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**GEF SHANGHAI AGRICULTURAL AND
NON-POINT POLLUTION REDUCTION
PROJECT
ENVIRONMENTAL MANAGEMENT PLAN
(EMP)**

EAST CHINA NORMAL UNIVERSITY

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Shanghai is the most economically developed and the most populated city in China. At the end of 2007, Shanghai had a population of 18 million across its 6340.5 km² of land. The suburban area beyond the outer ring is an important production base for agriculture and industry of Shanghai. N, P and organic matters discharged to water bodies in suburban area account for 60-70%, mainly from agriculture and animal husbandry, agricultural chemicals and surface runoffs including rain runoff and farmland irrigation water drainage, livestock and poultry manure and untreated industrial and domestic wastewater are the major causes for eutrophication of water bodies. Non-point pollution has become a major form of pollution for the water environment of Shanghai. Contaminated surface waters draining into Huangpu River and Yangtze River impose an adverse impact on the two rivers that we cannot afford to neglect. As the municipal drinking water source protection area upstream Huangpu River suffers from increasingly heavier contamination of water in recent years, the development of the higher-quality new Qingcaosha municipal drinking water source has to be accelerated. To reduce land-based pollution of offshore waters of Yangtze River Estuary, improve natural and ecological environment of Shanghai, and eliminate the conflicts between agricultural and non-point pollution in Shanghai and its objective of becoming an environment-friendly city, Shanghai Municipal Government cooperates with the World Bank, the PIU of GEF, to seek a feasible new approach to pollution reduction in relation to the non-point pollution in suburban areas where the economy experience ongoing growth, and to find solutions for difficulties in regional economic growth and urbanization.

In November 2007, GEF approved the Shanghai Agricultural and Non-Point Pollution Reduction Project (SANPRP). The Ministry of Finance of China entered into the Shanghai GEF Project Preparation Grant (PPG) Agreement on June 24, 2008. The project is invested in jointly by Shanghai Municipal Government and GEF and implemented by Shanghai Municipal Government. The project consists of a series of environmental protection demonstration components aiming at mitigating agricultural and non-point pollution, reducing pollutants discharged via runoffs into Huangpu River and Yangtze River, and protecting and improving water environment.

The EMP was prepared based on the GEF SANPRP Environmental Impact Report and feasibility study reports of sub-projects. The EMP, as a separate document, involves the implementation plan for environmental protection in construction and operation phases of the Project, and provides a code of conduct and working framework for environmental pollution mitigation solutions and environment monitoring.

1.2 OBJECTIVES OF THE EMP

Environmental impact assessment is mainly intended to identify potential environmental impact factors in construction and operation of the Project and predict the levels of impacts by means engineering analysis, prediction and assessment. It also proposes and develops a series of technically feasible, financially sustainable and practical environmental solutions. The EMP assures proper implementation of measures in respect of environmental solutions, environment monitoring and environment management organization to be used in construction and operation of the Project, thereby avoiding, reducing and controlling adverse impact of the Project on the environment, and put forwards action plans for implementing these environmental impact mitigation measures.◦

1.3 ORGANIZATION OF THE EMP

The ensuing chapters of this report deal with the following topics:

- * Overview of Project
- * Environmental Standard
- * Environmental Impact & Mitigation Measures
- * Environmental Management Plan
- * Environmental Monitoring Plan
- * Budget Estimate and Source of Funds
- * Staff Training
- * Information Management
- * Summary of Environmental Management Plan

2 OVERVIEW OF PROJECT

2.1 COMPONENTS OF THE PROJECT

GEF Shanghai agricultural and non-point pollution reduction project consists of four components as shown below:

Component 1: Livestock Waste Management Technology Demonstration.

Component 2: Wetland Demonstration for Pollution Reduction.

Component 3: Integrated Agricultural Pollution Reduction Techniques

Component 4: Project Management and Dissemination.

For main components of the Project, see Table 2.1.

Table 2.1 The Main Components of the Project

Components	Main Contents
Component 1: Livestock Waste Management Technology Demonstration	Livestock Waste Management on Large Farm (Jinshan Dairy Farm) (Component 1-A)
	Livestock Waste Management on Medium Farm (Chongming Dairy Farm) (Component 1-B)
	Integrated Livestock and Agricultural Waste Management (Qianwei Village) (Component 1-C)
Component 2: Wetland Demonstration for Pollution Reduction	Wetland Demonstration for Pollution Reduction (Component 2-A)
	Qingpu Village Wetland Sewage Treatment System (Component 2-B)
Component 3: Integrated Agricultural Pollution Reduction Techniques	Integrated Agricultural Pollution Reduction Techniques Scientific Application of Agricultural Chemicals (insecticides and pesticides) Scientific Application of Agricultural Chemicals (insecticides and pesticides)
Component 4: Project Management and Dissemination	Project Management and Dissemination Replication Strategy Development and Monitoring and Evaluation Training and Dissemination

2.2 CONSTRUCTION SCALE AND MAIN ECONOMICAL TECHNICAL INDEXES

2.2.1 COMPONENT 1-A

Owner is Shanghai Bright Holstan Co., Ltd. The project is located at the existing site of Livestock Waste Management on Large Farm (Jinshan Dairy Farm) in the Jinshan Modern Agricultural Park, Langxia Town, Jinshan District, Shanghai.

