and a complete and effective regulation and standard system. However, the Chinese Government is making progress on this as mentioned earlier.
4. While industrial pollution control (main sources of agricultural land pollution) is under the responsibility of the EPD, agricultural land and crop pollution management is under the administration of the agriculture departments. Effective collaboration is inevitably required for addressing agricultural land pollution but needs to be strengthened. Agricultural agencies pay close attention to safe agricultural production but are reluctant to address pollution sources, especially polluted irrigation water (rivers and lakes) and industrial emissions, because of their function limitations.
5. Soil health and crop safety are affected by many factors such as air, water, climate, agrochemicals and inputs, soil tillage and straw handling, which make pollution management technically and managerially complex. Risk assessment is an effective scientific tool which enables decision makers to manage land pollution in a cost-effective manner while preserving public and ecosystem health, which is, however, new to the government officials and farmers. And one key lesson learned from the national programs for heavy metal pollution prevention and control is that application of lime, water management, and low metal-accumulating variety substitution requires careful planning, strict and effective implementation and supervision, which implies that professional services will be needed for demonstration planning, implementation, and supervision under this project to allow accurate evaluation of demonstration results and compilation of good operational guidelines for dissemination and replication beyond the project life.
6. Although the national soil survey has provided an overview of soil pollution in farmlands and the Hunan AC has been investigating soil and crop pollution situation since 2011, the pollution risks and soil-water-crop relationships in specific locations remain unclear. Furthermore, China does not have tracking systems for events and activities related to industrial facilities that generate, transport, treat, store, discharge, or dispose of hazardous waste which may cause land and groundwater pollution, and dissemination and use of agrochemicals and other agricultural inputs. China has also not yet established an effective agricultural environmental monitoring (AEM) database and network or a mechanism for information disclosure of soil pollution, resulting in a lack of a pollution prevention and warning system as well as a limited awareness of potential harm caused by pollution.
7. Financing is often a major obstacle as well, especially for such a huge area of polluted agriculture land in China.
8. Recognizing these challenges for heavy metal pollution management of agricultural land, to ensure the safety of agricultural product areas, Hunan requested the assistance of the World Bank to prepare and implement this project that aims to establish an Agricultural Environmental Monitoring (AEM) database, introduce a risk-based integrated management approach, develop management capacity, explore sustainable financing models, and propose a road map for reducing heavy metals in crops and soils and avoiding new pollution (keeping clean what is clean).

## Higher Level Objectives to which the Project Contributes

1. The proposed project is fully consistent with the World Bank Group’s Country Partnership Strategy for China for 2013–2016 (Report No. 67566-CN) discussed by the Board of Executive Directors of the World Bank on November 6, 2012, and in line with the Strategic Theme 1 of the Country Partnership Strategy, Supporting Greener Growth. The proposed project will contribute to several outcomes under this theme: demonstrating pollution management measures and sustainable natural resources management approaches, promoting sustainable agriculture practices, and enhancing urban environmental services. The project will also contribute to the World Bank Group’s goals of ending extreme poverty by 2030 and boosting shared prosperity, especially the bottom 40 percent of the population who have currently limited access to information and are relatively more exposed to degraded or contaminated areas than other population groups.
2. The project is in line with the Soil Ten Provisions. It is an integral part of Hunan’s efforts to improve the quality and safety of its agricultural product areas, and also part of the national efforts to reduce heavy metal pollution under the 12th Five-Year Plan on Integrated Prevention and Control of Heavy Metal Pollution. Hunan is one of the 14 key provinces selected under the Plan. The project will contribute to sustainable agriculture in Hunan and China.

# PROJECT DEVELOPMENT OBJECTIVES

## PDO

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

## Project Beneficiaries

1. The direct beneficiaries of the project include farmers and farmers’ cooperatives of the selected farmlands that adopt the project-promoted risk-based integrated approach to address heavy metal pollution in agricultural lands. The provincial AC, EPD, Land Resource Department, Water Resource Department, Work Safety, Livestock and Fisheries, and those at the municipal and county levels will also receive project support to develop their capacity in applying the risk-based land management approach and managing heavy metal pollution sources. Indirect beneficiaries include: (a) farmers and farm workers who are directly exposed to agricultural land pollution in their daily activities; (b) communities directly affected by contaminated farmlands; and (c) consumers of products grown on project farmlands who benefit from reduced level of metals in the products.

## PDO-Level Results Indicators

1. The indicators to measure achievement of this PDO will include the following:
2. safety risks of agriculture production areas in participating counties classified;
3. crop sampling points meeting food safety standards at demonstration areas (%);
4. regulations for agricultural environment protection developed and relevant technical standards issued at local levels;

# PROJECT DESCRIPTION

1. The project is innovative 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 (see details in Section VI) and establish a risk-based management framework (see figure 2.3 in Annex 2); (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.
2. The project includes four components (See details in Annex 2). These activities are expected to be implemented in about 15 candidate counties in Hunan (the selection criteria are provided in Annex 2). Considering the project complexity, two counties (Hengyang and Yongxing) and one district (Yongding) have been selected as pioneers to prepare detailed county feasibility study reports (FSRs). The three FSRs have been appraised during project preparation. Detailed implementation plans including feasibility study contents for other potential participating counties are being prepared by the counties (expected to be submitted for review by end of November 2017), and will be reviewed by an expert group organized by the Provincial Project Management Office (PPMO) and approved by the World Bank and the PPMO expected by early 2018. The first three counties will initiate project implementation soon, which allows a quick start of project implementation right after its approval, while benefitting from the accumulation of experiences during project implementation for the other participating counties. An element of competition will be applied to confirm other participating counties during project implementation, to avoid having counties claim resources under the project but not using them in a timely manner.

## Project Components

1. **Component 1: Demonstration of Risk-based Agricultural Land Pollution Management** (*US$71.11 million, of which IBRD US$67.28 million*)**.** 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[[9]](#footnote-9)); (b) agronomic measures to immobilize heavy metals in soil (reducing crop uptake); (c) planting structure adjustment (switching crops); (d) soil remediation to reduce heavy 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 the effectiveness of the measures applied in the demonstrations. 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, i.e. the levels of contaminants in the crops will meet the food safety standard. 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.
2. 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 levels 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 (local authorities’ approval is required) 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 restrict access to lands. The relevant farmers will be informed of the effectiveness of the demonstrations in every harvest season.
3. **Component 2: Strengthening Agricultural Environmental Monitoring and Management** (*US$3.07 million, of which IBRD US$1.63 million*).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:
4. **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 dissemination of agricultural land pollution and its effects on agricultural product quality, establishing soil big data, implementing agricultural land classification management which are required by the Soil Ten Provisions (Provision 1 and 3).
5. **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).
6. **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).
7. **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).
8. **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).
9. **Component 3: Capacity Development and Knowledge Distribution** (*US$16.23 million, of which IBRD US$14.01million*).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) disseminate knowledge gained from demonstrations for increasing awareness and building ability to make informed choices among alternatives. It includes the following five subcomponents:
10. **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 resources are expected to foster and sustain project outcomes beyond the project life.
11. **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.
12. **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.
13. **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.
14. **Knowledge Dissemination.** 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 dissemination and learning purpose to increase awareness and build ability to make informed choices among alternatives.
15. **Component 4: Project Management and Monitoring and Evaluation (***US$5.92 million, of which IBRD US$1.48 million***).** 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.

## Project Financing

1. The project will be financed by an IBRD loan of US$100 million in single currency, to be recovered over a period of 26 years, inclusive of a grace period of 6 years and a front-end fee of 25 basis points. The project will be implemented in 6 years. The lending instrument is Investment Project Financing (IPF). Hunan Province will provide US$11.94 million co-financing for this project, of which 75 percent will be from Hunan Provincial Government and 25 percent will be from participating counties. A total of US$22 million of loan proceeds has been allocated to the first three counties and the provincial activities, which leaves US$78 million for other participating counties, to be confirmed during project implementation.
2. **Use of counterpart funding.** The provincial-level counterpart funding (about US$8.96 million) will be used mainly for the following project activities at both provincial and county levels: project management at the provincial level, project monitoring and evaluation, project management information system, development and establishment of the AEM database, national and international training activities for government officials, training for farmers, and training for AEM staff. The counties will only be requested to provide limited counterpart funding (about US$3.00 million) for running of their PMUs during the project life.

## Project Cost and Financing (US$, millions)

| **Project Components** | **Project cost** | **IBRD Financing** | **% Financing** |
| --- | --- | --- | --- |
| 1. Demonstration of Risk-based Agricultural Land Pollution Management | 71.11 | 67.28 | 95 |
| 1. Strengthening Agricultural Environmental Monitoring and Management | 3.07 | 1.63 | 53 |
| 1. Capacity Development and Knowledge Distribution | 16.23 | 14.01 | 86 |
| 1. Project Management and Monitoring and Evaluation | 5.92 | 1.48 | 25 |
| **Total Baseline Costs** | 96.33 | 84.39 | 88 |
| Contingencies | 7.71 | 7.71 | 100 |
| **Total Project Costs** | **104.04** | **92.10** | **89** |
| Interest during Implementation | 7.03 | 7.03 | 100 |
| Front-end Fees | 0.25 | 0.25 | 100 |
| Commitment Fees | 0.62 | 0.62 | 100 |
| **Total Financing Required** | **111.94** | **100.00** | **89** |

# IMPLEMENTATION

## Institutional and Implementation Arrangements

1. At the provincial level, the following have been set up: (a) a Provincial Steering Committee (PSC), led by a vice governor of Hunan Provincial Government with members from relevant provincial government line departments, including the Department of Finance (DOF), AC, EPD, Department of Water Resources, Department of Land Administration, and Development and Reform Commission (DRC), will oversee implementation of the project; (b) a PPMO, headed by a deputy director general of AC, will be the main implementing agency with the overall responsibility for project implementation; and (c) a Technical Experts Group (TEG), consisting of national and local experts drawn from different areas of specialization (soil science, heavy metal activity in soil and availability in crops, risk-based land pollution management, environmental management, AEM, economy, laws, and policies), will provide technical, legal, and financial guidance; review and evaluate technical documents; and design solutions to issues that may arise.
2. At the county level, the following have been set up: (a) a Project Leading Group (PLG) in the first three participating counties, led by the county governor with members from the relevant county government line bureaus (finance, DRC, agriculture, environmental protection, water resources, land resource, animal husbandry, work safety, and so on); (b) a PMU in the county agricultural bureau; and (c) a TEG with local technical experts to guide the PMU on daily management of county-level project activities. For some counties under the Xiangxi Prefecture, if confirmed during project implementation, a Project Steering Committee at the prefecture level responsible for providing overall policy and project management guidance on project implementation in its counties will be established. A Project Management Unit will also be set up at the prefecture level for coordinating with the PPMO and the relevant County Project Management Units and monitoring project implementation within the prefecture.
3. At the township and village level, the township government and administrative village committee will be responsible for local public information dissemination, awareness and community mobilization, planning and implementation of investments under component 1 assigned to the township and village level, and coordination of any land adjustments for irrigation schemes and other infrastructure construction, as well as monitoring the project outputs and outcomes in a participatory manner.
4. During project implementation, the provincial DOF will supervise the Financial Management (FM) of the project, while the PPMO will be involved in direct implementation of Components 2 and 4 and Subcomponent 3.1. The PPMO will also support the county-level PMUs for their management and implementation of project activities in counties: Component 1; Subcomponents 2.1, 2.3, 2.5; Subcomponents 3.2, 3.3, 3.4 and 3.5; and Component 4.
5. A Project Implementation Manual (PIM) has been prepared to guide project implementation. The PIM will provide detailed information on: (a) the project objective, project activities, and financing arrangements; (b) roles and responsibilities of all entities involved in project implementation; (c) FM, disbursement, procurement, environmental, and social safeguard procedure and requirements; (d) selection criteria and appraisal requirements of additional participating counties; (e) selection criteria of demonstration farmlands; (f) steps and procedures for project activity implementation; and (g) M&E, reporting, and information disclosure arrangements.

## Results Monitoring and Evaluation

1. The progress toward the PDO will be monitored by the outcome indicators, as detailed in Annex 1. Data on these indicators will be collected by the PPMO and the county PMUs from project beneficiaries, stakeholders, and contractors. Additional studies will be made, if necessary, to obtain evidence-based data for justifying achievement of the PDO. The focus will be on monitoring and verification of crops exceeding food safety standards, compensation to farmers at an appropriate level, information disclosure during demonstrations, contaminated rice straw handling and treatment, and safe disposal of heavy metal enriched plants from soil remediation if any.
2. The M&E reporting system of the project includes: (a) annual work plans and budgets by counties; (b) periodic on-site inspection and verification by the PPMO and the county PMU staff; (c) consolidated semiannual project progress reports compiled by the PPMO to the World Bank; (d) consolidated semiannual unaudited Interim Financial Reports (IFRs) on use of funds provided by the PPMO to the World Bank; (e) completion reports for each demonstration under Component 1; (f) project completion reports in participating counties and a consolidated project completion report by the PPMO; and (g) annual financial audits of the project account. Details are provided in Annexes 1 and 3.

## Sustainability

1. The Government of Hunan is committed to improving agricultural product safety by addressing heavy metal pollution in farmlands. The project is proposed and prepared at the right time. Its design is aligned with the recently issued Soil Ten Provisions. The Chinese Government’s efforts in issuing the Soil Pollution Prevention and Control Law, likely in 2017 or 2018, will also greatly facilitate project implementation. Sustainability and replicability of the project will also be ensured through the following project design features:
2. The project is designed based on the concepts of: (i) identifying and analyzing the problems and their systematic resolutions; (ii) applying risk-based integrated approach for sustainable agricultural land pollution management; (iii) combining investment, policy actions and institutional capacity-building measures; and (iv) introducing technical and management innovations, building on lessons learned from the ongoing national programs on heavy metal pollution control.
3. The farmer is the key stakeholder for agricultural land management. Component 1 is proposed to be implemented by local agricultural cooperatives. The project has also designed activities on technical training and awareness raising for farmers at both demonstration areas and non-demonstration areas in participating counties.
4. The project will promote and facilitate stakeholder involvement and collaboration among relevant government agencies in Hunan, especially the agriculture, environmental protection, land resource and water resource agencies. Lessons learned from the participating counties will be disseminated to other counties in Hunan and other provinces in China for replication.
5. An Environmental and Social Management Plan (ESMP) for each participating county will be prepared, approved, and disclosed to make sure that any potential environment, social, health, and safety impacts from project implementation are minimized.

# KEY RISKS

1. The overall risk rating for project implementation is Substantial. Key project risks are associated with the following:
2. **Technical design.** The risk-based pollution management concept is new to Hunan. It will take time for the governments and farmers in Hunan to understand and properly apply the approach on the ground. Timely and appropriate application of those technical measures is critical to achieve the goal: safe agricultural product. To mitigate these risks, the project has designed training and awareness-raising activities for government officials and beneficiary farmers. The project has also designed a supervision plan for implementation of Component 1, including approval by the related farmers; provision of purchase evidence of lime, organic fertilizer, and water consumption, and so on; evaluation by village committees; and supervision by a third entity (e.g. Agriculture Supervision Company).
3. **Institutional capacity.** The PPMO and the county PMUs have very limited experience with World Bank-supported projects. To mitigate this risk, the PPMO and the county PMUs have been requested to mobilize national and local technical experts to support project implementation.
4. **Procurement.** The overall procurement risk is rated as “Substantial” as a multiplicity of actors involved in procurement, up to 15 potential participating counties, and the PPMO and county PMUs have no prior procurement experience in Bank-financed projects. To address these risks, procurement and contract management training will be provided by the Bank during project implementation. A Project Implementation Manual (PIM) has been prepared and reviewed by the Bank. The PIM describes in sufficient details the procurement arrangements, methods, and procedures, as well as roles, responsibilities, and oversight functions.
5. **Environmental and social risks.** The project will involve activities to control heavy metal transfer from soils to crops/plants. This includes implementation of agronomic measures to reduce the availability of heavy metals in crops so that they cannot be taken up by crops, or, alternatively to reduce the total heavy metal in soil via phytoremediation and contaminated straw removal (can be considered a form of phytoremediation as well). These activities will cause environmental, health, safety, and social impacts. There are also risks of selling contaminated crops at the demonstration sites and inappropriate compensation to farmers during demonstrations of switching crops or soil remediation. To mitigate these environmental and social impacts and risks, Environmental and Social Impact Assessments (ESIA) with Environmental and Social Management Plans (ESMPs) for the first three counties and an Environmental and Social Management Framework (ESMF) for other counties have been prepared. The demonstration plans will include clear mechanisms for management of crops exceeding food safety standards and compensation to farmers.
6. **Stakeholders.** Controlling toxic substances at their source is the most effective way of keeping pollutants out of the environment. Soil should not be remediated while it continues to be polluted. However, while industrial pollution control is under the responsibility of the Hunan EPD, agricultural land and crop pollution control is managed by Hunan AC. Collaboration between the two agencies needs to be improved. This issue is also observed in other provinces in China. To mitigate this risk, the project has established the PSC and the PLG, at the provincial and county levels, to promote multi-stakeholders’ collaboration and address coordination issues as needed.