The project will produce biogas through pre-treatment and anaerobic digestion of cow wastes, silage leachate and wastewater from milking stall rinsing and cooling sprinklers generated each day by 5,000 cows in the dairy farm, and use the purified biogas to

generate electricity with the cogeneration units fueled by biogas; the residual heat from cogeneration units is used for heating anaerobic feeds; the liquid fraction from bio-digester will be discharged into the municipal sewer network after treatment at the wastewater treatment station reconstructed to the discharge standard of Jinshan Langxia Wastewater Treatment Co., Ltd., and the sludge is shipped to organic fertilizer plant and turned into organic fertilizer for sale.

The project mainly consists of civil works and plant works. The civil works include anaerobic reactor, biogas storage tank, power generation building, slurry storage pool and reconstructing wastewater treatment station. The plant works include power generation units, grid connection system and pipework. The main economical technical indexes of Component 1-A are shown in Table 2.2.

Table 2.2 The Main Economical Technical Indexes of Component 1-A

No.	Item	Unit	Economical Technical index
1	Total covered area	m ²	2460
2	Total floor area of new buildings	m ²	820
3	Total covered area of structures	m ²	740
4	Road	m ²	400
5	Greening	m ²	500
6	Treatment capacity	t/d	270
7	Construction phase	month	17
8	Total works investment	Million RMB	36.0002
9	Total cost unit price	RMB /t	37.77
10	Operating cost unit price	RMB /t	14.27

2.2.2 COMPONENT 1-B

Owner is Shanghai Shenye Dairy Cooperative. The project is located at Chongming Dairy Farm, Beiliuyao Section, Chongming Modern Agricultural Park. The park is included into Chongming overall development plan. The project covers a total land area of 18,750 m². The farm now has a stock of 1,600 cows.

The project plans to build the Eastern Chongming Livestock Waste Treatment Center that produces 6,000t solid organic fertilizers and 10,500t liquid organic fertilizers (the center to be under management of Shanghai Shenye Dairy Farm). The project mainly includes the dry livestock waste treatment system and the livestock farm livestock wastewater treatment and transfer system.

In the project, the total floor area of new buildings is 7,075 m², with volume of structures being 2,130 m³, fermentation workshop being 4,000 m² and on-farm liquid fraction from bio-digester transfer pipeline being 3,000 m. The main economical technical indexes of Component 1-B are shown in Table 2.3.

Table 2.3 The Main Economical Technical Indexes of Component 1-B

No.	Item	Unit	Economical Technical index
1	Total covered area	m ²	18750
2	Total floor area of new buildings	m ²	7075
3	Volume of structures	m ³	2130
4	Road and paved surface	m ²	2500
5	Greening	m ²	1600
6	Dispose of Wet dung	t/d	49.3
7	Construction phase	month	9
8	Total works investment	Million RMB	6.449

2.2.3 COMPONENT 1-C

Owner is Chongming ShuxinTown Qianwei Village Committee. The project is located at Eco-farming Demonstration Zone, Qianwei Ecological Village, to the north of the east-west axis of the village, between Jing'er Road and Jingsi Road, and to the north of Wei'er Road.

The project consists of two independent sub-systems: the multiple agricultural wastes-based biogas-fueled power generation and nutrients recovery sub-system, and the straw gasification-based power generation and biomass briquetting sub-system. The two sub-systems are inter-adjusted in operation to ensure stability of energy supply.

The project covers a land area of 6,900 m² (90m×60m+50m×30m), including 5,400 m² for the multiple agricultural wastes-based biogas-fueled power generation and nutrients recovery sub-system (90m×60m), and 1,500 m² for the straw gasification-based power generation and biomass briquetting sub-system (50m×30m).

After the Project is completed, the 600 m³ biogas plant completed in 1993 with investment of RMB2.66 million Yuans and having an annual output of 150 m³ biogas will be removed. Residuals in the biogas digester will be used as raw materials of organic fertilizers, construction wastes will be disposed of according to requirements of the Construction Wastes Management Office, and the original site will be prepared and afforested.

The main economical technical indexes of Component 1-C are shown in Table 2.4.

Table 2.4 The Main Economical Technical Indexes of Component 1-C

No.	Item	Unit	Economical Technical index
1	Total covered area	m ²	6900
2	Buildings covered area	m ²	2620
3	Volume of structures	m ³	2600
4	Power generation capacity	kwh	940000
5	Biogas	m ³ /d	2138
6	Output of solid organic fertilizer	t/a	1801

7	Output of liquid organic fertilizers	t/a	11093
8	Construction phase	month	8
9	Total works investment	Million RMB	20.72
10	Annual profit	Million RMB/a	1.06
11	Phase of return on investment	year	20

2.2.4 COMPONENT 2-A

(1) Project Owner

Shanghai International Automobile City Newanting Joint Development Co., Ltd.

(2) Project Location

The River Network Wetland Demonstration Area is situated northwest of the planned North Suburban Wetland, encompassing the area confined by Lianqihe, Gujing and Miaojing, sized around 667407.34 m².

(3) Situation of the Rivers Dredging

A. River Dredging and Its Function

In the range of the dredging project there are main rivers, like Miaojing River, Gujing River and Shenzhaijing River, as well as some natural creeks, all of which are governed by the Town. These rivers have now the principal functions of flood control and drainage, and provision of agricultural and fisheries water. In the future after the completion of the river regulation, apart from the current functions, new functions will be added such as wetland and landscape, thus becoming a model project of river-network and wetland construction. Table 2.5 lists the present situation of the rivers.

Table 2.5 The Present Situation of the Rivers.

River	Beginning and End	Length (m)	Wide (m)	Area of the Rivers (ha)
Miaojing	Gujing –Lianqi river	1104	10~15	1.7
Gujing	Lianqi river - Miaojing	783	8~13	1
Shenzhaijing	Miaojing - Lianqi river	487	8~11	0.54
Natural creeks		2405	7-15	3
Total				6.24

B. Present situation of river bed material

According to the heavy metal content sampling analysis and the sediment toxic leaching test done on the bottom sludge dredged from Miaojing River, Shenzhaijing River and Gujing River, the contents of heavy metals do not exceed the requirements in “Control standards for pollutants in sludge from agricultural use” (GB4284-84), and the

concentration of leach solution are not exceeded the concentration limits of hazardous components (*Identification standard hazardous wastes- leaching toxicity identification GB5085.3-2007*), therefore, these bottom sludge dredged are not hazardous wastes and can be used for agricultural use or forestry purposes.

C. Total Earthwork Volume of River Dredging

According the estimation of the project feasibility study report, the total earthwork volume of the connection and dredging will be 99,200 m³. (See Table 2.6)

Table 2.6 Total Earthwork Volume of River Dredging and Connection

River	Length of the Connection (m)	Earthwork Volume of the Connection (m ³)	Earthwork Volume of the Dredging (m ³)
Gujing	72.5	3290	13430
Shenzhaijing	/	/	7046
Miaojing	/	/	41590
Natural creeks	192.5	7277	26567
Total	265	10567	88633

(4). Description of the Project

The project consists of the following two aspects:

A. To form river network wetland by means of eco-restoration to restore functions of river network wetland.

This part includes 3 aspects: base repair, construction of vegetation buffer zone and connection of river system.

- Basement Repair
- Construction of Vegetation Buffer Zone:
- Connection of River System

Arrangement of works: The watercourse trend and layout are maintained “as is” in principle. In line with the water system planning requirements in the area, the three planned watercourses are widened towards both sides of the centerlines, with original trends and curves maintained unchanged if possible. Other natural watercourses are all maintained as they are now, except necessary interconnection is made.。

B. To construct artificial wetlands to treat rural domestic sewage

It is recommended that the project adopts a reed - grit vertical underflow constructed

wetland system with the area 120 m², consisting mainly of substrate, plants and water distribution system. For wastewater treatment process of the project, see Fig. 2-1:

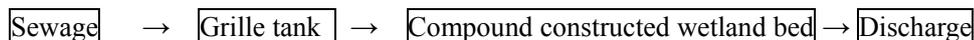


Fig.2.1 Process Flow Diagram of Sewage Treatment

The main economical technical indexes of Component 2-A are shown in Table 2.7.

Table 2.7 The Main Economical Technical Indexes of Component 2-A

No.	Item	Unit	Economical Technical index
1	Earthwork dredging	m ³	99,200
2	watercourse dredging	m	2,577
3	Watercourse interconnection	m	265
4	Slope vegetation	m ²	47,264
5	Constructed wetland	m ²	120
6	Designed total wastewater	m ³ /d	12
7	Total works investment	Million RMB	9.88

2.2.5 COMPONENT 2-B

Project Owners are Liantang Town Government and Jinze Town Government, Qingpu District. The project is located at Jintian Village, Qianwan Village and Beiwangbang Village of Liantang Town; and Xie Zhuang Village of Jinze Town, Qingpu District. The service area of the project covers all households of the foregoing four natural villages.

The project consists of wastewater treatment plants (WWTPs) separately constructed in five natural villages, including collection pipeline work and wastewater and sludge treatment facilities, with a total treatment capacity of 502 m³/d. With the required effluent quality met, WWTPs will be constructed to demonstrate advanced technology, low treatment cost and reliable operation and help improve water environment of river and other water bodies.

The project would adopt the wastewater treatment process shown below:

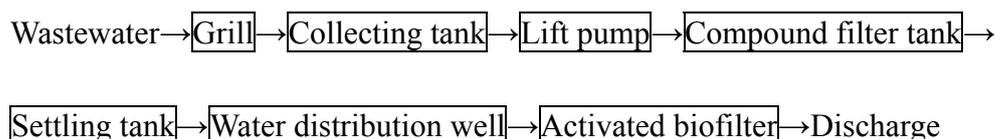


Fig.2.2 Process Flow Diagram of Sewage Treatment

The main economical technical indexes of Component 2-B are shown in Table 2.8.