# APPRAISAL SUMMARY

## Economic and Financial Analysis

1. **Project impact.** Management of agricultural land pollution will benefit the environment, natural resources, food safety and human health and provide long-term investment induced by diversified reuse potential of the lands, including added-value agriculture production. In addition, future agricultural possibilities for these lands could play a role in addressing national and global priorities such as climate change.
2. **Economic analysis.** A cost-benefit analysis has been adopted for the economic analysis. Comparing the “with project” and “without project” situations, the incremental quantifiable benefits are values of the safe agricultural produce from the project. Other significant but not readily measurable benefits include: (a) improving the soil fertility and efficiency of land resources; (b) reducing health hazards; (c) reducing fertilizer and pesticide use; and (d) promoting the province’s reputation and agriculture competitiveness. In the economic rate of return/net present value calculations, the economic prices of the polluted agricultural produce are valued at zero, which is actually a conservative assumption as they could be negative if the bad externalities, such as negative health impact, are internalized. The total project costs have been included in the analysis as the project benefits are accrued from successful implementation of all the project interventions combined.
3. A staged approach has been adopted to streamline project preparation and implementation and provide lessons which will benefit the design and implementation of the remaining investments. For the first tranche of 3 counties/district for implementation, specific project activities have been identified and appraised, while the project activities for the subsequent counties will be selected during the implementation of the first tranche to incorporate the lessons learned. Economic Internal Rate of Return (EIRR) has been calculated by county. Incremental economic benefits are accrued from the safe agriculture produce generated from project interventions, as the unsafe produce in the project area (under without project situation) are conservatively estimated at “zero” as they should be negative if the bad externalities (such as harm to health) are factored in. While the project costs cover (i) the incremental costs of VIP inputs (calculated from comparison of crop budgets under “without project” situation and “with project” situation in the project area; and (ii) institutional capacity building and project management and evaluation. The aggregated economic cash flow of the project by county, shows an EIRR of 17-20 percent. Per Bank guidelines, the opportunity cost of capital (OCC) is set at 6 percent, which happens to be in line with NDRC’s established discount rate for environment sector projects in China. Thus the project is economically viable. Details of the analysis and cash flow tables are in the counties’ FSRs.
4. **Financial analysis.** This analysis has been conducted at farmer household level. Based on the proposed site-specific project interventions, crop budgets have been prepared to gauge income changes from VIP interventions by comparing with and “without project” situations income. The analysis has included various degrees of polluted agricultural land ranging from light to heavy based on technical specification as contained in the detailed project descriptions. Initial results have shown that farmers’ income would be reduced (from 3,300- 6,000 Yuan/ha depending on the pollution degree) due to additional inputs for improved varieties (alternative crops in the case of heavy polluted areas), irrigation and acidity control, which justify the subsidy policy to provide financial incentives for farmers’ participation in the project. Detailed income changes by site-specific inventions by county, and accordingly, the proposed subsidies are available in each of the three counties’ FSRs.
5. The bottom line is to ensure the net income of farmers will not be reduced in comparison with “without project” situation. This will entail providing location specific financial compensation at appropriate level to farmers under the project as needed for very limited cases where project activities may cause less income. In this context, the estimated compensation mainly in the form of subsidy will be provided to the farmers participating in the project. Specifically, subsidies are considered for affected farmers at about 3,300 Yuan/ha for light risk areas, 4,600 Yuan/ha for medium risk area, and 6,000 Yuan/ha for heavy risk areas which may be used partially for subsidies for alternative crops, such as citrus or grape with no income from harvest in the first couple of years.
6. **Fiscal sustainability.** Analysis has been conducted during the pre-appraisal to evaluate the county government’s fiscal sustainability (examine the project’s expected Government budget impact), which will gauge the local government fiscal resources available for: (a) provisioning of counterpart funds; and (b) servicing the World Bank loan.
7. The Hunan Provincial Government will provide 75 percent of the counterpart funds for the project. County level fiscal analysis of the past three years indicates that all three participating project counties have sufficient financial resources to contribute counterpart funds (which is a minimal Yuan 0.5 million each year during project implementation mainly for project management) and service debt incurred under the project. In all three counties, the Bank project debt service constitutes a very small fraction of total government project budget expenditure (from 0.1-0.7 percent). All the three project counties therefore are in a good fiscal position to service the World Bank loan.

## Technical

1. **Risk-based approach (risk assessment).** The soil environmental quality standard (for example, 0.3 mg/kg for Cd in farmlands with soil pH≤7.5[[10]](#footnote-10)) is often used as the only risk index to classify farmland pollution risks. This approach is not scientific and will lead to a large amount of farmlands for soil remediation (not to be used for growing agriculture products without soil remediation). An integrated concept of determining farmland pollution risks, which will be introduced by the project, is to take the crops (mainly rice) exceeding the standard as the main risk but also consider additional risk indexes: (a) the percentage of soils exceeding standards; (b) the degree of heavy metal pollution sources entering farmlands including those via irrigation water (including sediments), atmospheric deposition, heavy metal contaminated straw and fertilizers containing heavy metals; and (c) agriculture production management practices: inappropriate rice variety, water management and soil cultivation practices. Five risk levels (no risk, low, moderate, substantial, and high) are set up by the initially established thresholds[[11]](#footnote-11) for each risk index summarized in table 1 – 4 (taking Cd as an example). The next step (after the assessment of the potential risks) is to decide what technical measures can be taken to ensure that the quality of rice is appropriate for consumption and trade (i.e. that heavy metal contaminant levels in rice meet the national food quality standard). These measures, to be implemented as single measures or in combination include soil, crop or water management strategies and strategies aiming at changing the land use (switching crops) and conducting remediation in case that the quality of the land is such that management is not sufficient.

Table 1. Rice Cd Risk Early Warning Thresholds

|  |  |
| --- | --- |
| **Risk Levels** | **Cd in Rice (RCd)**  **(RCd + 2Se\*) (mg/kg）** |
| No risk (I) | <0.2 |
| Low (II) | 0.2–0.3 |
| Moderate (III) | 0.3–0.4 |
| Substantial (IV) | 0.4–0.6 |
| High (V) | >0.6 |

*Note:* \*Se: Standard error.

Table 2. Soil Cd Risk Early Warning Thresholds[[12]](#footnote-12)

| **Risk Level** | **Soil Cd (mg/kg）** | | | | |
| --- | --- | --- | --- | --- | --- |
| **pH<4.5** | **pH 4.5**–**5.5** | **pH 5.5**–**6.5** | **pH 6.5**–**7.5** | **pH>7.5** |
| No risk (I) | <0.2 | <0.3 | <0.4 | <0.5 | <0.6 |
| Low (II) | 0.2–0.3 | 0.3–0.4 | 0.4–0.5 | 0.5–0.6 | 0.6–0.7 |
| Moderate (III) | 0.3–0.4 | 0.4–0.5 | 0.5–0.6 | 0.6–0.7 | 0.7–0.8 |
| Substantial (IV) | 0.4–0.5 | 0.5–0.6 | 0.6–0.7 | 0.7–0.8 | 0.8–0.9 |
| High (V) | >0.5 | >0.6 | >0.7 | >0.8 | >0.9 |

Table 3. Cd Risk Thresholders for Different Heavy Metal Pollution Sources

| **Risk Level** | **Cd Concentration or Cd Inputs** | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Irrigation Water**  **(mg/L or mg/mu)** | **Dry-Wet Deposition**  **(mg/mu)** | **Other Agricultural Inputs**  **(mg/kg or mg/mu)** | | | **Total Cd Inputs（mg/mu）** |
| **Contaminated Straw** | **Fertilizer containing Cd** | **Subtotal** |
| No risk (I) | 0.001/600 | 300 | 1.0/600 | 0.5/100 | 700 | 1,600 |
| Low (II) | 0.002/1,200 | 500 | 1.5/900 | 1.0/200 | 1,100 | 2,800 |
| Moderate (III) | 0.003/1,800 | 700 | 2.0/1,200 | 1.5/300 | 1,500 | 4,000 |
| Substantial (IV) | 0.005/3,000 | 1,000 | 2.5/1,500 | 3.0/600 | 2,100 | 6,300 |
| High (V) | 0.005/3,000 | 1,000 | 3.0/1,800 | 3.0/600 | 2,100 | 6,300 |

Table 4. Bioconcentration Factor (BCF) Thresholds (Agricultural Production Management Risk Thresholds)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **BCF** | <0.4 | 0.4–0.8 | 0.8–1.2 | 1.2–1.6 | >1.6 |
| **Risk Level** | No risk (I) | Low (II) | Moderate (III) | Substantial (IV) | High (V) |

*Note:* BCF is used to identify risks from rice variety, availability of soil Cd, and other agriculture production management practices.

1. To better understand the types of soil that are safe to grow specific crops, a model to link heavy metal contaminants in soil to those in crops, that is, a risk-based land management tool, is proposed to be developed under the project. The tool will be used together with the risk screening and assessment following the above risk warning thresholds to map pollution risks of all farmlands in the participating counties and in Hunan. This is an important step for planning and developing the action plans for agricultural land pollution management.
2. **AEM.** Accurate AEM is crucial for effective reduction of heavy metals in soil and crops which are affected by many factors separately or conjunctively, especially the soil-water-crop relationships. The project will establish an AEM database (building on existing AEM data under the environmental protection, agriculture, and land resource agencies) to provide warning on farmland pollution. Site-specific AEM will be conducted to collect the baseline data for the demonstration areas, which will be used to assess risks and select technical measures. In addition, monitoring of heavy metal mass balance in soil and monitoring of demonstration effectiveness will also be designed and carried out. The monitoring contents will include soil, agricultural products, irrigation water, underground water, air, sediment, organic fertilizer, and pesticides with specific monitoring parameters determined according to the demonstration area characteristics, the national environmental monitoring standards, and the environmental quality standards. The AEM, combined with risk screening and assessment, would provide early-warning signals about crop and soil pollution.
3. **Agronomic measures.** Measures (immobilization techniques) such as high-accumulating variety substitution, water management, and soil pH management have been piloted since 2014 in three bigger cities (about 2,740,100 mu farmlands in Changsha, Zhuzhou, and Xiangtan) in Hunan under the MOA and the MOF collaboration for heavy metal pollution control in agricultural lands. Its pilot results have proved the effectiveness of these measures in the first year (rice Cd was reduced 30 percent on average). However, the results were not able to be maintained at the same level in the second and third years. In addition, the pilots in Changsha-Zhuzhou-Xiangtan did not differentiate the measures for different farmland pollution risk types and levels, and they were not designed for pollution risk management. Instead, this project will focus more on the risk-based integrated approach to achieve comprehensive and sustainable control of farmland environmental risks, improvement of farmland environmental quality, and safe production of agricultural products in participating counties. It aims to provide an integrated management framework for addressing heavy metal pollution in agricultural land in the entire province (See Annex 2 for a diagram).
4. **Soil remediation.** Remediation technologies for heavy metal contaminated soils can be classified under five categories of general approaches: isolation, immobilization, toxicity reduction, physical separation, and extraction. In practice, it will be more cost-effective to employ a hybrid of two or more of these approaches. The key factors that may influence the applicability and selection of any of these available remediation technologies are: (a) cost: (b) long-term effectiveness and permanence; (c) commercial availability; (d) general acceptance; (e) applicability to high metal concentrations; (f) applicability to mixed wastes (heavy metals and organics); (g) toxicity reduction; (h) mobility reduction; and (i) volume reduction. Immobilization and phytoremediation (mainly phytoextraction[[13]](#footnote-13) applicable to the project) techniques are frequently listed among the best demonstrated available technologies for management of heavy metal contaminated farmlands, but they require adequate awareness of their inherent advantages and principles of operation. In China, with great population density and scarce funds available for environmental restoration, low cost and ecologically sustainable remedial options are required to restore contaminated lands so as to reduce the associated risks, make the land resource available for agricultural production, and enhance food safety.

## Financial Management

1. The Bank loan proceeds, including overseeing the DA, will be managed by Hunan Provincial Finance Bureau (HPFB). The primary FM responsibilities of the Provincial Project Management Office (PPMO) will be implementing the activities at the provincial level, coordinating and supervising project implementation, providing guidance to county/district PMO, and finalizing and submitting financial reports to the Bank. The primary FM responsibilities of county PMUs are preparing the annual plan and payment request, accounting and financial reporting. However, most county PMUs do not have prior experience managing World Bank financed projects. An action plan to strengthen FM capacity has been agreed with the implementing agencies, including modification and dissemination of FM manual, provision of extensive training, and establishment of systematic monitoring mechanism. The FM assessment concluded that with the implementation of the proposed actions, the project’s FM arrangements satisfy the Bank’s requirements under OP/BP 10.00.

## Procurement

1. Considering the project complexity, two counties (Hengyang and Yongxing) and one district (Yongding) have been selected as pioneers to prepare detailed county feasibility study reports (FSRs), therefore, the procurement capacity of PPMO and the CPMU of those three counties has been assessed.
2. Procurement under the project will be carried out by PPMO and CPMUs for the investments in the respective jurisdictions, except sub-component 1 (b) agronomic measures to immobilize heavy metals in soil (reducing crop uptake), 1 (c) soil remediation to reduce total metals in soil, 1 (d) integrated pest management, 1 (e) control of rice exceeding food standards, if any, at the demonstration areas, and 1 (f) measures to protect no risk/clean farmlands which would be undertaken by selected cooperatives/villages through community participation in accordance with a Project Implementation Manual prepared by the PPMO and reviewed by the Bank. The PPMO and CPMUs have designated full-time procurement staff. The key project procurement issues and risks identified by the procurement capacity assessment include: (1) a multiplicity of actors involved in procurement; (2) activities under Component 1 are dispersed in 14 candidate counties; (3) PPMO procurement staff and some CPMUs and all CPMU designated procurement staff have no prior procurement experience in Bank-financed projects; and (4) The PPMO and CPMUs may unintentionally follow national procurement practices, which may lead to non-compliance with Bank procurement guidelines. To address these risks, designated procurement staff attended procurement training provided by the Bank during project preparation and will attend additional procurement and contract management training during the project implementation. The PPMO will be responsible for providing support and monitoring the implementation of project activities, carried out by the CPMUs, who will support and monitor the implementation of project activities carried out by the cooperatives and village committees. A Project Implementation Manual (PIM), acceptable to the Bank, has been prepared and reviewed by the Bank. The PIM describes in sufficient detail the procurement arrangements, methods, and procedures, as well as roles, responsibilities, and oversight functions.
3. The Procurement Plan (PP) for the initial 18 months of project implementation (dated June 28, 2017) has been prepared by PPMO and reviewed by the Bank. The PP will be available in the project’s database and on the Bank’s external website. The PP will be updated annually (or as often as required) in agreement with the Bank, to reflect project implementation needs and improvements in institutional capacity. Annex 3 provides additional information on the project’s procurement arrangements.