Table 2.8 The Main Economical Technical Indexes of Component 2-B

No.	Item	Unit	Economical Technical index
1	Total works investment	Million RMB	11.3966
2	Designed Total Wastewater	m ³ /d	502
3	Designed Quality of Effluent		Discharge standards of Class 1B (GB 18918-2002)

2.2.6 COMPONENT 3

3 core demonstration bases are selected and constructed. The project includes Jinshan Langxia Modern Agricultural Park (A), Qingpu Zhujiajiao Production Base (B) and Chongming Changjiang Farm (C).

The foregoing bases are located within the Huangpu River Municipal Drinking Water Protection Area, Chongming Biological Island and Taihu Lake Drainage Area, respectively. They are key agricultural production zones involving environmental and resource protection in Shanghai. Chongming Changjiang Farm is a pilot for modern agriculture; Qingpu Taihu Lake Rim has a stringent demand on water quality; Jinshan Langxia is a district-level Modern Agricultural Park which accommodates a large dairy farm and focuses on farming-animal husbandry combination and resource recycling.

The project will further irradiate from the 3 core demonstration bases to the entire outskirts of Shanghai.

3 ENVIRONMENTAL STANDARDS

3.1 ENVIRONMENTAL QUALITY STANDARD

3.1.1 ENVIRONMENTAL QUALITY STANDARD FOR SURFACE WATER

According to the environmental impact reports of sub-projects and opinions of environment authorities on standards to which the environmental impact assessment of the Project is subject, the standards applicable to surface water of Component s are listed in Table 3.1 and Table 3.2.

Table 3.1 Environment Quality Standard for Surface Water(GB3838-2002)
(mg/L, except pH)

No.	Parameter	II	III	IV	V
1	pH	6~9	6~9	6~9	6~9
2	DO	≥6	(5	(3	(2
3	COD _{Cr}	≤15	≤20	≤30	≤40
4	BOD ₅	≤3	≤4	≤6	≤10
5	NH ₃ -N	≤0.5	≤1.0	≤(1.5	≤2.0
6	TP	≤0.1	≤0.2	≤0.3	≤0.4

Table 3.2 Executive Standard for Surface Water

Components	River	Executive Standard (GB3838-2002)
Component 1-A	Hongqiaogang river	V
	Epidemic prevention river (Moat)	V
Component 1-B	Liuxiao river	III
	Moat	III
Component 1-C	Open ditch	III
Component 2-A	Miaojing river	IV
	Gujing river	IV
	Shenzhajing river	IV
Component 2-B	Beiwangbang village river	II
	Jintian village river	II
	Qianwan village river	II
	Xiezhuang village river	II
Jinshan Langxia Pilot Base	Huigaojing river	III
Qingpu Zhujiajiao Pilot Base	Mojiacun river	II
Changjiang Farm Pilot Base	Zhi River	III

3.1.2 AMBIENT AIR QUALITY STANDARD

According to the environmental impact reports of Components and opinions of environment authorities on standards to which the environmental impact assessment of the Project is subject, the standards applicable to ambient air of Components are listed in Table 3.3 and Table 3.4.

Table 3.3 Ambient Air Quality Standard (GB3095-1996) (mg/m³)

Grade	Sampling Time	TSP	PM ₁₀	SO ₂	NO ₂
1st Standard	Annual average	0.08	0.04	0.02	0.04
	Daily average	0.12	0.05	0.05	0.08
	Hourly average	—	—	0.15	0.12
2nd Standard	Annual average	0.20	0.10	0.06	0.08
	Daily average	0.30	0.15	0.15	0.12
	Hourly average	—	—	0.50	0.24

Table3.4 Executive Standard for Ambient Air Quality

Components	Executive Standard (GB3095-1996)
Component 1-A	1st Standard
Component 1-B	1st Standard
Component 1-C	1st Standard
Component 2-A	1st Standard
Component 2-B	1st /2nd Standard

3.1.3 ENVIRONMENTAL QUALITY STANDARD FOR NOISE

The standards applicable to noise of Components are listed in Table 3.5 and Table 3.6.

Table3.5 Environmental Quality Standard for Noise (GB3096-2008) Leq(A):dB

Grade	Standard Value		Grade	Standard Value	
	Daytime	Nighttime		Daytime	Nighttime
0	50	40	3	65	55
1	55	45	4	70	55
2	60	50			

Table3.6 Executive Environmental Quality Standard for Noise

Components	Executive Standard (GB3096-2008)
Component 1-A	Grade I
Component 1-B	Grade I
Component 1-C	Grade I
Component 2-A	Grade II
Component 2-B	Grade I

3.1.4 STANDARD OF ASSESSMENT FOR SEDIMENT

The Class II standard defined in Environmental Quality Standard for Soils (GB15618—1995) is used for assessment on river sediment removal involved in the Project, see Table 3.7.

Table3.7 Executive Standard of Assessment for Sediment

Environmental Factor	Standard Reference	Pollutant Parameter	Unit	Standard Value
Soil	<i>Environmental quality standard for soils</i> (GB15618 - 1995) Grade II	Copper	mg/kg	≤100
		Lead	mg/kg	≤350
		Chromium	mg/kg	≤250
		Zinc	mg/kg	≤300
		Cadmium	mg/kg	≤0.60
		Arsenic	mg/kg	≤30
		Mercury	mg/kg	≤1.0

The analysis on heavy metal content of removed bottom sediments of watercourses is as per the Solid Waste - Extraction Procedure for Leaching Toxicity (HJ/T299-2007).

If any hazardous component of the leaching solution of a solid waste prepared as per HJ/T299 exceeds the concentration limit specified in the table Table3.8, such solid waste is considered hazardous waste with leaching toxicity characteristics.

Table3.8 Standard Values for Determination of Leaching Toxicity (HJ/T299-2007)

S/N	Hazardous Component	Concentration Limit of Hazardous Component in Leaching Solution(mg/L)	Analysis Method
1	Lead(total lead)	5	ICP-AES, ICP-MS, etc.
2	Cadmium(total cadmium)	1	ICP-AES, ICP-MS, etc.
3	Copper (total copper)	100	ICP-AES, ICP-MS, etc.
4	Zinc(total zinc)	100	ICP-AES, ICP-MS, etc.
5	Mercury(total mercury)	0.1	ICP-MS

3.2 POLLUTANTS DISCHARGE STANDARD

3.2.1 WASTEWATER DISCHARGE STANDARD

For the wastewater discharge standards applicable to the present EA, please see Tables 3.9, 3.10 and 3.11. According to the zoning of receiving water bodies involved in the Project, the wastewater discharge standards applicable to works adjacent to the project area are listed in Table 3.12 and 3.13.

Table3.9 Discharge Standard of Pollutants for Municippal Wastewater Treatment Plant (GB18918-2002) (mg/L)

Parameter \ Standard	Class I		Class II	Class III
	A	B		
BOD ₅	10	20	30	60
COD _{Cr}	50	60	100	120
Petroleum	1	3	5	15
NH ₃ -N	5 (8)	8(15)	25(30)	-
TN	15	20	-	-
SS	10	20	30	50
Vegetable and animal oils	1	3	5	20
TP	0.5	1	3	5

Table3.10 Shanghai Integrated Sewage Discharge Standard (DB31/199-1997) mg/L

Parameter \ Standard	The Allowable Discharge Limited Concentration for Second Class of Pollutants	
	Class I	Class II
BOD ₅	20	30
COD _{Cr}	100	100
Petroleum	5	10
NH ₃ -N	10	15
SS	70	150
Vegetable and animal oils	10	15

Table3.11 Executive Standard of Wastewater Discharge during Construction Phase

Pollutant	Standard Reference	Components	Standard Limited Value (mg/L)				
			COD _{Cr}	BOD ₅	Petroleum	NH ₃ -N	SS
Wastewater	<i>Integrated Sewage Discharge Standard in Shanghai (DB31/199-1997)</i>	Component 1-A	100	30	10	15	150
		Component 1-B	100	20	5	10	70
		Component 1-C	100	20	5	10	70
		Component 2-A	100	30	10	15	150
		Component 2-B	100	20	5	10	70

Table3.12 Executive Standard for Wastewater Discharge during Operation Phase

Pollutants	Standard Reference	Components	Standard Limited Value (mg/L)					
			COD _{cr}	BOD ₅	Petroleum	NH ₃ -N	SS	TP
Waste water	<i>Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant (GB18918-2002)</i>	Component 2-A	100	30	5	25 (30)	30	5
		Component 2-B	20	60	3	8(15)	20	1
	<i>Discharge Standard for Municipal Sewerage System (DB31/425-2009)</i>	Component 1-A	500	300	20	40	400	8

3.2.2 DISCHARGE STANDARD FOR SEDIMENT

In addition to the environmental quality standard for soils, the Control Standard for Pollutants in Sludge from Agricultural Use is also used for river sediment removal to control disposal and discharge of sludge from river sediment removal (details see Table 3.13).

Table3.13 Control Standards of Pollutants in Sludge for Agricultural Use (GB 4284-84)

Pollutant	Standard Reference	Parameter	Standard Limited Value(mg/kg dried sludge)	
			Acidic Soil (pH<6.5)	Neutral and Basic Soil (pH≥6.5)
Sediment	<i>Control Standards of Pollutants in Sludge for Agricultural Use (GB 4284-84)</i>	Cadmium and its compounds	5	20
		Mercury and its compounds	5	15
		Lead and its compounds	300	1000
		Chromium and its compounds	600	1000
		Arsenic and its compounds	75	75
		Copper and its compounds	250	500
		Zinc and its compounds	500	1000
		Nickel and its compounds	100	200

3.2.3 EMISSION STANDARD FOR NOISE

The noise emission standards applicable during construction and operation of the Project are shown in Table 3.14 and 3.15.