## Social

1. The project takes a framework approach. Although it is expected to include up to 15 counties, the first batch includes two counties and one district. The rest of project counties and sites will be determined during project implementation according to the selection criteria of the project. A social assessment (SA) has been done for the first batch of two project counties and one district which are Hengyang county, Yongxing county and Yongding district. The social assessment was done by a professional consulting team with public consultation in six villages of the three counties. To address social risks and impacts, three main social documents have been prepared, including a SA report, an environment and social management framework (ESMF) which includes an ethnic minority development framework (EMDF), employee resettlement framework and a resettlement policy framework.
2. The project is expected to have significant positive social impacts on local community and residents using or living near the project sites after their farmland pollution is improved. The project is also expected to have limited negative social impacts on local community and residents in terms of affecting people’s non-land economic incomes, which will be caused without acquiring affected people’s land. The impacts will be mainly related to changing cropping systems and from grain crops to other plants. The scale of such change will be small, only 49 ha of land in the first three counties will change from grain crops to other crops like citrus and cotton. In some contaminated areas grain crops may be changed to fruit trees, the latter may not generate income for farmers in the first couple of years before it provides fruits. These impacts will be mitigated through compensation and other suitable income maintenance and livelihoods restoration. Project civil works are small scale on village land with no need to change land ownership, such as village level small irrigation canals and ditches which are usually constructed through land readjustment among villagers within the same village, for the works belong to the village and used by all villagers as a common practice in China. There is no need to demolish any ground structures for project civil works. Farmers will be mostly allowed to change to other agricultural activities without significant impacts on their livelihoods. The project will compensate farmers as needed for very limited cases (such as shifting cropping system) which may cause less income than the old crops. This compensation arrangements will be implemented following details specified in the ESMF and the project FM requirements.
3. In terms of presence of ethnic minority, the Bank OP/BP 4.10, Indigenous People, is not triggered for the first two project counties and one project district. Although by the Chinese ethnic criteria, there are some ethnic minorities of Tujia, less than 200 Bai and 13 Miao people by the Chinese ethnic criteria in Yongding district, these three groups of minorities have long been well integrated with the majority Han people, live scattered amongst dozens of villages in similar ways as the majority people do, and they speak mandarin Chinese language. They do not fit the definition of indigenous people (IP) under OP 4.10 according to a detailed social assessment. However, since project villages in project sites have not been firmly determined and affected households and people cannot be determined at project appraisal, the social assessment has not come to a conclusion on whether there is presence of ethnic minority people or whether there will be involuntary resettlement under the project. Taking a cautious approach though, both OP. 4.10 and OP 4.12 policies are triggered in order to address any possible presence of ethnic minority (by the Bank IP definition) and involuntary resettlement during project implementation.
4. The social management framework as part of the ESMF includes an RPF, EMDF (also called IPPF) and an employee resettlement plan framework (ERPF). The ERPF is prepared for any future cases of employee retrenchment by project enterprise relocation or closure. These social instruments have set out the principles, rules, guidelines and procedures to assess the social risks and impacts as per the World Bank safeguards policies and national laws/regulations. The PMOs are required to report and monitor potential social risks, such as issues emerging from involuntary resettlement, ethnic minority development as well as other social aspects regarding project affected people and communities during project implementation. Monitoring and evaluation will be done by professionals and reports will be submitted to the Bank team on an agreed regular basis. As necessary, PMO will also take actions to implement the ESMF to address social risks and impacts, with the Bank team’s and professional social consultants support. The PMO will provide training for county PMOs and other project implementing units on social safeguards.
5. In accordance with the Bank’s policies, the ESMF, RPF and IPPF (also named EMPF) were disclosed on November 7, 2016, in the project areas and on websites of the local government agencies, and made accessible to the public by the PMOs. These social safeguards instruments were also disclosed by Bank's InfoShop on November 8, 2016.
6. **Gender aspects.** As the project will reduce pollution in demonstration sites, it will reduce potentially health risks on nearby residents, female and male equally. While quantifying health impacts arising from soil pollution is nearly impossible, scientific studies show that exposure to certain contaminants found in the soil leave serious health impacts on both men and women. However, exposure to certain contaminants is known to result in more serious impacts on women’s and children’s health. Some heavy metal pollution causes additional danger for pregnant women with increased risk of miscarriage, still-birth and premature birth. As part of the M&E system, the Project will measure the number of people (male and female) positively affected by the project. Social and gender equality has also been considered through participation of men and women during consultations of project sample sites. Such approach to gender equality will also be applied to compensation of affected male and female people related to the project temporary and permanent land acquisition and resettlement during project implementation. Specific gender responsive measures will be documented in the environment and social assessment report for each site.
7. **Citizen engagement.** This is a key aspect considered in the project social assessment (SA): consultation activities included field investigations with relevant government agencies, group consultative meetings with project communities and people, Questionnaire surveys across selected villages in three project counties. Public consultation has and will continue to draw on local people’s engagement and feedback in line with the project objectives. Consultations will be continued with local residents (both men and women) on the needs for awareness and skill training associated with the project-led changes to farming activities, village-based organizations such as village monitoring committees in polluted farm land management. Public consultations will be further held for the selection of locations for farming facilities, e.g., village irrigation canals. Grievance redress mechanism will be established for affected people in the project. Information on potential social impacts, community development, and planned mitigation measures will be shared with the public. Citizen engagement will also be reflected in the project Results Framework, through the following indicator: share of beneficiaries reporting that they were consulted in farm land pollution management.

## Environment

1. The project is assigned ‘Category A’ project and OP 4.01, OP 4.09, and OP 4.37 are triggered. OP 4.01 is triggered because heavy metal pollution sources upstream or near the project areas could be very harmful to the environment and community health if not well managed; especially if the contaminated rice products were sold, it will cause serious social risks and health risks on the public. During the project preparation stage, the total number of project counties has not been decided; it is expected that up to 15 counties will be selected for the project.
2. During the project preparation stage, the two counties and one district were selected as the pioneers for the first year, the remaining counties will be decided during the implementation of the project. In this sense, an ESMF and three counties’ ESIAs (ESMPs) for the first-year implementation, Pest Management Plan (PMP), and EA Executive Summary were prepared in accordance with domestic and World Bank requirements. The ESMF includes the overall project description, an analysis of key environment and social risks of the project, a robust screening process for each farmland to be supported under the project terms of reference (TOR) for the preparation of ESIAs (ESMPs) of the participating counties. The ESIAs (ESMPs) for the remaining participating counties will be prepared during project implementation following the ESMF, when they are confirmed. A separate Social Assessment was prepared to address the social impacts of the project, and the relevant context was included in the ESIAs (ESMPs).
3. The three counties’ ESIAs (ESMPs) analyzed adverse environmental and social impacts of the project, which mainly include four aspects: impacts related to the construction of small scale civil works, potential impacts from upstream or nearby pollution sources, potential impacts caused by comprehensive agronomic control technologies, and social impacts of the project activities.
4. The civil works of the project are very small scale, they will have very limited impacts on the air, noise, wastewater, solid waste etc. during the construction, the impacts are temporary, limited and site-specific, and easily avoided or mitigated to acceptable level. The EISAs (ESMPs) screened out the potential pollution sources upstream or nearby the project areas, to avoid or mitigate the potential impacts on the sediments of upstream rivers and irrigation water from such external pollution sources. The due diligence review for the associated possible heavy metal pollution sources were conducted and included in the ESIAs (ESMPs). The comprehensive agronomic control technologies are designed to reduce the absorption of the heavy metals by the crops; their impacts are mainly positive. The project activities include use of lime (CaO and CaCO3) to adjust the pH value of the agricultural soil, use of organic fertilizer (manure), management of irrigation water to reduce the absorption of heavy metal by the crops, use of inactivated materials to reduce the activity of the heavy metals of the agricultural soil, and removal of the straw from the farmland. The project activities may bring secondary pollution (negative impacts) only if the unqualified products (lime, manure, inactivated materials) were used, or too large amounts of the products were used. The negative impacts can be easily avoided by following up with the technical guideline for the adoption of the measures, including control and management of the quality of the productions and quantity used. The project will also have positive impacts. It can improve the soil quality in the project area, improve the infrastructure condition and the ecological environment of the project area, promote the social and economic development in the project area and improve the knowledge and skills of the farmers and the comprehensive service level of agriculture. In addition, it will promote dissemination of agricultural technology and improve the awareness on the importance to prevent heavy metal pollution. Furthermore, the ESIAs (ESMPs) of Yongxing indicated that the closure or relocation of the polluting industries upstream of the project areas may have potential environmental related issues if the solid or liquid wastes were not disposed appropriately, and may also have potential social related issues such as the possible unemployment of the workers of the industries. The due diligence review for such industries were conducted and the mitigation measures were included in the ESMF and ESIAs (ESMPs) for the potential environmental and social impacts. The ESIAs (ESMPs) include both the ECOPs and the site specific impacts and mitigation measures.
5. To enhance the positive and long-term environmental benefits of the project, mitigation measures for the identified adverse impacts have been integrated into the project design and construction and operational plans. Public consultation on the ESMF and county ESIAs (ESMPs) was undertaken with project information being disclosed at project villages, communities, and government websites before public consultation. The ESMF and ESIAs (ESMPs) incorporated countermeasures to address the concerns of the stakeholders who were consulted. With implementation of the proposed mitigation measures, the potential adverse impacts will be avoided, eliminated entirely, or mitigated to an acceptable level.
6. For Component 1, which will support integrated pesticides management measures, triggers the policy, and hence, a Pest Management Plan (PMP) acceptable to the Bank has been prepared.
7. The site survey identified a total of 13 reservoirs in the three pioneer counties of the project; therefore, the OP 4.37 Safety of Dams is triggered. The dams will provide irrigation water to the project areas, and the failure of these upstream dams could cause extensive damage to or failure of some of the investments under the Project. Among them, there are seven in Yongding District of Zhangjiajie City and six in Yongxing County of Chenzhou City. The client hired an independent Dam Safety Expert (DSE), whose CV and terms of references (TOR)have been approved by the Bank. The DSE prepared a dam safety review report stating that all the dams are operationally safe, and provided recommendations to improve the operational safety and maintenance (O&M) of the dams. The local government (Yongxing County and Yongding District) prepared a dam safety action plan, based on the DSE and the Bank recommendations. The Bank has reviewed and endorsed the action plan. The dams/reservoirs are in compliance with the requirements of OP4.37.
8. In accordance with the Bank’s information disclosure policy, on November 7, 2016, the ESMF, ESIAs (ESMPs) and PMP were disclosed in the project areas and on websites of the local government agencies, and made accessible at PMOs. The ESMF, ESIAs (ESMPs) and PMP were also disclosed by Bank's Infoshop on November 8, 2016.

## Other Safeguards Policies Triggered

Not applicable.

## World Bank Grievance Redress

1. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB’s Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB’s independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank’s corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org/).

# Annex 1: Results Framework and Monitoring

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Project Name: Hunan Integrated Management of Agricultural Land Pollution Project (P153115)** | | | | | | | | | | |
| . | | | | | | | | | | |
| **Project Development Objectives** | | | | | | | | | | |
| The project development objective is to demonstrate a risk-based integrated approach to managing heavy metal pollution in agricultural land for safety of agricultural production areas in selected counties in Hunan. | | | | | | | | | | |
| **These results are at** | | Project Level | | | | | | | | |
| **Project Development Objective Indicators** | | | | | | | | | | |
|  |  | | Cumulative Target Values | | | | | | | |
| Indicator Name | Baseline | | YR1  2017 | YR2  2018 | YR3  2019 | YR4  2020 | YR5  2021 | YR6  2022 | YR7  2023 | End Target |
| Regulations developed and technical guidelines/standards issued for agricultural environment protection at local levels (Text) | Existing national and local relevant policies/regulations and technical guidelines/standards | | TORs prepared, approved by the World Bank | |  |  | Regulations and technical guidelines/standards developed |  | Technical guidelines/standards issued | Regulations developed and technical guidelines/standards issued |
| Safety risks of agriculture production areas in participating counties classified Text) | No safety risks classified | | TORs prepared, approved by the World Bank |  |  |  | Risk maps produced | Risk maps improved | Safety risks of agricultural production areas in participating counties classified | Safety risks of agricultural production areas in participating counties classified |
| Crop sampling points meeting food safety standards at demonstration areas (%) | 20% (estimated, vary from site to site) | | 20% | Not available | Not available | Not available | Not available | Not available | 80% | 80% |
| . | | | | | | | | | | |
| **Intermediate Results Indicators** | | | | | | | | | | |
|  |  | | Cumulative Target Values | | | | | | | |
| Indicator Name | Baseline | | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 | YR7 | End Target |
| Agricultural lands managed under the project (ha) | 0.00 | | 0 | 0 | 0 | 0 | 3,000 | 5,000 | 8,000 | 8,000 |
| AEM database for early warning established and operational in participating counties (Text) | Existing AEM practices under AC, EPB, and Land Resource Department | | TOR prepared and approved by the World Bank |  |  | AEM database for early warning established |  | AEM database operational | AEM database for early warning operational in participating counties | AEM database for early warning established and operational in participating counties (Text) |
| Risk-based land management tool developed (Text) | No such tool | | TOR prepared and approved by the World Bank |  |  | Tool development completed |  | Tool used for risk mapping |  | A tool is established and applied in counties and Hunan Province |
| Sustainable financing models for risk-based agricultural land management identified  (Text) | 0 | | TOR prepared and approved by the World Bank |  |  | Sustainable financing models identified |  | Long-term financing mechanism established if possible |  | Sustainable financing models identified |
| Action plans for risk-based agricultural land management developed in participating counties and in Hunan Province  (Text) | 0 | |  |  |  | TORs prepared and approved by the World Bank |  | Action plans developed | Action plans approved by local governments | Action plans in participating counties and Hunan Province developed and approved |
| Number of management personnel and environment monitoring staff trained (Text) | 0 | | Training needs analysis | National and international training |  | National and international training |  | National and international training |  | As per annual training plan |
| Number of farmers trained, compensated, and involved (Text) | 0 | | TORs prepared, approved by the World Bank, training and awareness raising material developed | | As per annual training plan | As per annual training plan | As per annual training plan | As per annual training plan | As per annual training plan | As per annual training plan |
| Percentage of beneficiaries of project villages consulted for farm land pollution management | 20% (estimated, vary from site to site) | | 20% | Not available | Not available | Not available | Not available | Not available | 80% | 100% |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Indicator Description** | | | | |
| **Project Development Objective Indicators** | | | | |
| Indicator Name | Description (indicator definition and so on) | Frequency | Data Source/Methodology | Responsibility for Data Collection |
| Regulations developed and technical guidelines/standards issued for agricultural environment protection at local levels | This indicator measures project outcome sustainability | Semiannually | Implementation progress reports | The PPMO and the county PMUs |
| Safety risks of agriculture production areas in participating counties classified | This indicator measures establishment of the risk-based approach. | Annually | Farmland data and risk assessment | The PPMO |
| Crop sampling points meeting food standards at demonstration areas (%) | This indicator measures crop safety (meeting national food standards) at the demonstration areas as a result of the project. | Annually | Monitored crop data of every season | The PPMO, the county PMUs, national experts |
| . | | | | |
| **Intermediate Results Indicators** | | | | |
| Indicator Name | Description (indicator definition and so on) | Frequency | Data Source/Methodology | Responsibility for Data Collection |
| Agricultural lands managed under the project (ha) | This indicator measures the cumulative agricultural land that are managed as a result of the project. In this context, ‘managed’ refers to safe agricultural production areas by soil and crop management, transfer of contaminants into the food chain avoided by planting structure adjustment, or heavy metal concentrations reduced in soils by remediation. | Semiannually | Implementation progress reports, soil and crop monitoring | The county PMUs |
| AEM database for early warning established and operational in participating counties | This indicator measures AEM capacity building. | Semiannually | Monitored air, water, soil, crops, sediments, agrichemical data by the project, and data from agriculture, environmental protection, water resource, and land resource agencies | The PPMO, the county PMUs with support from local agriculture, environmental protection, water resource, and land resource agencies |
| Risk-based land management tool developed | This indicator measures establishment of the risk-based approach. | Annually | Farmland data and risk assessment | The PPMO with support from Hunan AC and the EPD, and agriculture and environmental protection agencies at the county level |
| Sustainable financing models for risk-based agricultural land pollution management identified | This indicator measures sustainability of project outcomes, especially demonstration results. | Annually | Implementation progress report | The PPMO |
| Action plans for risk-based agricultural land management developed in participating counties and in Hunan Province | This indicator measures capacity building of local governments. | Annually | Implementation progress report | The PPMO |
| Number of management personnel and monitoring staff trained | This indicator measures environmental management and monitoring capacity building. | Semiannually | Implementation progress reports | The PPMO |
| Number of farmers trained, compensated, and involved | This indicator measures capacity building of farmers. | Semiannually | Implementation progress reports | The county PMUs |
| Percentage of beneficiaries of project villages consulted for farm land pollution management | This indicator measures participation of farmers in project sites. | Semiannually | Implementation progress reports, external monitoring reports | The county PMUs, social consultants |

# Annex 2: Detailed Project Description

**CHINA: Hunan Integrated Management of Agricultural Land Pollution Project**

**Component 1: Demonstration of Risk-based Agricultural Land Pollution Management**

1. This component aims to demonstrate a risk-based approach to reducing heavy metal levels in the crops and/or soils by adopting a menu of technical measures at the selected farmlands in participating counties of Hunan. For heavy metal-contaminated soils, the physical and chemical forms of the heavy metal contaminant in soil strongly influence the selection of the appropriate management and remediation approaches. Sufficiently detailed information and data about the physical characteristics of the site and the type and level of contamination at the site must be obtained to enable accurate assessment of land management and remedial alternatives. Therefore, detailed environmental monitoring[[14]](#footnote-14) of the demonstration sites will be carried out before, during, and after completion of the demonstrations to prove demonstration effectiveness. Specifically, site-specific farmland environmental monitoring, risk analysis, and classification will be carried out before demonstrations, based on which the site-specific technical measures will be selected for demonstrations. Monitoring of a mass balance of heavy metals in soils will also be carried out in selected areas. Demonstration effectiveness will be evaluated annually based on the monitored data and professional judgment by the national and local technical experts invited by the PPMO.
2. The menu of technical measures is summarized in table 2.1. It is proposed that the local agricultural cooperatives will implement these measures.