Table3.14 Executive Emission Standard for Noise during Construction Phase

Pollutant	Standard Reference	Factors	Standard Limited Value dB(A)		
Noise	<i>Noise limits for construction site (GB 12523-2008)</i>	Leq	Cubic meter of earth and stone	Daytime	75
				Nighttime	55
			Piling	Daytime	85
				Nighttime	Ban
			Construction	Daytime	70
				Nighttime	55
			Fitting	Daytime	65
				Nighttime	55

Table3.15 Executive Emission Standard for Noise during Operation Phase

Pollutant	Standard Reference	Factors	Components	Standard Limited Value dB(A)	
Noise	<i>Standard of Noise at Boundary of Industrial Enterprises (GB12348-2008)</i>	Leq	Component 1-A	Daytime	65
				Nighttime	55
			Component 1-B	Daytime	55
				Nighttime	45
			Component 1-C	Daytime	55
				Nighttime	45
			Component 2-A	Daytime	60
				Nighttime	50
			Component 2-B	Daytime	55
				Nighttime	45

3.2.4 EMISSION STANDARD FOR WASTE GAS

Waste gas emission standards applicable during construction of the Project are shown in Table3.16.

Table3.16 Executive Emission Standard for Waste Gas during Construction Phase

Pollutant	Standard Reference	Pollutant Parameter	Standard Limited Value (mg/m ³)	
Waste gas	<i>Integrated Emission Standard of Air Pollutants, (GB16297-1996)</i>	NO ₂	Concentration limited value of fugitive emission	0.15
		PST		5.0

According to the State Environmental Protection Administration and the National Development and Reform Commission jointly issued the Circular on Strengthening Management of Environmental Impact Assessment on Biomass-Fueled Power Generation Projects (HF [2006] No. 82), the flue gas emission in biogas-based power generation projects is subject to the maximum allowable emission concentration for air pollutants emitted by gas-fired boilers defined in the Emission Standard for Air Pollutants from Boilers (DB31/387-2007), see Table 3.17. The executive emission standards for odor during operation phase are shown in Table 3.18.

Table 3.17 Emission Standard for Air Pollutants from Boilers (DB31/387-2007)

No.	Pollutants	Unit	Maximum allowable emission concentration for air pollutants emitted by gas-fired boilers
1	SO ₂	mg/m ³	50
2	NO _x	mg/m ³	200
3	Smoke	mg/m ³	30

Table 3.18 Executive Emission Standard for Odor during Operation Phase

Pollutant	Standard Reference	Component	Pollutant Parameter	Standard Limited Value	
Odor	<i>Discharge standard of pollutants for livestock and poultry breeding (GB18596-2001)</i>	Component 1-B	Odor	Concentration limited value of in-organizing emission	70
					Component 1-C
	NH ₃ -N	1(mg/m ³)			
	H ₂ S	0.03(mg/m ³)			
	Component 1-A Component 2-A Component 2-B	Odor	20		
		NH ₃ -N	1.5(mg/m ³)		
		H ₂ S	0.06(mg/m ³)		

Nitrogen oxide contained in exhaust gas of generator units shall meet the Stage II limit (7.0 g/kW.h) provided in *Limits and measurement methods for exhaust pollutants from positive ignition (P.I.) engines of vehicles and vehicles equipped with P.I. engines GB14762-2002*, sulfur dioxide to meet Class II standard defined in *Integrated Emission Standard of Air Pollutants GB16297-1996*, and these Standards are listed in Table 3.19 and Table 3.20.

Table3.19 Limits and measurement methods for exhaust pollutants from positive ignition (P.I.) engines of vehicles and vehicles equipped with P.I. engines (GB14762-2002)

Pollutant	Limits for Exhaust Pollutants from Positive Ignition NG Engine g/(kw•h)
NO _x	7

Table3.20 Integrated Emission Standard of Air Pollutants (GB16297-1996)

Pollutant	Concentration of Maximum Allowable Emission (mg/m³)	Rate of Maximum Allowable Emission (kg/h)	
		Height of Exhaust Stack (m)	Class II
SO ₂	1200	15	3.0
		20	5.1

4 ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4.1 COMPONENT 1 AND 2

TABLE 4.1 Construction Phase

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Component 1			
Dust	<p>Spoil, building garbage, building materials (sand and cement) would generate dust to pollute air in the process of handling, stacking and mixing, so that TSP is increased, in particular in windy days. Following measures shall be adopted:</p> <ul style="list-style-type: none"> ● "Shanghai Dust Pollution Control Management Methods" should be strictly enforced. Spoil generated in road excavation should be frequently watered in fine and windy days. Construction Phase shall be shortened as far as possible and dust shall be timely removed. In transportation, watering or covering shall be conducted to prevent dust pollution. ● Sand, cement and other building materials easy to produce dust should be put in appropriate places with wind boards and isolated wall installed; cement should be put in warehouse. Dust prevention bag shall be installed when unloading bulk cement. ● Vehicles entered on to the construction site should have their speed limited. Road surface shall be maintained clean and wet to reduce dust. ● Construction site management shall be strengthened. When choosing construction units, PIA shall consider the quality of construction unit. Environmental impact mitigation measures shall be included in the contract, which shall be under strict supervision and inspection from the beginning to the end. <p>In transportation, spoil, building garbage, building materials (sand and cement) shall be covered.</p>	Contractor	<p>SEPBB /Jinshan DEPB (Component 1-A)</p> <p>SEPBB /Chongming CEPB (Component 1-B, 1-C)</p>

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Waste gas	<ul style="list-style-type: none"> ● A certain amount of diesel machinery and vehicles will be employed in construction and tail gas emissions will cause air pollution. Good quality diesel machinery of sufficient combustion shall be chosen and operated in places as far as possible away from residential areas and other sensitive points. ● Similar transport vehicle emission mitigation measures shall be adopted. Vehicles of inadequate combustion causing heavy pollution should be repaired before use. 		
Wastewater	<ul style="list-style-type: none"> ● The construction process (such as land excavation and open caisson construction, etc.) will produce a lot of mud water. Sedimentation tanks of different sizes shall be installed according to mud water volume. Water on the upper level of the tank can be discharged into rivers nearby as ordinary wastewater. Sediment shall be treated regularly as solid wastes and should not be put together with domestic garbage. 	Contractor	SEPB /Jinshan DEPB (Component 1-A) SEPB /Chongming CEPB Component 1-B, 1-C)
Noise	<ul style="list-style-type: none"> ● Low-noise construction machinery and equipment should be chosen as far as possible. Simple noise barriers should be set up when construction area is quite close to sensitive areas. ● In the construction Phase, construction noise should be strictly controlled and it is required to meet the requirements in GB12523-2008. No high-noise operations could be performed from 22:00 to 6:00. In case night operation is required by technology, application to the local environmental protection department for approval shall be made before operation to be carried out. Prior-notice shall be given to gain forgiveness of the masses. ● In order to reduce noise impact on the environment in the operation of equipment, sound insulation measures shall be adopted in civil works and surrounding environment shall be considered in the civil works design. 	Contractor	SEPB /Jinshan DEPB (Component 1-A) SEPB /Chongming CEPB Component 1-B, 1-C)

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Spoil and building garbage	<ul style="list-style-type: none"> ● Construction of this project will produce a certain amount of spoil and building garbage. PIA should, in accordance with the requirements set in the "Management and Regulation of the Shanghai Municipality Regarding Disposal of Building Garbage and Engineering Spoil", apply to the Shanghai Municipal Spoil Management Department for approval of its building garbage and spoil disposal plan prior to the commencement of construction. Do accordingly after approval. ● In case toxic and hazardous wastes are produced, construction should be suspended and the EP and health department contacted timely. Construction can be restarted after safety measures are adopted. 	Contractor	SCAESAB /Jinshan DCAESAB (Component 1-A) SCAESAB /Chongming CCAESAB (Component 1-B, 1-C)
Residential wastes	<ul style="list-style-type: none"> ● Construction of the project requires a certain amount of construction staff. Contractors will often provide necessary facilities within the temporary work area for construction workers in order to complete the project on quality and time. Thus, a certain amount of domestic wastes will be produced. PIA must contact with sanitation department for timely removal of wastes. ● Contractor is required to carry out education for construction workers, who shall develop civilized construction, creating a clean and hygiene environment for work and living. 	Contractor	SCAESAB /Jinshan DCAESAB (Component 1-A) SCAESAB /Chongming CCAESAB (Component 1-B, 1-C)
Greening	<ul style="list-style-type: none"> ● If project buildings or structures are constructed on the original greening area, this will have impact on greening, which shall be addressed in accordance with provisions of the "Shanghai Municipal Afforestation and Green Land Administration Regulation". Trees within construction area should be transplanted. In order to ensure the survival rate of trees, the construction unit shall engage green professionals to be responsible for this work. ● After the completion of the project, greening shall be restored as far as possible to minimize the adverse impact on green space and trees. 	Contractor	SCAESAB /Jinshan DCAESAB (Component 1-A) SCAESAB /Chongming CCAESAB (Component 1-B, 1-C)

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Social impact (traffic and immigrant, etc.)	<ul style="list-style-type: none"> ● Road excavation shall have an impact on traffic. Before construction, the consent of the traffic management department should be obtained. Excavation site shall set up isolation binder or board. Persons on duty shall be arranged at the crossroads to direct traffic to guard against the occurrence of traffic accidents. ● Construction of this project does not involve the issue of resettlement and immigrant. 	Contractor	SEPB /Jinshan DEPB (Component 1-A) SEPB /Chongming CEPB Component 1-B, 1-C)
Protection of cultural relics	Construction should be stopped and the site should be blocked off immediately once any cultural relics are found, to prevent artificial damage, timely report should be sent to local protection department of cultural relics, and protection measures should be taken with the decision from government.	Contractor	Jinshan cultural relic bureau (Component 1-A) Chongming cultural relic bureau Component 1-B, 1-C)
Environmental Management	<ul style="list-style-type: none"> ● Independent environmental supervision engineers should supervise the whole process of the entire project. ● Demand of civilized construction is asked for the contractor during the bidding process. when call for tender and tender, auditing and manage the technique measures and non- technique measures of the contractor. 	Contractor	PMO
Staff Training	Civilized construction (contractor, workers). The training system includes training of professional health and safety regulations and contingency plan.	Contractor	PMO
Component 2			