Table 2.1. Technical Measures for Risk-based Agricultural Land Pollution Management

| **Category** | **Technical Measures** |
| --- | --- |
| Heavy metal pollution source control measures | **Irrigation water.** The engineering works will include the following to ensure sufficient and clean irrigation water for demonstration areas:   * Water channel upgrade. To ensure that irrigation water is clean in the project areas, it is necessary to upgrade channels and carry out dredging where the channel conditions are poor and sediments are exceeding standards and to separate irrigation and drainage channels to effectively prevent secondary pollution. * Water supply. In case of an increased flooding regime to reduce crop uptake of Cd it may be necessary to increase the required amount of irrigation water four to five times per acre per season. Construction of irrigation schemes and pump station might be needed to regulate runoff, so that sufficient water supply can be provided in the demonstration areas. * Ecological engineering * Pre-library: settlement belt, enhanced purification system, and reuse system * Sand and gravel traps * Ecological interception ditches used to control agricultural non-point source pollution * Field roads. In the demonstration areas, when lime is sprayed, crop straws are removed from fields, and cash crops such as flowers and seedlings are planted, use of machines is needed. Therefore, some field roads need to be improved.   **Atmospheric deposition.**  Source control. Awareness raising and technical assistance for surrounding industries discharging heavy metals (Component 3), request line authorities to supervise heavy metal emissions of industries.  **Agricultural inputs control (including rice straw)**   * Rice straw removal from fields or growing heavy metal high-accumulated plants in winter seasons for heavy metal balance control. When Cd content in straw exceeds 1.5 mg/kg, it should be removed from demonstration areas. Straw removals through changing harvest patterns (ensuring that the whole straw is removed) and increasing bundled straw (by using bundling machines) will be stimulated by subsidizing farmers or specialized harvesting cooperatives. Rice straws can be used for energy or fodder (only if it meets the fodder quality criteria for metals in order to prevent animal disease or transfer of Cd into the food chain – namely in organs like kidney and liver) through possible public-private partnership models, or be used as soil cover in orchard garden (for example, honey pomelo). However, a careful balance calculation is needed to prevent pollution of clean fields by the introduction of polluted straw. * Contaminated straw and plants will be collected, transported, and treated/disposed in an environmentally sound way. * Strict implementation of the proposed threshold standards, monitoring, and controlling heavy metal concentration in all agricultural inputs (fertilizers and pesticides). |
| Agronomic management measures (to reduce active heavy metals in crops) | * The cultivation of rice varieties that do not accumulate metals. * Optimization of water management in fields: under the premise that irrigation water is clean and sufficient, the technical requirement for water management is to ensure that water is irrigated at the whole growth stage and dehydrated after rice wax ripening, at least in the critical period of heavy metal absorption and accumulation (filling period) to ensure that farmland is not dehydrated (that is, in a flooded state) three weeks before and after that period. * In case of low pH soils (pH < 6.5): increase soil pH using lime or other soil amendments * Application of organic fertilizers (Cd concentration less than 1 mg/kg; the content of readily oxidizable organic carbon shall not exceed 15% of the total carbon content). * Apply soil immobilization agents. |
| Planting structure adjustment (switching crops) | For high-risk areas, adjust the crop planting structure (or lie fallow) to grow non-metal accumulating food crops or crops used for oil production, garden, forage crops according to regional planting habits, industrial base, and market demand. A suitable level of compensation to farmers for the changes which would affect their livelihood or restricted access to land will be considered.  Demonstration plans will be prepared based on the monitoring data and risk assessment, which will include technical justification and compensation mechanisms. The demonstration plans will require local government approval as land use change is involved. |
| Soil remediation if applicable (to reduce total heavy metals in soil) | **Phytoremediation:** Especially for high-risk farmlands where agronomic measures and switching crops are not suitable, according to the pollution types, farmland conditions, and specific seasons of the demonstration areas, the heavy metals in soil are reduced to some extent by growing highly accumulating plant species such as Sedum, *Pteris vittata*, water onion (moisture tolerance), and grain amaranth.  The plants that are highly enriched with Cd and/or other heavy metals after harvest will be safely handled, from the environmental and social safeguard point of view. A suitable level of compensation to farmers for the changes which would affect their livelihood or restricted access to lands will be considered.  Demonstration plans will be prepared based on the monitoring data and risk assessment, which will include technical justification and compensation mechanisms. The demonstration plans will require local government approval as agricultural production at the sites for soil remediation demonstrations will have to be stopped temporally or permanently. |
| Other measures | **Control of rice exceeding national food standards** (potential use of rice exceeding standards): For rice with a Cd content between 0.2 and 0.5mg/kg, the project counties are to choose the nearest designated enterprises for food purchasing and storage as industrial food and forage; rice with a Cd content over 0.5mg/kg, it will be used for other industrial purposes (e.g. production of Monosodium glutamate, alcohol, and starch).  To the degree possible the project will look for a solution that is based on the provinces existing food safety monitoring system if any, or the project financed enhancement of the province’s existing food safety monitoring system that could be a demonstration for future use.  **Integrated pest management:** To reduce use of pesticides and fertilizers. |
| Protection of no-risk areas | Establish farmland pollution risk management mechanism, optimize the field management, promote new agricultural technologies, improve soil health\* continue monitoring for indicators of success and failure to address nutrient status, organic matter and other relevant soil parameters to limit the activity of heavy metals in soils and dissolve excess total nitrogen and total phosphorus (water pollutants), ensuring that there will be no new heavy metal polluted farmlands and crops. |

*Note:*

\* Most types of agriculture soil health can be improved through six main approaches: reducing tillage, avoiding soil compaction, growing cover crops, using better crop rotations, applying organic amendments, and applying inorganic amendments, depending on the soils, the climate, the nature of the farm enterprise, the surrounding region, potential markets, and the farm’s needs and goals. There is rarely a simple recipe. Holistic soil health management requires an integrative understanding of the processes. “Building Soils for Better Crops - Sustainable Soil Management,” by Fred Magdoff and Harold Van Es.

1. The steps to determine site-specific technical measures are the following:
2. **Demonstration farmlands’ selection in participating counties.** Demonstration villages and towns will be selected based on these indexes: farmland areas, polluted farmland areas, crop production, rate of agriculture products exceeding standards, and pollution source. The demonstration farmlands’ selection will give priority to the areas where field infrastructures exist and where the farmers are willing to be involved in the project.
3. **Site-specific environmental monitoring for the selected demonstration farmlands.** Data to be collected (for the next step risk assessment) will include (i) soil data: pH, cation exchange capacity, organic matter, heavy metal concentration, soil type, and so on.; (ii) agricultural product data: (rice) cultivar and heavy metal concentration; and (iii) heavy metal pollution source data: irrigation water and groundwater, sediments, agriculture inputs, atmosphere deposition, and so on.
4. **Farmland pollution risk analysis**. The risk analysis process is illustrated in figure 2.1 (taking Cd as an example).
5. **Site-specific technical measure selection.** Based on the risk levels, technical measures from the menu will be selected for demonstration.
6. An integrated demonstration plan for each selected area that includes site information, pollution source analysis, environmental monitoring data, risk assessment, technically justified measures listed in Table 2.1 will be developed, which will vary from field to field. These sites-specific demonstration plans will also include as appropriate (i) 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, (ii) a compensation mechanism to ensure the interests of farmers; and (iii) safe handling, treatment and disposal measures for the plants that are highly enriched with Cd and/or other heavy metals from soil remediation measures taken.

Figure 2.1. Heavy Metal Pollution Risk Warning Procedure (Taking Cd as an example)

|  |
| --- |
| Rice Cd concentration  (RCd + 2Se）  National Food Safety Standards (mg/kg)  Above standards  Below standards  0.2 /kgmg/kg  Cd mass balance monitoring  Monitoring crop accumulation  Risk management targets  No risk  Field pollution risk classification  Pollution trend  Field protection measures  L  M  S  H  BCF\*  Risk screening  Crop accumulation reduced  Soil total HM not increased  Soil  Pollution sources  Agricultural production  Soil active HM reduced  Farmland pollution risk management measures |

1. **Hengyang County.** The county has a total of 69,670 ha of arable farmlands, in which the paddy field area is 60,070 ha. The main heavy metal identified in rice is Cd. The pollution risk level of Cd in rice and soil is rated moderate (RIII) and low (SII), respectively. This is likely because (a) the Cd level in straw exceeds the standard, and (b) according to the available emission data from heavy metal discharging enterprises, Hengyang’s heavy metal pollution risk resulting from atmospheric deposition is roughly rated moderate (DIII) (subject to additional monitoring after the project appraisal). The overall agriculture production management risk is rated low (MII). Therefore, the main technical options for Hengyang to manage heavy metal pollution risk to crops will include agronomic measures, monitoring of heavy metal pollution in farmlands, Cd balance monitoring and control measures (especially rice straw removal), and pollution source control engineering measures (channel upgrade, dredging, and sand and gravel traps).
2. **Yongxing County.** The county has a total of 35,153 ha of arable farmlands, in which the paddy field area is 28,590 ha. The main heavy metals identified in farmlands are Cd, As, and Hg. The pollution risk level of Cd in rice and soil is both rated substantial (RIV) and (SIV). This is likely because the Cd level in straw is far beyond the standard and the Cd concentration in Zhengjiachong irrigation water is also far beyond the standard. According to the available emission data from heavy metal discharging enterprises, Yongxing’s heavy metal pollution risk resulting from atmospheric deposition is roughly rated low (DII) (subject to additional monitoring after the project approval). The overall agriculture production management risk is rated low (MII). Therefore, the main technical options for Yongxing to manage heavy metal pollution risk will include agronomic measures (including planting structure adjustment); pollution source control engineering measures (channel dredging, upgrade, separating irrigation and drainage channels, sand and gravel traps, ecological interception ditches); and straw removal.
3. **Yongding District.** The district has a total of 22,908 ha of arable farmlands, in which the paddy field area is 16,965 ha. The main heavy metals identified in farmlands are Cd, Hg, and As. The pollution risk level of Cd in rice and soil is rated moderate (RIII) and substantial (SIV), respectively. This is mainly because the Cd level in straw far exceeds the standard and the straw have been recycled to the field. There are no other pollution sources. The overall agriculture production management risk is rated low (MII). Therefore, the main technical options for Yongding to manage heavy metal pollution risk will include agronomic measures (including planting structure adjustment), pollution source control engineering measures (channel upgrade), straw removal, heavy metal pollution monitoring, and Cd balance monitoring.
4. The demonstration areas and estimated risk levels in the first three counties are summarized in table 2.2, which may be adjusted as needed when developing site-specific demonstration plans.

Table 2.2. Hengyang County Demonstrations

| **Town and Village** | **Area**  **(ha)** | **Estimated Risk Types and Levels** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Rice**  **(R)**  **mg/kg** | **Soil (S)** | | **Farmland Pollution Sources (O)** | | | | **Agriculture Production Management (M)**  **BCF** | |
| **pH** | **Cd**  **mg/kg** | **Irrigation Water (W)a** | **Air Deposition (D)** | **NPK**  **Fertilizer (F)** | **Straw**  **(C)**  **mg/kg** | **Variety (V)** | **Farming Practices** |
| Hongshi (2 villages) | 254 | 0.228 | 6.05±0.18 | 0.515 | Meet standards | No data | Safe | 1.14 | 0.443 | |
| RII | SIII | | O (WIDIIIFICII) | | | | MII | |
| Taiyuan (4 villages) | 446 | 0.384 | 6.13±0.2 | 0.475 | Meet standards | No data | Safe | 1.92 | 0.808 | |
| RII | SII | | O (WIDIIIFICII) | | | | MII | |
| Xidu (3 villages) | 284 | 0.409 | 6.07±0.19 | 0.403 | Meet standards | No data | Safe | 2.045 | 1.015 | |
| RIV | SII | | O (WIDIIIFICII) | | | | MIV | |
| **Total** | **984** |  |  | |  | | | |  | |

*Note:*  No = I, Low = II, Moderate = III, Substantial = IV, High = V.

a. However, sediments exceed standards.

Table 2.3. Yongxing County Demonstration

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Town and Village** | **Area**  **(ha)** | **Estimated Risk Types and Levels** | | | | | | | | | |
| **Rice (R)**  **mg/kg** | **Soil (S)** | | **Farmland Pollution Sources (O)** | | | | | **Agriculture Production Management (M)**  **BCF** | |
| **pH** | **Cd**  **mg/kg** | **Irrigation water (W)** | **Air Deposition (D)** | **NPK**  **Fertilizer (F)** | | **Straw**  **(C)** | **Variety (V)** | **Farming Practices** |
| Changlu (1 village) | 155 | 0.33 | 5.66±0.53 | 0.55 | Meet standards | No data | Safe | | 1.625 | 0.6 | |
| RIII | SIII | | O (WIDIIIFICII) | | | | | MII | |
| Songbai (1 village) | 162 | 0.81 | 6.16±0.23 | 1.29 | Meet standards\* | No data | Safe | | 4.06 | 0.63 | |
| RV | SV | | O (WVDIIFICv) | | | | | MII | |
| Shihu (2 villages) | 174 | 0.48 | 5.87±0.48 | 0.77 | Meet standards | No data | Safe | | 2.4 | 0.63 | |
| RIV | SV | | O (WIDIIFICIV) | | | | | MII | |
| Muzitang (2 villages) | 227 | 0.64 | 5.86±0.36 | 1.52 | Meet standards | No data | | Safe | 3.2 | 0.42 | |
| RV | SV | | O (WIDIIFICv) | | | | | MII | |
| **Total** | **718** |  |  | |  | | | | |  | |

*Note:*  No = I, Low = II, Moderate = III, Substantial = IV, High = V.

\*Meet standards except for Zhengjiachong irrigation water

Table 2.4. Zhangjiajie Yongding District Demonstrations

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Village and Town** | **Area**  **(ha)** | **Estimated Risk Types and Levels** | | | | | | | | |
| **Rice (R)**  **mg/kg** | **Soil (S)** | | **Farmland Pollution Sources (O)** | | | | **Agriculture Production Management (M)**  **BCF** | |
| **pH** | **Cd**  **mg/kg** | **Irrigation water (W)** | **Air Deposition (D)** | **NPK**  **Fertilizer (F)** | **Straw**  **(C)** | **Variety (V)** | **Farming Practices** |
| Luotaping (1 village) | 51 | 0.55 | 5.52±0.22 | 0.85 | Meet standards | No data | Safe | 2.75 | 0.65 | |
| RV | SV | | O (WIDIFICV) | | | | MII | |
| Wentang (1 village) | 125.1 | 0.31 | 5.55±0.1 | 0.54 | Meet standards | No data | Safe | 1.55 | 0.57 | |
| RIII | SIII | | O (WIDIFICIII) | | | | MII | |
| Houping (3 villages) | 331.8 | 0.42 | 6.02±0.37 | 0.86 | Meet standards | No data | Safe | 2.1 | 0.49 | |
| RIV | SV | | O (WIDIFICIII) | | | | MII | |
| Fengxianggang (4 villages) | 268.06 | 0.38 | 6.12±0.53 | 0.51 | Meet standards | No data | Safe | 1.9 | 0.75 | |
| RIII | SIII | | O (WIDIFICIII) | | | | MII | |
| Yanghuping (2 villages) | 144.7 | 0.33 | 6.48±0.48 | 0.50 | Meet standards | No data | Safe | 1.65 | 0.66 | |
| RIII | SIII | | O (WIDIFICIII) | | | | MII | |
| Xixiping (1 village) | 86.6 | 0.36 | 6.3±0.14 | 0.47 | Meet standards | No data | Safe | 1.8 | 0.77 | |
| RIII | SIII | | O (WIDIFICIII) | | | | MII | |
| **Total** | **1007.3** |  |  | |  | | | |  | |

*Note:*  No = I, Low = II, Moderate = III, Substantial = IV, High = V.

1. An evaluation methodology for demonstration effectiveness included in Subcomponent 2.3 will be developed as early as possible. The relevant farmers will be informed of effectiveness of the demonstrations in every harvest season. The targeted outcome of the project is that by end of the demonstrations (which can be adjusted annually based on intermediate results during the project life), all crops grown on the demonstration sites will meet the food quality standard. The demonstrated technical measures should be maintained after the project life to sustain the project results. Any rice exceeding food standards during demonstrations will be safely managed as an integral part of the project.
2. This component will also finance innovative supervision of implementation of these technical measures, especially timely collection of evidence (photos, audios, and videos) to prove their actual implementation and accuracy. After completion of agronomic measures, it is difficult to retain the persistent evidence as civil engineering does. Local agricultural cooperative organizations have no experience of carrying out contract projects, and the local government agencies have no supervision experience either. Therefore, the following supervision plan is proposed to ensure effectiveness of the selected technical measures:
3. Approval of related farmers (who own the crop harvesting rights)
4. Agricultural cooperative’s provision of receipts of purchase of lime, organic fertilizer, water consumption, and so on which will be selectively verified with the suppliers by the county PMUs
5. Agricultural cooperative’s provision of lists of temporary workers
6. Village-level appraisal led by the village committee
7. Roving inspection by the town working groups and the county PMUs during the key periods: lime spray, application of organic fertilizers, flooding irrigation, and so on
8. Agricultural supervision companies (a third party) to take photos, audios, and videos and deliver evidences to prove that the technical measures have been accurately implemented

**Component 2: Strengthening Agricultural Environmental Monitoring and Management**

1. This component aims to improve agricultural land environmental monitoring and risk assessment capacity to orderly, precisely, and sustainably manage agricultural land pollution in Hunan.
2. **Subcomponent 2.1: Establishment of the AEM database for early warning.** This subcomponent will support development of an AEM database building on the existing environmental monitoring managed by the Agriculture, Environmental Protection, and Land Resource Bureaus in participating counties, to enable agricultural land and product risk assessment, mapping, and early warning, which will help identify areas that are more or less vulnerable to crop and land pollution and display this information graphically, therefore preventing the expansion and degree of pollution. Continuous soil, crop, surface water, groundwater, sediment, air, organic fertilizer, and pesticide monitoring and data analysis would be required for meeting the monitoring objectives. The AEM database may also be expanded to include, if possible, the monitoring of energy use in agriculture (energy efficiency and greenhouse gas emissions) and potential effect of agriculture on biodiversity. The results of the AEM, together with statistical data from the agricultural sector and results from special research and evaluations, will be the basis for taking decisions on assessing and developing agricultural policy and helping direct resources and land use activities to appropriate areas, and assisting in agricultural land protection and remediation efforts. This will also mark the beginning of effective and comprehensive agricultural land pollution management planning.
3. This subcomponent will finance development and establishment of an AEM database (led by the PPMO); continued environmental monitoring; data analysis; and procurement of sampling inspection vehicles, terminal computers, testing equipment (for example, heavy metal fast detecting instruments, global positioning system locators and digital elevation instruments) for participating counties. This component will also finance upgrade of the existing Monitoring Center in Hengyang Agricultural Bureau by purchasing more detection equipment and receiving training and certificate to allow timely and cost-effective sampling and testing of the local crop and soil. Currently, all crop and soil samples have to be sent to Changsha for testing.
4. **Subcomponent 2.2: 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 county and provincial levels to classify areas with different risk levels, crops for different soil types and conditions (for example, pH and organic matter), and identify risk management options. This subcomponent will be implemented by the PPMO. The subcomponent will include the following activities (also summarized in figure 2.2):
5. Screen representative areas in all counties of Hunan Province: degree of heavy metal pollution (from clean to polluted); soil conditions (pH, organic matter, soil types-loam/clay/sand/others); and common rice cultivars used by farmers, representing different topography, climate, and planting patterns of the province.
6. Select pilot farmlands with a wide range of environmental conditions across the province based on information in (a).
7. Cultivate all selected cultivars, test water, and manage pH and agronomic measures, if needed, on all pilot farmlands.
8. Use data (sampling of soil and crops at time of harvest) collected (establishment of a database) to derive relationship between soil (pH, organic matter, pollution degree) and crops (different cultivars) in the pilot farmlands to derive soil-crop models.
9. Generate agricultural product and soil risk maps for the province—use this tool to initially assess what soil is suitable to produce safe crops (mainly rice) and what soil is not in the province based on soil organic matter and pH conditions which are regularly monitored for all farmlands. This is to identify risky areas in the province where it is expected that rice would not meet the food safety standards.
10. Generate agricultural product and soil risk maps for counties. These risk maps will serve as a basis for the development of action plans in participating counties and the province to manage agricultural risks (improve crop safety) and/or to reduce pollutant levels in soils.
11. Validation of risk maps. Implementation results of Component 1 can be used for validation of the risk maps for the participating counties. This approach is briefly summarized in figure 2.2.

Figure 2.2. Approach to Developing Risk-based Land Management Tool and Risk Mapping



1. **Subcomponent 2.3: Local regulations and standards for risk-based integrated agricultural land pollution management.** Prevention is the best method to protect the environment and human health from pollution and is far less expensive than any kind of remediation/cleanup. This subcomponent will support development and/or issuance of local regulations and standards/guidelines and 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 integrated risk-based management. This subcomponent will be implemented by the PPMO at the provincial level or by the PMUs at the county level.
2. **At the provincial level:**
3. Development of an evaluation methodology for demonstration effectiveness of Component 1 from the technical, economic, environmental, and social point of view
4. Technical guidelines for risk assessment of agricultural land pollution
5. Heavy metal pollution source control: Development and/or issuance of administrative measures for pollution source control from industries and agriculture inputs as needed
6. **In Hengyang county:**
7. Guidelines for monitoring of heavy metals in farmland and measures for ensuring its implementation (including sources of funding);
8. Studies on optimization of risk assessment and management measures for cadmium contaminated farmlands;
9. Guidelines for utilization and management of classified rice;
10. **In Yongxing county:**
11. Guidelines for planting structure adjustment for highly-contaminated farmlands
12. Studies on measures for heavy metal pollution source control
13. **In Yongding District:**
14. Guidelines on protection and risk control of no-risk/clean agricultural lands
15. Technical guidelines for safe production of rice
16. The local regulations and standards to be developed in other participating counties will be confirmed during project implementation.
17. **Subcomponent 2.4: Studies on sustainable financing models and eco-compensation mechanisms for agricultural land management.** Once a farmland is contaminated with heavy metals, it will take years and be very costly to restore soil quality and health. This subcomponent will carry out studies to identify sustainable financing models and ecological compensation mechanisms (economic compensation level, modality, targets and management methods for different pollution risk levels) for long-term agricultural land management, therefore ensuring agriculture production safety in Hunan Province. This activity will be implemented by the PPMO.
18. **Subcomponent 2.5: Development of agricultural land management Action Plans*.*** Based on the demonstration results and outputs of all other project activities, this subcomponent will support development of the Action Plans on risk-based agricultural land pollution management for each participating county and for the province, which will be in line with the national Soil Ten Provisions and guide agricultural land pollution management beyond the project life.

**Component 3: Capacity Development and Knowledge Distribution**

1. This component aims to (i) develop management capacity of the local governments and technical capacity of beneficiary farmers, the agriculture technical service providers, and farmer field schools to apply risk-based approaches for agricultural land management and sustainable soil management, and (ii) disseminate knowledge gained from demonstrations for increasing awareness and building ability to make informed choices among alternatives.
2. **Subcomponent 3.1: Training for government officials.** The risk-based land management, that is, controlling risks through soil and crop management to reduce the impact of soil pollution by heavy metals on the safety of rice, is clearly quite a step from the classical method of having a single food standard to be used. All stakeholders involved will need to understand what it means and why, what needs to be done, and how. This subcomponent will support organization and provision of national and international trainings on risk-based land management, AEM, pollution prevention, policy enforcement, and compliance for government officials recommended from the provincial and county levels of the agricultural, environmental protection and land resource departments, development and reform committees, financial departments, and other agencies as needed. These personnel are expected to foster and sustain the project outcomes beyond the project life. The personnel training activities will be implemented by the PPMO.
3. **Subcomponent 3.2: Training for environmental monitoring staff.** Annual training for environmental monitoring staff from the local government agencies will be carried out under the project to continuously improve monitoring capacity.
4. **Subcomponent 3.3: Training for farmers.** This subcomponent will support awareness raising activities and training for beneficiary farmers on environmental impacts of poor farming practices, knowledge and international good practices on soil health management, the risk-based land management tool, AEM, and regulations and standards to prevent agriculture inputs containing heavy metals from entering farmlands.
5. **Subcomponent 3.4: Technical assistance for heavy metal discharging enterprises.** The focus of effective environmental management is the use of a systematic approach to planning, controlling, measuring, and improving an industrial enterprise’s environmental impact, that is, the International Standards Organization 14000 series of environmental management standards. Clean production and cost savings can be achieved by improving the environmental management processes. The subcomponent will support technical assistance and training for selected enterprises discharging heavy metals in eight key industry sectors: 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, for example, the use of adequate pollution control devices and appropriate recycling or disposal of captured materials (but not considered as part of the project). This subcomponent will also provide on-site assistance for establishing an EMS in selected enterprises.
6. **Subcomponent 3.5: 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 dissemination and learning purpose to increase awareness and build ability to make informed choices among alternatives.

**Component 4: Project Management and Monitoring and Evaluation**

1. This component will support day-to-day project implementation, procurement, FM; environmental and social safeguards functions to be carried out by the PPMO and the county-level PMUs; and coordination and collaboration among the local government agencies, nongovernmental agencies, and the farmers’ professional organizations. Specifically, this component will finance (a) provision of consulting services for providing technical support to the PPMO and CPMUs, engineering design, construction supervision, and environmental and social management as needed; (b) capacity-building activities through workshops, training, and study tours; (c) the operation of PPMO and CPMUs (including the purchase of office equipment); and (d) purchase of a project management information system.
2. This component will also support the project launch and completion workshops and M&E of the project indicators and outcomes by collecting evidence-based information and data, summarizing, and disseminating lessons and experiences derived from participating counties to the rest of the counties in the province.

**Selection of Participating Counties**

1. The PPMO, hosted in the Foreign Economic and Cooperation Center of the provincial Agriculture Committee, has conducted a rapid risk analysis to identify participating counties of the project. There are a total of 123 counties in 13 cities and one autonomous prefecture in Hunan Province. Based on soil and crop sampling/testing and pollution source investigation in recent years done by the provincial AC and the EPD, serious heavy metal pollution has been found in 40 counties in 13 cities and the prefecture. Most of the 40 counties are located in South or West Hunan or along the Xiang River. The rapid risk analysis used the following criteria and further selected a long list of 15 potential counties to participate in the project.
2. Main agricultural product areas (especially rice).
3. Located in Xiang River basin, in South or West Hunan, and in industrial, sewage irrigated, or suburban areas where farmland pollution is considered serious.
4. Pollution sources have been identified and can be controlled.
5. Safety levels of heavy metals in agriculture products and soils.
6. Representativeness of topography, climate, and planting patterns.
7. Public awareness and willingness to participate.
8. Existing efforts on heavy metal pollution management.
9. Capital investments for heavy metal pollution management so far.

Table 2.6. Candidate Participating Counties

|  |  |  |
| --- | --- | --- |
| **No.** | **City** | **County** |
| 1 | Xiangxi Autonomous Prefecture | Jishou |
| 2 | Baojing |
| 3 | Huayuan |
| 4 | Yongshun |
| 5 | Zhangjiajie | Yongding District |
| 6 | Cili |
| 7 | Huahua | Zhongfang |
| 8 | Yiyang | Anhua |
| 9 | Hengyang | Hengyang |
| 10 | Hengnan |
| 11 | Chenzhou | Linwu |
| 12 | Yizhang |
| 13 | Yongxing |
| 14 | Yongzhou | Lengshuitan District |
| 15 | Qiyang |

1. Considering the project complexity, three counties (Hengyang and Yongxing Counties and Yongding District, one in each of the three key areas: Xiang River basin and South and West parts of Hunan) were appointed as pioneers to prepare detailed FSRs. The three counties’ FSRs were appraised during project preparation. The FSRs for other participating counties will be prepared by the counties, appraised and approved by the World Bank during project implementation. This allows the overall project preparation to be on time and facilitates a quick start of project implementation right after its approval. The step-wise participation also enables the other participating counties to benefit from the accumulated experiences from the three pioneer 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.

**Risk-based Land Pollution Management Framework**



Figure 2.3. Risk-based Land Pollution Management Framework

# Annex 3: Implementation Arrangements

**CHINA: Hunan Integrated Management of Agricultural Land Pollution Project**

**Project Institutional and Implementation Arrangements**

*Project Administration Mechanisms*

1. For implementation of this project, it is proposed to set up the following institutional structure at the provincial level:
   1. **PSC.** The PSC, headed by a vice governor, is to oversee the implementation of the proposed project, with representatives from the DOF, DRC, AC, EPD, Water Resources, Land Administration, and Work Safety Bureau. The PSC will hold annual meetings to review project implementation and solve implementation issues if any.
   2. **PPMO.** The PPMO is hosted in the FECC of the AC to be responsible for overall implementation of the project and focus on project activities at the provincial level, including Subcomponents 1(c), 2.1, 3.1, 3.3, and 3.4 action plan on agricultural land management for the province. The PPMO will also provide to prefectural and county PMOs for implementation of their activities, coordinate learning and experience-sharing activities, and be the project’s focal point in liaison with the World Bank. Its key staff members will include two project officers, an FM specialist, a procurement specialist, and two safeguard specialists.
   3. **TEGs.** A provincial TEG has been set up, comprising eight highly competent professors or research fellows to provide technical support to the PPMO. TEG members will help review technical documents and designs, evaluate project progress, identify problems, and provide technical solutions.
2. At the Xiangxi Prefecture level:
   1. A Project steering committee, responsible for providing overall policy, financial and institutional guidance on project implementation at the prefecture level and facilitating coordination among different implementing agencies within its respective jurisdiction.
   2. A Project management unit responsible for implementation of the project at the prefecture level, and coordinating day-to-day activities with the Provincial Project Management Office and the relevant County Project Management Units, and monitoring Project implementation within the prefecture.
3. At the county level, the following structure is proposed:
4. **PLG.** The PLG at the county level will be led by the county governor or a vice-county governor with members from the relevant county government line bureaus (finance, DRC, environmental protection, water resources, land administration, work safety, animal husbandry, agriculture, and so on). The PLG will oversee project implementation at the county level and address implementation issues. The director of each government agency at the county level will be a member of the PLG and the directors will meet quarterly for the project.
5. **County PMUs.** Considering that the project involves all relevant agencies, as mentioned above, it is proposed that the county-level PMU is hosted in the county government (or in agricultural bureaus). The CPMUs will be responsible for the daily management of project activities at the county level, including Subcomponents 1 (a), 1(b), 2.2, 2.3, 3.2, and 3.4 action plan on agricultural land management at the county level. Its key staff members will include two project officers, an FM specialist, a procurement specialist, and two safeguard specialists.
6. **County TEG.** A county-level TEG will also be set up to guide the PMU’s daily project implementation. The county TEG should seek technical guidance, as needed, from the provincial TEG.
7. At the township and village level, the township government and administrative village committee will be responsible for local public information dissemination, awareness and community mobilization, planning and implementation of investments under component 1 assigned to the township and village level, and coordination of any land adjustments for irrigation schemes and other infrastructure construction, as well as monitoring the project outputs and outcomes in a participatory manner.
8. Table 3.1 provides an overview of the detailed project implementation per activity.

Table 3.1. Summary of Project Activities and Responsible Agencies

|  |  |  |  |
| --- | --- | --- | --- |
| **Component** | **Subcomponent** | **Responsible Agency** | **Operation and Maintenance Unit** |
| 1. Demonstrations of Risk-based Agricultural Land Pollution Management | See detailed technical measures in annex 2. Technical measures will be maintained after project life by regulations, operation guidelines, eco-compensation, and so on. | County PMUs | Operation and maintenancefor field infrastructure by local agencies |
| 2. Strengthening Agricultural Environmental Monitoring and Management | 2.1 Establishment of the AEM database for early warning | PPMO, county PMUs | Provincial AC and county agriculture bureaus |
| 2.2 Development of a risk-based land management tool and crop/soil risk mapping | PPMO, |
| 2.3 Local regulation and standards for risk-based integrated agricultural land pollution management | PPMO, county PMUs | Provincial and local governments |
| 2.4 Studies on sustainable financing models and eco-compensation mechanisms for agricultural land management | PPMO, |
| 2.5 Development of agricultural land management action plans | PPMO, county PMUs |
| 3. Capacity Development and Knowledge Distribution | 3.1 Training for government officials | PPMO, | Local AC, EPB, and Land Resource agencies |
| 3.2 Training for environmental monitoring staff | County PMUs |
| 3.3 Training for farmers | County PMUs |  |
| 3.4 Technical assistance for heavy metal discharging enterprises | County PMUs | Local EPBs |
| 3.5 Knowledge distribution | County PMUs and PPMO | Provincial AC and county agriculture bureaus |
| 4. Project Management and Monitoring & Evaluation | See details in annex 2. | PPMO, county PMUs |  |

**Financial Management, Disbursements, and Procurement**

*Financial Management*

1. The FM capacity assessments were conducted in July 2015 and March 2016, at the provincial and county PMUs in accordance with OP/BP 10.00 and the Financial Management Practice Manual. The assessment identified the principal risk as the lack of knowledge and experience in managing Bank-financed projects by county PMU staff. This could lead to misuse or inefficient use of project funds. Mitigation measures to address this risk are as follows: (a) modification and distribution of an FM manual (FMM) to standardize project FM coordination and reporting procedures; and (b) provision of FM technical training and knowledge sharing workshops to be arranged by the Bank and PPMO. In addition, the risk of delayed delivery of counterpart funds by the government will be mitigated by preparing the realistic financing plan by local government and considering the alternative measures if the budget from local government is insufficient and close Bank team monitoring during project implementation. FM control risk is assessed as Moderate by considering above-mentioned matters.
2. Funding sources for the project include the Bank loan and counterpart funds. The World Bank loan agreement will be signed between the World Bank and the Ministry of Finance (MOF). The on-lending agreement will be entered into by MOF and the Hunan Provincial Government. The provincial government will on-lend the Bank loan to county government directly. The county government will bear the repayment responsibility. The required counterpart funds will be raised by provincial and county government. Since 75 percent of counterpart funds are financed by the provincial government, project counties will not encounter serious financial burden to invest the funds to the project. However, project county government shall commit that the funds to be financed from its budget be included in the annual sectoral budget.
3. **Audit Arrangements.** Hunan Provincial Audit Office (HPAO) has been identified as the auditor for the project. The annual audit report on the project financial statements will be issued by this Audit Office and will be due to the Bank six months after the end of each calendar year (by June 30 each year). HPAO has extensive experience with previous Bank projects and is deemed acceptable to the Bank. The audit report and audited financial statements will be publicly available at both the World Bank and HPAO’s websites.
4. **Budgeting.** According to the new Budget Law and the Decree 85 issued by MOF, the Bank loan is required to be included in government budgeting system. However, the Bank funds will be managed by government treasury in the specially set up accounts. County PMOs are responsible for preparing the project annual plan and submitting to PPMO for consolidation. Since the required counterpart funds will be fully raised by county government, the PMOs will be responsible for ensuring the required counterpart funds are committed in county government’s annual budget. Given the weak financing situation of Project County, besides allocating additional cash contribution to the project, local governments may consider some alternatives, such as mobilizing domestic projects, to address the potential funds shortage problem. Nevertheless, the realistic financing plan prepared by county government will enable the Bank and government entities to supervise timely delivery of the committed funds.
5. Project funds will be paid to contractors based on the approved construction progress. Project annual plan variance analysis will be conducted regularly by PPMO and CPMUs, thus enabling timely corrective actions to be taken.
6. **Funds flow.** HPFB will open and manage a segregated U.S. dollar designated account (DA) for the Bank loan proceeds in a commercial bank acceptable to the Bank. For those counties which are managed by the provincial finance bureau directly, the county PMUs will prepare payment request that will be reviewed by the county finance bureaus before submission to the PPMO for its review. HPFB will provide final approval and deliver funds to the county finance bureaus; then the finance bureaus will pay to the contractors. For remaining counties, the municipal level will be involved in application review and funds delivery procedures. For those activities financed by counterpart funds, county finance bureaus will pay to the contractors directly based on PMUs’ request. The finance bureaus should inform PPMO and CPMUs timely after the payment so that that they can prepare accounting ledgers. Detailed disbursement procedures and funds flow arrangement are described in the project FMM.
7. The proposed funds flow arrangement and related processing period should ensure contractors receive payment within required dates stipulated in the signed contracts. The Bank will closely monitor disbursement efficiency during implementation. If material payment delays resulting from slow disbursement are noted, the Bank will guide the project to explore more streamlined funds flow arrangement.
8. **Accounting and Financial Reporting.** The administration, accounting and reporting of the project will be set up in accordance with Circular #13: “Accounting Regulations for World Bank-financed Projects” issued in January 2000 by MOF.
9. County PMUs are the lowest level responsible for maintaining project accounting records and preparing financial reports for project activities. All county PMUs and the PPMO will use a system called “PROMIS” for project management and accounting. The system has been used in about 20 Bank-financed projects and is reliable. After receiving county project financial statements through the system and DA information from HPFB, the PPMO will generate the consolidated project financial statements in PROMIS. The PMOs will also generate unaudited semi-annual project financial reports in PROMIS and furnish these to the Bank as part of the semi-annual Progress Report no later than 60 days following each semester.
10. **Internal Controls.** The internal control environment of the project is adequate. All transaction processing will use government’s institutions, processes and systems that provide for segregation of duties, supervision, quality control review, reconciliations, and independent external audits and appear to meet the needs of the project. Although the internal audit function does not exist in the project, all payments will follow the official verification and payment routine. All project funds are paid by government treasury directly although not all from single treasury account. A robust internal verification system has been established to ensure project constructions could be proper supervised and verified.
11. County agricultural broadcast school will be used to conduct the training for farmers in some places. The agreed procedure will be: a) county PMU signs an implementing agreement with the school including the contents of activities to be conducted and related detailed requirements, the responsibility of two parties, unit cost of one trainee, terms of payment, and verification procedures; b) the school carries out the training according to the agreement and request the payment after the training is completed; and c) county PMU verifies the training completed and makes the payment based on the agreed unit cost and the number of participants if the training is satisfactory. To ease the implementation of some project activities (including lime application, soil passivator application, organic fertilizer application, alkali compound fertilizer application, alkali compound fertilizer application, irrigation/water management, straw removal, and crop restructuring compensation) under component 1, the community participation approach will be introduced to the project and the disbursement will be made based on the output achieved in the form of subsidy. The detailed procedures are as follows:

* County PMU signs an implementing agreement with the community (including village, association and cooperation). The agreement should include but not limited to: a) activities to be conducted; b) the required technical criteria; c) the responsibility of related parties; d) the predetermined subsidies; e) terms of payment; f) review and verification procedures; g) publicity requirement; and h) complaints system.
* Village publishes related procedures and subsidy standards at village’s publicity board.
* The community conducts project activities according to the requirements stated in the agreement. County PMU provides technical guidance and support is needed.
* Village reviews the implementation of project activities and maintains the record whenever they complete the review. To stimulate the village to fulfill its review responsibility properly, awards (financed by the counterpart funds) will be granted to the village at the year-end if their performance is satisfactory. County PMU may review project activities at some important stages during implementation.
* County PMU verifies the activities completed and issue a verification report if the activities are satisfactory. The community will be paid according the predetermined subsidy. The verification report issued by the county PMO will be the only supporting document for both disbursement and accounting purposes.
* Verification result and the subsidies paid should be published at the village’s publicity board. Any complaints should be properly handled by related PMUs.
* The operating details of the proposed approach, the output-based disbursement mechanism and the detailed subsidies will be included in PIM.

***Disbursements***

1. The borrower has decided that disbursements will be documented via the transaction-based disbursement method. The primary Bank disbursement method will be advances to the DA. HPFB will open a USD designated account and be responsible for converting the US dollar to Chinese Yuan if the payment request currency is RMB. Withdrawal Applications (WAs) will be prepared by HPFB to request Bank disbursements and to document the use of Bank financing. WAs will include supporting documents in the form of Statement of Expenditures (SOEs) and Summary Sheets (SS) (both of them are prepared on cash basis) and source documents identified in the Disbursement Letter issued by the Bank. Direct payment and reimbursement from the loan account may also be used, provided the withdrawal application value is above the minimum application amount. The Bank loan would disburse against eligible expenditures (taxes inclusive) as in the table below.

**Table A3-1. Eligible Expenditures**

|  |  |  |
| --- | --- | --- |
| **Disbursement Categories** | **IBRD Loan** | |
| **Allocated  Amount**  **(in US$)** | **Percentage of Expenditures**  **to be financed**  **(inclusive of taxes)** |
| 1. Output-based Subsidies under Part 1, Goods, works, non-consulting services, consultants’ services, Training and Incremental Operating Costs under Parts 1, 2, 3, and 4 | 99,750,000 | 100% |
| 2. Front-end fee | 250,000 |  |
| Total | 100,000,000 |  |

1. Project activities will be clearly distinguished between IBRD loan and counterpart funds on expenses financing. The main activities to be financed by the counterpart funds include: project management at the provincial level, project monitoring and evaluation, project management information system, development and establishment of the Agricultural Environmental Monitoring database, certification compensation, development and publication of local policy and standards, and dissemination of project outputs and outcomes. The remaining activities will be financed by the IBRD loans.
2. The project will be closed by December 31, 2023. Retroactive financing will apply for payments made prior to the date of the Loan Agreement, but on or after January 31, 2017, to an aggregate amount not to exceed US$10,000,000 equivalent.

*Procurement*

1. ***Capacity assessment***. Procurement under the project will be carried out by PPMO and CPMUs for the investments in the respective jurisdictions, except sub-component 1 (b), 1 (c), 1 (d), 1 (e) and 1 (f) which would be undertaken by selected cooperatives/villages through community participation in accordance with the Project Implementation Manual. The PPMO and CPMUs have designated full-time procurement staff. The key project procurement issues and risks identified by the procurement capacity assessment include: (1) procurement personnel in 6 CPMOs have some experience with former Bank-financed projects, and in general is familiar with Bank procurement procedures, and that newly appointed procurement staff in PPMO and other 8 CPMUs, however, lack experience with Bank-financed projects; (2) a multiplicity of actors involved in procurement; (3) activities under Component 1 are dispersed in 14 candidate counties; and (4) PPMO and CPMUs may unintentionally follow national procurement practices, which may lead to non-compliance with Bank procurement guidelines. Those risks will be addressed through (1) preparation and implementation of a procurement training plan to train all procurement staff at the province and county levels during the project preparation and implementation; (2) participation of the procurement staff in the regular procurement training program offered by Tsinghua University (or equivalent) in cooperation with the Bank procurement team in the Beijing office; (3) preparation of a procurement section in the PIM to standardize project procurement procedures and provide guidance to procurement staff, with particular focus on community participation in procurement; and (4) a Procurement Agent with experience in Bank-financed projects will be hired by the provincial PMO to provide project procurement cycle management services. As result of the deficiencies identified, and relatively high number of procurement activities, the overall procurement risk is rated as “Substantial”.
2. ***Applicable Guidelines****.* Procurement for the project will be carried out in accordance with the Bank’s "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, revised July 2014; and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, revised July 2014; and the provisions stipulated in the legal agreements.
3. ***Procurement Arrangement of component 1.*** The non-engineering measures such as sub-component 1 (b) agronomic measures to immobilize heave metals in soil (reducing crop uptake), 1 (c) soil remediation to reduce total metals in soil, 1 (d) integrated pest management, 1 (e) control of rice exceeding food standards if any at the demonstration areas, and 1 (f) measures to protect no risk/clean farmlands will be implemented by cooperatives/village committee through community participation approach, detailed procedures are described in Project Implementation Manual; they may also be implemented by service providers which shall be procured as non-consulting services using the national model bidding documents, agreed with or satisfactory to the Bank for all national competitive bidding. Site-specific technical measures will be determined by site characteristics (which are investigated by detailed environmental monitoring) and risk assessment. Environmental monitoring will also be conducted during the demonstrations and after completion, to verify demonstration effectiveness.
4. ***Procurement of Goods, Works and Non-Consulting Services****.* The project will provide financing to heavy metal pollution source control measures (mainly field infrastructure investments for clean water supply) under subcomponent 1 (a); Office equipment and equipment for project management information system under component 4. Procurement activities will be carried out by PPMO or CPMUs for their investments in the respective jurisdictions using the Bank’s standard bidding documents for all international competitive bidding contracts and national model bidding documents, agreed with or satisfactory to the Bank for all national competitive bidding.
5. ***Selection of consultants.*** The project will finance consulting services for improving agricultural environmental monitoring and management capacity to orderly, precisely and sustainably manage agriculture land pollution under component 2 and technical assistance for heavy metal discharging enterprises under component 3. Procurement activities will be carried out by PPMO and/or CPMUs. The Bank’s standard request for proposal will be used for all competitive selection of firms. Universities and research institutes may be included in shortlists as a source of consultants, provided they possess the relevant qualifications and they are not in a conflict of interest situation. In such cases, Quality-Based Selection (QBS) or Selection Based on Consultants’ Qualifications (CQS, for small assignments) will be used, if the shortlist also includes consulting firms.
6. ***Training and workshops****.* Plans for training and workshops will be developed by the PMOs, and included in annual project work plan. Expenditures incurred in accordance with the approved plans for training and workshops will be the basis for reimbursement.
7. ***Procurement Plan****.* A consolidated Procurement Plan for the initial 18 months of project implementation of the three counties (Yongding district of Zhangjiajie Municipality, Hengyang and Yongxing counties) was prepared by the each CPMU and consolidated by PPMO. The procurement plan of other eleven counties will be prepared when the project activities have been determined and subject to the Bank’s approval. The plan will be made available in the project’s database and on the Bank’s external website. The Procurement Plan will be updated annually or as required to reflect implementation needs.
8. ***STEP.*** The Bank’s on-line tool for systematic tracking of exchanges in procurement will be used for monitoring and updating the procurement plan and assessing the Bank’s and client’s performance in the execution of the procurement activities under this project. All requests for no-objection, procurement comments and clearances will be processed through STEP. PPMO and CPMUs will be trained in the use of STEP.
9. ***Frequency of Procurement Supervision****.* Prior review supervision will be carried out through the World Bank office in Beijing. Procurement post reviews will be carried out by the Bank and/or by external auditors in accordance with terms, conditions, and reporting procedures acceptable to the Bank every 12 months. The procurement post review sampling ratio will be one out of fifteen contracts.
10. ***Prior-Review Thresholds.*** The prior-review thresholds are indicated in the table below:

Thresholds for Procurement Methods and Prior Review

| **Expenditure Category** | **Contract Value Threshold (USD)** | **Procurement Method** | **Prior-Review Threshold (USD)** |
| --- | --- | --- | --- |
| 1. Goods and Non-Consulting Services | ≥10,000,000  <10,000,000  <500,000  None | ICB  NCB  Shopping  Direct contracting | All  ≥2,000,000  Not applicable  ≥2,000,000 |
| 2. Works and Supply and Installation of Plant and Equipment | ≥40,000,000  <40,000,000  <500,000 | ICB  NCB  Shopping | All  ≥10,000,000  Not applicable |
| 3. Consulting Services | ≥300,000  <300,000 | QCBS/QBS/FBS/LCS  CQS  Individual consultant  Single-source selection (firm)  Single source selection (individual) | ≥1,000,000  N/A  ≥300,000  ≥1,000,000  ≥300,000 |
| Non-engineering measures under component 1(b),(c),(d),(e) & (f) | No threshold | Community participation | Not applicable |

*Note:* ICB = International Competitive Bidding; NCB = National Competitive Bidding; DC = Direct Contracting; CP = Community Participation in Procurement; QCBS = Quality- and Cost-Based Selection; QBS = Quality-Based Selection; CQS = Selection Based on the Consultants’ Qualifications; FBS = Selection under a Fixed Budget; LCS = Least-Cost Selection; SSS = Single Source Selection; IC = Individual Consultant

*Environmental (including safeguards)*

1. This project aims to demonstrate the risk-based approach to manage contaminated farmlands and thus has significant positive environmental and social benefits for all stakeholders involved. The impacts of the proposed project mainly include four aspects: impacts related to the construction of small scale civil works, potential impacts from upstream or nearby pollution sources, potential impacts caused by comprehensive agronomic control technologies, and social impacts of the project activities. However, the heavy metal pollution sources could be harmful to the environment and community health if not well managed, especially if the contaminated rice products was sold to the market, it will cause serious social risks and health risks on the public. Therefore, the project is classified as Category A according to OP 4.01 on Environmental Assessment.
2. During the project preparation stage, three counties were selected as the pilot for the first year. The remaining counties will be decided during the implementation of the project, and therefore an ESMF and three counties’ ESIAs (ESMPs) for the first year implementation were prepared by a certified Environmental Assessment institute in accordance with domestic and World Bank requirements. A separate Social Assessment was prepared to address the social impacts of the project, and the relevant context was included in the ESIAs (ESMPs). ESIAs (ESMPs) for the remaining participating counties will be prepared during project implementation following the ESMF, when they are confirmed. The ESMF includes the overall project description, an analysis of key environment and social risks of the project, a robust screening process for each farmland to be supported under the project, TOR for the preparation of ESIAs (ESMPs) of the participating counties. The ESMF has been prepared, which specifies procedures for the selection of counties and sites, for the environmental and social safeguards documents preparation as per requirement of World Bank safeguards policies, WBG EHS Guidelines, and national laws/regulations.
3. The three counties’ ESIAs (ESMPs) analyze adverse environmental and social impacts of the project, it includes the ECOPs to address the impacts of small scale civil works (air, noise, wastewater and solid wastes), the construction of the irrigation canals involves the dredging of the sediments of the irrigation canals, the dredged sediments that exceeds the Class III of the Soil Environmental Quality Standard will be transported to the sanitary landfills for disposal. The impacts of the agronomic activities were addressed by sound management of lime, inactivated materials, organic fertilizers in terms of quality and quantity, health and safety measures for the workers, and collection and disposal of the pesticides packages. The social impacts of the project was addressed by SA with mitigation measures incorporated into ESIAs (ESMPs), including the compensation for change of planting structure in high risk project areas, and sound management plan for the contaminated rice; the due diligence review for the associated possible heavy metal pollution sources were conducted and the mitigation measures were included in the ESIAs (ESMPs), including closure or relocated industries in Yongxing County, to ensure that the environmental and social risks are appropriately managed. The ESIAs (ESMPs) include both the ECOPs and the site specific impacts and mitigation measures. All mitigation measures related to contractors will be included in the bidding documents and the corresponding contracts.
4. The ESIAs (ESMPs) includes ECOPs to address potential negative impacts associated with the activities under Component 1. These ECOPs are prepared based on national norms, practices proven in other World Bank-financed projects, and the practices recommended in the Environmental Health and Safety Guidelines of the World Bank Group. They specify all aspects of environmental management issues during the whole project cycle, including, but not limited to, site preparation, erosion control, construction dust management, air pollution control, noise impact control, water pollution control, waste management, public and workers’ health and safety, and consultation for environmental aspects. It also includes the reporting and supervision arrangements for the implementation phase of the project. Chance finds during contaminated land remediation engineering work or soil management engineering work may occur and relevant clauses will be included in all bidding documents and construction contracts.
5. A detailed environmental monitoring program was prepared and incorporated into the ESIAs (ESMPs), which is consistent with the national requirements, as well as in compliance with the World Bank requirements and international best practices on agricultural pollution monitoring. It details environmental monitoring for operational phases, including parameters to be monitored, locations, frequencies, monitoring agency, and budget estimates. The environmental monitoring has been integrated and budgeted under Component 2 of the project.
6. To enhance positive and long-term environmental benefits of the project, mitigation measures for the identified adverse impacts have been integrated into the project design, construction, and operational plans. Public consultation on ESMF and ESIAs (ESMPs) was undertaken, with project information being disclosed at project villages, communities, and government websites before public consultation. The ESMF and ESIAs (ESMPs) incorporated countermeasures to address the concerns of the stakeholders who were consulted. With implementation of the proposed mitigation measures, the potential adverse impacts will be avoided, eliminated entirely, or mitigated to an acceptable level.
7. Component 2 will also support integrated pest management (IPM) measures. The policy is therefore triggered. A PMP acceptable to the World Bank has been prepared to describe the range of pest and disease control and management methods, pesticide management organizations, and their respective responsibilities in the project areas, emphasizing IPM approaches and the scope of the recommended application under various conditions. The PMP also provides a list of fertilizers, pesticides, and herbicides that may be required under the project in compliance with the World Health Organization’s recommended categories. The PMP includes detailed provisions for training for project stakeholders and a monitoring program. Implementation of the training and monitoring programs was budgeted in the project cost.
8. Through site survey, a total of 13 reservoirs are identified to trigger the OP 4.37 Safety of Dams in the three pioneer counties of the project. The dams will provide irrigation water to the project areas, and the failure of these upstream dams could cause extensive damage to or failure of some of the investments under the Project. Among them, there are 7 in Yongding District of Zhangjiajie City and 6 in Yongxing County of Chenzhou City.
9. The government, as the owner of these dams, has completed the remedial works of the dams. The dam safety evaluation report prepared by the independent dam safety experts indicates that the remedial works for the reservoir are in compliance with the domestic technical specifications and the completed works meet the relevant standards. All the dams are operationally safe. The client has prepared a dam safety action plan to improve operation and maintenance of these dams based on recommendations by the Bank and a Dam Safety Expert (DSE). During project implementation, the dam owners will prepare a dam safety report setting forth the safety status and operation and maintenance of these dams and the implementation of the dam safety action plan to ensure that the Project complies with the Bank’s Safeguard Policy on Safety of Dams.
10. **Public consultation and information disclosure.** During the preparation of the ESMF, ESIAs (ESMPs), and PMP, public consultations—including expert consultations, questionnaires, meetings, and interviews—were conducted with different stakeholders of the proposed project. This included persons of different gender, socioeconomic and educational backgrounds, groups, and occupations. The project information was disclosed at project towns/villages, communities, and government websites in September 2015, January 2016, and during July to August 2016 respectively. The majority of those consulted expressed strong support for the project. The ESIAs (ESMPs) incorporated countermeasures to address the concerns of the people consulted.
11. In accordance with the World Bank’s information disclosure policy, on November 7 2016, the ESMF, ESIAs (ESMPs), and PMP were disclosed in the project areas and on websites of the local government agencies and made accessible at the PMOs. The ESMF, ESIAs (ESMPs), and PMP were also disclosed at the World Bank’s InfoShop on November 8, 2016.

*Social (including safeguards)*

1. As the project takes a framework approach, social assessment has been done for the first batch of two project counties and one district which are Hengyang, Yongxing and Yongding, 5 project areas at administrative village levels in each of the three counties. The rest project sites out of total 15 counties will be determined during project implementation and the rest village level project sites can only be selected according to the selection criteria of the project. The social assessment has been done by professional consulting team with public consultation in 6 villages of 3 counties. To address social risks and impacts, three main social documents have been prepared, including a SA report, an environment and social management framework which include an ethnic minority development plan framework (EMDF) and a resettlement policy framework (RPF) and an employee resettlement plan framework (ERPF).
2. The Project is expected to have significant positive social impacts on local community and residents using or living near the contaminated sites after their farming land pollution is improved. The project is also expected to have limited negative social impacts on local community and residents in terms of affecting people’s non-land economic incomes. The social impacts will be mainly related to changing cropping systems and from grain crops to other plants. The scale of such change will be small, only 49 ha of land in the first three pilot counties will change from grain crops to other crops like orange and cotton. In some contaminated areas grain crops may be changed to fruit trees, the latter may not generate income for farmers in the first couple of years before it provides fruits. These impacts will be mitigated through subsidies and other suitable income maintenance and livelihoods restoration. Project civil works are in small scale on village land with no need to change to land ownership, such as village level small irrigation canals and ditches which are usually constructed through land readjustment among villagers within the same village, for the works belong to the village and used by all villagers as a common practice in China. There is no need to demolish any ground structures for project civil works. Farmers will be mostly allowed to change to other agricultural activities without significant impacts on their livelihoods. The project will apply a subsidy policy to subsidize farmers in shifting cropping system for the situation where new crops such as cotton, fruit trees would generate less income than the old crops until such an income is restored. This subsidy policy will be implemented in the project as detailed in the ESMF.
3. In terms of presence of ethnic minority, although there are some ethnic minorities of Tujia, less than 200 Bai and 13 Miao people by the Chinese ethnic criteria in Yongding district in the first batch of project sites, yet these three minorities have long been well integrated with the majority Han people, live scattered amongst dozens of villages. They do not fit the definition of the Bank IP term according to a detailed social assessment. Thus the Bank OP/BP4.10: Indigenous People is not triggered for the first three pilot counties. However, since natural villages in all project sites has not been firmly determined and specific affected households and people were not determined. The presence of IP by the Bank definition cannot be ruled out at project appraisal, the social assessment based upon the first three project counties and district have not come to a conclusion on whether there is presence of ethnic minority people or any involuntary resettlement (mainly resulting from changes to cropping system) under the project. To take a cautious approach, the task team concludes that both Op. 4.10 and Op 4.12 policies are triggered in order to address any possible presence of ethnic minority by the Bank IP definition and involuntary resettlement during project implementation.
4. The social management framework as part of the ESMF includes an RPF, EMDF (also called IPPF) and an employee resettlement plan framework (ERPF). The ERPF is prepared for any future cases of employee retrenchment by enterprise relocation or closure in project sites. These social instruments have set out the principles, rules, guidelines and procedures to assess the social risks and impacts as per the World Bank safeguards policies and national laws/regulations. The PMOs are required to report and monitor potential social risks, such as issues emerging from involuntary resettlement, ethnic minority development as well as other social aspects regarding project affected people and communities during project implementation. Monitoring and evaluation will be done by professionals and reports will be submitted to the Bank team on an agreed regular basis. As necessary, PMO will also take actions to implement the ESMF to address social risks and impacts, with the Bank team’s and professional social consultants support, the PMO will provide training for county PMOs and other project implementing units on social safeguards.
5. In accordance with the Bank’s information disclosure policy, on 7 Nov. 2016 the ESMF, ERPF and IPPF (also named EMDF) were disclosed in the project areas and on websites of the local government agencies, and made accessible to the public by the PMOs. These social safeguards instruments were also disclosed by Bank's InfoShop on 8 Nov. 2016.
6. **Gender aspects.** As the project will reduce the pollution levels in demonstration sites, it is expected to reduce health risk on nearby residents, both female and male. While quantifying health impacts arising from soil pollution is difficult, scientific studies show that exposure to certain contaminants found in the soil has serious health impacts on both men and women. Exposure to certain contaminants is known to result in more serious impacts on women’s and children’s health. For example, arsenic (contaminant found in the pilot cleanup site can cause serious gastrointestinal tract, skin, heart, liver and neurological damage, diabetes, bone marrow and blood and cardiovascular disease. But it causes additional danger for pregnant women with increased risk of miscarriage, still-birth and premature birth. Likewise, children are particularly at risk from adverse effects of lead exposure, and studies carried out in Iraq (Greenwood, 1985) showed that children whose mothers ate bread made from grain treated with a fungicide containing mercury when they were pregnant were the worst affected. As part of the M&E system, the Project will measure the number of people (male and female) positively affected by the project. Social and gender equality has also been considered through participation of men and women during consultations of project sample sites. Such an approach to gender equality will also be applied to compensation of affected male and female people related to the project temporary and permanent land acquisition and resettlement during project implementation. Specific gender responsive measures will be documented in the environment and social assessment report for each site.
7. **Citizen engagement.** This is a key aspect considered in the project social assessment (SA): consultation activities included field investigations with relevant government agencies, group consultative meetings with project communities and people, more than 600 questionnaires were collected from the surveys across 6 villages in three project counties. Public consultation has and will continue to draw on local people’s engagement and feedback in line with the project objectives. Consultations will be continued with local residents (both men and women) on the needs for awareness and skill training associated with the project-led changes to farming activities, village-based organizations such as village monitoring committees in polluted farm land management. Public consultations will be further held for the selection of locations for farming facilities, e.g., village irrigation canals. Grievance redress mechanism will be established for affected people in the project. Information on potential social impacts, community development, and planned mitigation measures will be shared with the public. Citizen engagement will also be reflected in the project Results Framework, through the following indicators: i) share of beneficiaries reporting that they were consulted in farm land pollution management; ii) portion of affected villagers in highly contaminated project sites reports that adequate subsidies are received.

*Monitoring & Evaluation*

1. The progress toward the PDO will be monitored by the project indicators in annex 1. Data on these indicators will be collected by the PPMO and the county PMUs from project beneficiaries, stakeholders, and contractors. Additional studies will be made, if necessary, to obtain evidence-based data for justifying achievement of the PDO. The PPMO and county PMUs will carry out regular supervision and inspection of project outcomes. Capacity building on project management will be provided to the PPMO and county PMUs as needed. M&E costs are included in Component 4. A midterm review is expected to be carried out in 2020.
2. **Reporting requirements.** Project reporting requirements are at three levels: (a) overall project level, (b) county level, and (c) demonstration level. At the overall project and county levels, the PPMO and the county PMUs will be responsible for preparing the following reports, and the PPMO will provide the consolidated reports to the World Bank:
3. **Annual work plans and budgets.** These will provide a complete overview of all activities of project components to be carried out within the next calendar year. They should include an estimated budget for each activity and expected disbursement for the related calendar year. The annual work plans and budgets will also provide an update on achievements and lessons learned from the previous year, including progress on project indicators and disbursements in the previous years. These annual work plans and budgets will be prepared in accordance with the format agreed among the PPMOs, the county PMUs, and the World Bank and provided annually to the World Bank by March 1.
4. **Semiannual IFRs.** These reports are to be submitted to the World Bank half yearly, not later than 60 days after the end of each semester. The semiannual FM reports will be prepared in accordance with the format agreed with the World Bank.
5. **Semiannual project progress reports.** These progress reports, including progress on safeguard instruments implementation, will be prepared by the PPMO and submitted to the World Bank by February 28 and August 31 of every calendar year. The semiannual progress reports will be prepared in accordance with the format agreed with the World Bank. As part of the progress reports, implementation progress on county ESMPs will be prepared as well for Component 2 demonstrations.
6. **Annual financial audit report of the project account.** Annual financial audit reports of the project account should be prepared by independent qualified financial auditors on a calendar year basis. The annual audit reports should be made available to the World Bank by July 1 of every calendar year.
7. **Project completion reports.** The PPMO will prepare a completion report for the overall project. The county PMUs will prepare a completion report for their activities respectively. All these completion reports are to be submitted to the World Bank not later than three months after the project closing date stipulated in the project loan agreement.
8. For reporting at the demonstration subproject level, the county PMUs will be responsible for providing a site-specific completion report for each demonstration site to the PPMO and the World Bank. The report should include information on the farmlands, implementation entity, technical options, clean or contaminated farmland managed (ha) (core sector indicator), heavy metal in crops and soil reduced, environmental and social impacts mitigated, demonstration duration, verification, affected farmers and other indirect beneficiaries, future plans to maintain the outcomes, potential economic and social benefits, and others as requested. Such a demonstration subproject completion report should be submitted to the World Bank within three months after completion. PowerPoint presentations, photos, or videos are recommended for recording the demonstration process and completion.

# Annex 4: Implementation Support Plan

**CHINA: Hunan Integrated Management of Agricultural Land Pollution Project**

**Strategy and Approach for Implementation Support**

1. The objective of the implementation support plan is to ensure that (a) the objectives of the project are satisfactorily achieved by the project end and (b) implementation of all project activities follows agreed procedures and complies with all fiduciary and safeguard requirements. The plan takes into consideration the nature of the project and the identified project risks. As the overall implementation risk is rated Substantial and individual risk categories are rated either Low or Moderate except for technical design, stakeholder, implementation agency capacity, and environmental and social safeguards (which are rated Substantial), the focus of the World Bank implementation support will be knowledge transfer on risk-based approach, on stakeholder engagement, implementation agency capacity building, and social and environmental management.

**Implementation Support Plan**

1. **Risk-based land management.** The risk-based land management, that is, controlling risks through soil and crop management to reduce the impact of soil pollution by heavy metals on the quality of rice, is clearly quite a step away from the classical method of using a single food standard. All stakeholders involved will need to understand what it means and why, what needs to be done, and how it can be done under the project. If successful, the project will have a transformational impact in addressing agricultural soil polluted with heavy metals in Hunan and other provinces in China.
2. In various parts of the world, not only in Asia but also in the European Union and the United States, risk-based land management is already implemented in policy or tools that can be used to assist in decision making on the safe use of agricultural land have been or are being developed. This is often based on the development of practical relationships that link the quality of crops to that of the soil (that is, to be applied using readily available data from soil maps or monitoring networks). In countries like the United Kingdom or the Netherlands, such soil-to-crop relationships are already implemented in the tools for calculating the exposure of human beings to contaminants. Such relationships can be used to define areas at risk that is, areas where based on the measured soil data, the predicted levels in rice can be expected to exceed the current food quality criteria. This approach has been applied for many types of crops, including rice, as was documented for the case in Taiwan, China (Römkens et al. 2009) and more recently also for vegetables (Lin et al. 2015). During project preparation, the World Bank team will continue to facilitate knowledge exchange and experience-sharing events to bridge international good practices and local needs. The project has also designed substantive international and national training for Hunan Government officials and management staff to systematically understand risk-based land management concepts and economic benefits from pollution prevention at the source. Farmers will also be educated on these concepts and trained and engaged on sustainable soil management.
3. **Stakeholder engagement.** During preparation, consultations were made to address the risk that the project will involve several local government agencies at the provincial and county levels, coordination among these agencies could be difficult and poor, and responsibilities and roles in the agricultural land management process could be hard to define. Monitoring of this issue will continue during project implementation. The World Bank team will encourage regular meetings of the PSC at the provincial level and the PLG at the county level during implementation, to report and review project progress and issues to achieve the PDO. World Bank supervision will ensure that the institutional arrangements agreed at appraisal are maintained and continue to function effectively. The project activities in Chongqing and Liaoning: Development of Administrative Measures for Contaminated Sites will further clarify and define agencies’ roles and responsibilities for managing contaminated sites. Experience and lessons will be shared at the training workshops on site cleanup or at the project completion workshop.
4. **PPMO and county PMUs’ capacity**. County PMUs have no World Bank project experience. During project implementation, the World Bank will continue to provide capacity-building support to the PMO and PMUs, focusing on project management, fiduciary control, and monitoring and inspection of project activities.The World Bank will also review and supervise the preparation and implementation of farmland management demonstration plans and capacity-building activities included in the project Components 1 and 3.
5. **Environmental and social management.** The World Bank will regularly review the proper implementation of the ESMF and county ESIA (ESMPs). The World Bank team will also review the EMSP for each site and provide training on environmental and social safeguard requirements.
6. **M&E.** In addition to reviewing and verifying project progress reports provided by the provincial PMO, the World Bank will carry out field visits to demonstration farmlands during implementation support missions, conduct annual evaluation of project progress and intermediate results, and maintain an internal reporting system.
7. Tables 4.1 and 4.2 summarize the implementation support and the resources needed during different stages of the project.

Table 4.1. Implementation Support Needed

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Time** | **Focus** | **Skills Needed** | **Resource Estimate** | **Partner Role** |
| First 24 months | * Implementation of appraised land management demonstration plans * Preparation of land management demonstration plans in new counties * Development risk-based land management tool * Initiate most activities under Components 2 and 3 * Project progress reporting * Environmental and social safeguards * FM and procurement | Technical skills,  World Bank policies | US$250,000 | Partner with Netherlands to be explored |
| 25–80 months | * Contaminated land management demonstrations * Activities under Components 2 and 3 * FM and procurement * Environmental and social safeguards * Project progress reporting * Project completion | Technical skills,  World Bank policies | US$500,000 |

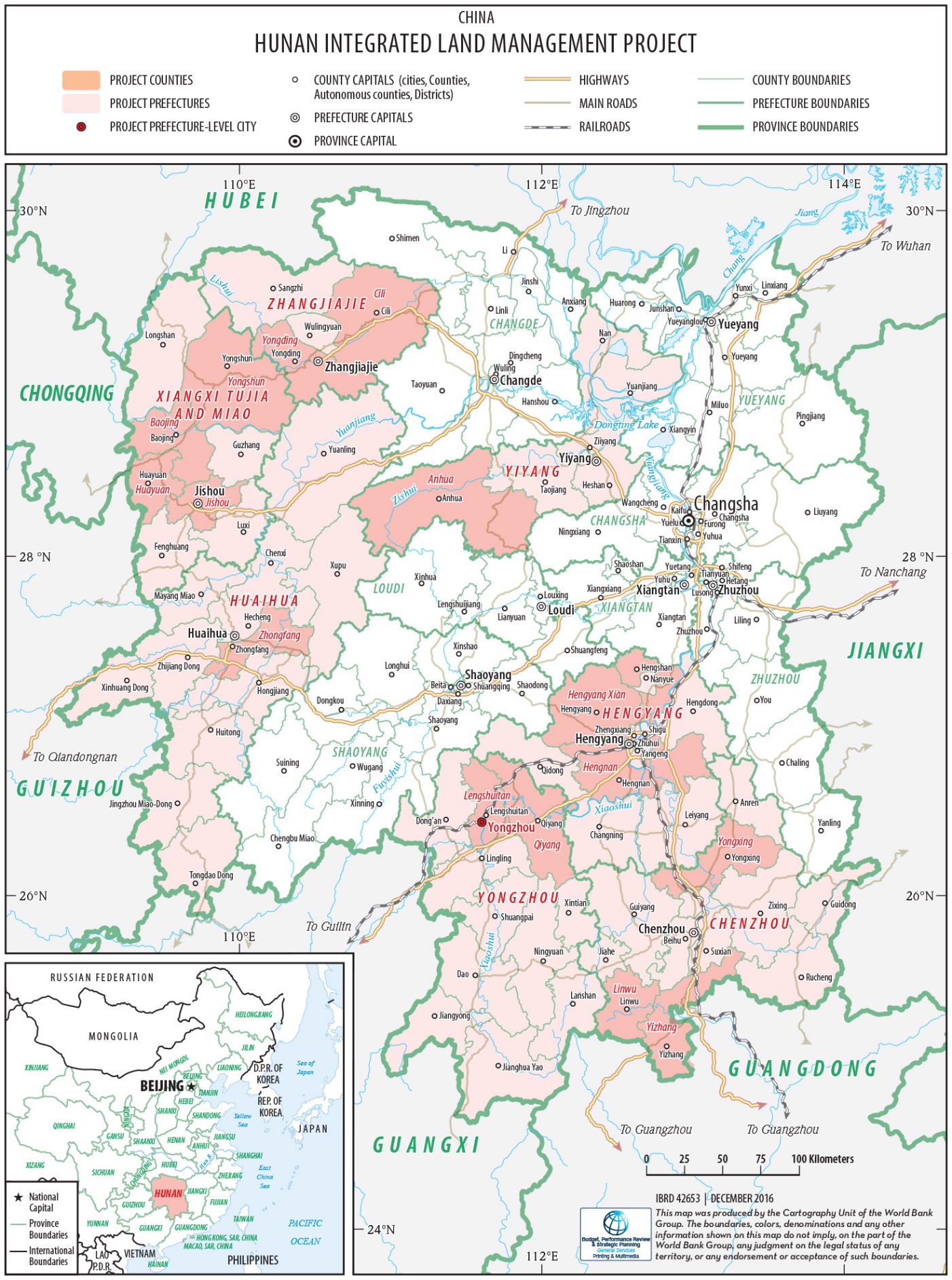
**Table 4.2. Skills Mix Required (2017–2023)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Skills Needed** | **Number of Staff Weeks** | **Number of Trips** | **Comments** |
| Environmental quality and food safety, soil science technical experts | 4 | 2 | Annually |
| World Bank safeguard policy | 3 | 2 | Annually |
| World Bank FM policy | 2 | 1 | Annually |
| World Bank procurement policy | 2 | 1 | Annually |
| Logistics management at Washington, D.C. and Beijing office of the World Bank | 2 | — | As needed |

# Annex 5. Project Financial and Economic Analysis

|  |  |
| --- | --- |
| 1. **Project's development impact** | |
| 1. Management of agricultural land pollution will benefit environment, natural resource, food safety and human health and provide long term investment induced by diversified potential reuse of the lands, including added-value farm products. The lessons learned in the project will also benefit other provinces in China and may benefit other developing countries with similar problems and challenges.   **II. Rationale for the Involvement of Public Financing**   1. Pollution liability has been a main barrier to making decision on who should pay for site cleanup and land remediation. China has set up “polluter pays principle”, but it has been very hard to apply this principle to cleanup and remediation due to high cost, and in collectively owned agricultural land. The government funds tend to be used especially for emergency removal cases and abandoned sites and land. International experience shows that in many cases contamination stems from decades of poor environmental management and uncontrolled waste disposal, often from actors that were state-controlled or were acting at a time when environmental legislation and awareness did not exist or were poorly developed. Hence, generally, these legacies are considered as public responsibilities or it is concluded that there are simply no legal instruments to divert remediation costs to the private sector, especially because it is difficult to assign direct responsibility for land contaminated by air borne and water borne pollutants.   **III. Value Added of the Bank Support**   1. The Bank has been supporting China and other countries through its Trust Fund and Bank Budget resources to raise awareness of land pollution, build capacity, prepare and implement GEF projects addressing POPs contaminated sites since 2002. Given its extensive engagement in China on issues relating to food safety and agricultural pollution control, the Bank has also positively contributed to the much larger scale government efforts in these areas by sharing international good practices and piloting site-specific pollution reduction measures through the Bank’s lending operations, such as Jilin Food Safety, Guangdong Agricultural Pollution Control projects, and Shanghai Agricultural NPS Pollution Reduction which would be scaled up for much wider impact Therefore, the Bank’s support would add values in terms of the development and up scaling of good practices on contaminated land/site management, investment financing, and long-term engagement with the country in ensuring food security and safety. The proposed project is fully consistent with the Bank’s County Partnership Strategy (CPS) for 2013-2016 (Report No. 67566-CN) dated October 11, 2012, and in line with the Strategic Theme One of the CPS, Supporting Greener Growth. The proposed project will contribute to several outcomes under this theme: demonstrating pollution management measures and sustainable natural resources management approaches, promoting sustainable agriculture practices, and enhancing urban environmental services. The project will also contribute to the World Bank’s Group’s goals of ending extreme poverty by 2030 and boosting shared prosperity, especially the bottom 40% of the population has currently limited access to information and are relatively more exposed to degraded or contaminated areas than other population groups, through establishing a risk-based management framework and road maps. 2. The project is in line with the Soil Ten Provisions. It is an integral part of Hunan’s efforts to improve the quality and safety of its agricultural product areas, and also the part of the national efforts to reduce heavy metal pollution under the 12th Five Year Plan on Integrated Prevention and Control of Heavy Metal Pollution. Hunan is one of the 14 key provinces selected under the Plan. The project will contribute to sustainable agriculture in Hunan and China.   **IV. Project Benefits and Costs**   1. In comparing “with project situation” with “without project situation”, the incremental quantifiable benefits are values of the safe agricultural produce from the project. Other significant but not readily measurable benefits include: (i) improving the soil fertility and efficiency of land resources; (b) reduction of health hazards; (c) reduction of fertilizer and pesticide use to contribute to carbon reduction; and (iv) promoting the Province’s reputation and agriculture competitiveness. The total project costs will be included in the analysis as the project benefits are accrued from successful implementation of all the project interventions combined. 2. In the ERR/NPV calculations, the economic prices of the polluted agricultural produce are valued at zero, which is actually a conservative assumption as they could be negative if the bad externalities, such as negative health impact, are internalized. No conversation factors have been used to adjust financial prices to economic prices as the current stage of trade liberalization in China does not suggest significant price distortions.   **V. Financial Analysis**   1. A framework approach has been adopted to streamline project preparation and implementation and provide lessons which will benefit the design and implementation of the remaining investments. For the first tranche of 3 counties for implementation, specific project activities have been identified and appraised, while the project activities for the subsequent counties will be selected during the implementation of the first tranche to incorporate the lessons learned. 2. Based on the proposed site-specific project interventions, crop budgets have been prepared to gauge the income changes from project interventions by comparing them with those from “without project situation”. The analysis has included various degrees of polluted agricultural land ranging from the light to heavy based on technical specification as contained in the detailed project descriptions. Initial results have shown that farmers’ income would be reduced (from 3,300- 6,000 Yuan/ha depending the pollution degree) due to costs related to required additional inputs for improved varieties (alternative crops in the case of heavy polluted areas), irrigation and acidity control, which justify the subsidy policy to provide financial incentives for farmers’ participation in the project. Detailed income changes by site- specific inventions by county, and accordingly, the proposed subsidies are available in each of the three county FSRs. 3. The bottom line is to ensure that the net income of farmers will not be reduced in comparison with the “without project situation”. This will entail providing location specific financial incentives at appropriate level to farmers. In this context, the estimated compensation mainly in the form of subsidy will be provided to the farmers participating in the project. Specifically, subsidies are considered for affected farmers at about 3,300 Yuan/ha for light risk areas, 4,600 Yuan/ha for medium risk area, and 6,000 Yuan/ha for heavy risk areas which may be used partially for subsidies for alternative crops, such as citrus or grape with no income from harvest in the first couple of years.   **VI. Economic Analysis**   1. **Economic Internal Rate of Return (EIRR).** EIRR has been calculated by county. Incremental economic benefits only include the safe agriculture produce generated from project interventions, as the unsafe produce under without project situation are economically valued at “zero” ( see Section above on Project Benefits and Costs); while the project costs cover (i) the incremental costs of VIP inputs ( calculated from comparison of crop budgets under “without project” situation and “without project” situation) in the project area, and (ii) institutional capacity building and project management and evaluation. The aggregated economic cash flow of the project by county, shows an Economic Internal Rate of Return (EIRR) of 17-20%, with weighted average for the province at 18%. Per latest Bank guidelines, the opportunity cost of capital (OCC) is set at 6%, which happens to be in line with NDRC’s established discount rate for environment sector projects in China. Thus the project is economically viable. Details of the analysis and cash flow tables are in the county FSRs which will be available in project files. 2. **Sensitivity analysis**. The EIRR calculation is based on all costs incurred but on benefit side, only agriculture produce (readily quantifiable) was accounted for, leaving out significant unquantifiable environmental and health benefits (see Section above for Project Benefits and Costs). As such the EIRR of 18% should be treated as an extremely conservative estimation of the rate of return, no sensitivity test is therefore warranted.   **VII. Fiscal analysis**   1. As the project investments are for public goods have little revenue generation, fiscal impact analysis of the project has conducted to ensure that the selected counties have sufficient financial resources to cover: (a) counterpart funds; and (b) loan repayment. 2. The Hunan Provincial Government will provide 78% the counterpart fund for the project. County level fiscal analysis of the past three years indicates that all participating project counties have sufficient financial resources to contribute counterpart funds (which is a minimal Yuan 0.5 million each year during project implementation mainly for project management) and service debt incurred under the project. In all three counties, the Bank project debt service constitutes only a very small fraction of total government project budget expenditure (estimated from 0.1-0.7%). All the project county counties therefore are in a good fiscal position to service the Bank loan. |

# Annex 6. Project Map-CHN42653

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1. Huiying Zhang, et al. 2015. “Impact of Soil Heavy Metal Pollution on Food Safety in China.” [↑](#footnote-ref-1)
2. The survey was carried out from April 2005 to December 2013 and covered all agricultural land, partial forest land, grassland, unused land, and construction land with a total area of about 6.3 million km2. On April 17, 2014, a communiqué was jointly issued by the MEP and Ministry of Land and Resources regarding the results of the survey. [↑](#footnote-ref-2)
3. Five key heavy metals, among others, to be controlled under the plan: lead, mercury, cadmium, chromium, and arsenic. [↑](#footnote-ref-3)
4. Safe Agricultural Product Area in China refers to farms for the production of raw or primary processed agricultural products whose production environment, process, and quality are certified to meet related national standards and guidelines. [↑](#footnote-ref-4)
5. Hunan has abundant rainfall. Soil acidification leads to gradual increase in heavy metal activity in soil, thereby increasing heavy metal accumulation in rice. [↑](#footnote-ref-5)
6. China National Environmental Quality Standards for Soils, GB 15618-1995, effective on 1 March 1996. [↑](#footnote-ref-6)
7. Highly contaminated area: pollutant concentration is five times more than the soil standard; medium-contaminated area: pollutant concentration is between three to five times more than the soil standard; low-contaminated area: pollutant concentration is between one to three times more than the soil standard. [↑](#footnote-ref-7)
8. Xiang River is the mother river of Hunan, which stretches across eight municipalities (Changsha, Zhuzhou, Xiangtan, Hengyang, Chengzhou, Loudi, Yueyang, and Yongzhou). About 40 million people live along the river and 70 percent of the provincial medium and large enterprises are located in the basin area. [↑](#footnote-ref-8)
9. The mass of heavy metal accumulated in rice straw is estimated as 6–12 times than that in rice, according to the national experts. [↑](#footnote-ref-9)
10. China National Environmental Quality Standards for Soils, GB 15618-1995, effective on 1 March 1996. [↑](#footnote-ref-10)
11. Based on the Chinese soil experts’ experience and expertise. [↑](#footnote-ref-11)
12. Based on the 1995 national soil standard and local experience in Hunan. More soil samples should be taken to properly determine the soil risk level. [↑](#footnote-ref-12)
13. Phytoextraction is a process where plant roots uptake metal contaminants from the soil and translocate them to their above-soil tissues. A plant used for phytoremediation needs to be heavy metal tolerant, grow rapidly with a high biomass yield per hectare, have high metal-accumulating ability in the foliar parts, and have a profuse root system and a high bioaccumulation factor. A serious challenge for the commercialization of phytoextraction has been the disposal of contaminated plant biomass, especially in the case of repeated cropping where large tonnages of biomass may be produced. The biomass has to be stored, disposed of, or utilized in an appropriate manner so as not to pose any environmental risk. [↑](#footnote-ref-13)
14. An environmental monitoring plan has been prepared and will be followed by all participating counties. [↑](#footnote-ref-14)