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Dust	<p>Spoil, building garbage, building materials (sand and cement) would generate dust to pollute air in the process of handling, stacking and mixing, so that TSP is increased, in particular in windy days. Following measures shall be adopted:</p> <ul style="list-style-type: none"> ● "Shanghai Dust Pollution Control Management Methods" should be strictly enforced. Spoil generated in road excavation should be frequently watered in fine and windy days. Construction Phase shall be shortened as far as possible and dust shall be timely removed. In transportation, watering or covering shall be conducted to prevent dust pollution. ● Sand, cement and other building materials easy to produce dust should be put in appropriate places with wind boards and isolated wall installed; cement should be put in warehouse. Dust prevention bag shall be installed when unloading bulk cement. ● Vehicles entered on to the construction site should have their speed limited. Road surface shall be maintained clean and wet to reduce dust. ● Construction site management shall be strengthened. When choosing construction units, PIA shall consider the quality of construction unit. Environmental impact mitigation measures shall be included in the contract, which shall be under strict supervision and inspection from the beginning to the end. 	Contractor	<p>SEPB /Jiading DEPB (Component 2-A)</p> <p>SEPB /Qingpu DEPB Component 2-B)</p>
Waste gas	<ul style="list-style-type: none"> ● A certain amount of diesel machinery and vehicles will be employed in construction and tail gas emissions will cause air pollution. Good quality diesel machinery of sufficient combustion shall be chosen and operated in places as far as possible away from residential areas and other sensitive points. ● Similar transport vehicle emission mitigation measures shall be adopted. Vehicles of inadequate combustion causing heavy pollution should be repaired before use. 		

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Wastewater	The construction process (such as land excavation and open caisson construction, etc.) will produce a lot of mud water. Sedimentation tanks of different sizes shall be installed according to mud water volume. Water on the upper level of the tank can be discharged into rivers nearby as ordinary wastewater.		
Noise	<ul style="list-style-type: none"> ● Low-noise construction machinery and equipment should be chosen as far as possible. Simple noise barriers should be set up when construction area is quite close to sensitive areas. ● In the construction Phase, construction noise should be strictly controlled and it is required to meet the requirements in GB12523-2008. No high-noise operations could be performed from 22:00 to 6:00. In case night operation is required by technology, application to the local environmental protection department for approval shall be made before operation to be carried out. Prior-notice shall be given to gain forgiveness of the masses. 	Contractor	<p>SEPB /Jiading DEPB (Component 2-A)</p> <p>SEPB /Qingpu DEPB Component 2-B)</p>
Spoil	<ul style="list-style-type: none"> ● Construction of this project will produce a certain amount of spoil and building garbage. PIA should, in accordance with the requirements set in the "Management and Regulation of the Shanghai Municipality Regarding Disposal of Building Garbage and Engineering Spoil", apply to the Shanghai Municipal Spoil Management Department for approval of its building garbage and spoil disposal plan prior to the commencement of construction. Do accordingly after approval. ● In case toxic and hazardous wastes are produced, construction should be suspended and the EP and health department contacted timely. Construction can be restarted after safety measures are adopted. 		<p>SCAESAB /Jiading DCAESAB (Component 2-A)</p> <p>SCAESAB /Qingpu DCAESAB (Component 2-B)</p>
Bed mud in dredging	<ul style="list-style-type: none"> ● Sedimentation tanks shall be installed near by. Water on the upper level of the tank can be discharged into rivers while the sediment mud can be used as farmland or for greening if the test shows that it is in conformity with the agricultural use standard. Otherwise it should be treated regularly as solid wastes and should not be put together with domestic wastes. 	Contractor	<p>SCAESAB /Jiading DCAESAB (Component 2-A)</p>

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Residential wastes	<ul style="list-style-type: none"> ● Construction of the project requires a certain amount of construction staff. Contractors will often provide necessary facilities within the temporary work area for construction workers in order to complete the project on quality and time. Thus, a certain amount of domestic wastes will be produced. PIA must contact with sanitation department for timely removal of wastes. ● Contractor is required to carry out education for construction workers, who shall develop civilized construction, creating a clean and hygiene environment for work and living. 		SCAESAB /Jiading DCAESAB (Component 2-A)
Greening	<ul style="list-style-type: none"> ● If project buildings or structures are constructed on the original greening area, this will have impact on greening, which shall be addressed in accordance with provisions of the "Shanghai Municipal Afforestation and Green Land Administration Regulation". Trees within construction area should be transplanted. In order to ensure the survival rate of trees, the construction unit shall engage green professionals to be responsible for this work. ● After the completion of the project, greening shall be restored as far as possible to minimize the adverse impact on green space and trees. 		SCAESAB /Qingpu DCAESAB (Component 2-B)
Water Plant	<ul style="list-style-type: none"> ● River dredging will affect the growth of original water plant. Invading of foreign water plant shall be avoided. 		SCAESAB /Jiading DCAESAB (Component 2-A)
Blocking-up of rivers	<ul style="list-style-type: none"> ● If dredging must block-up of rivers, prior consent of water authority must be obtained. ● Pay attention to the climate and adopt precaution measures of flood control. Keep a smooth drainage of fields. ● Blocking up of rivers would affect fields' irrigation. This should be informed to the related organizations and farmers to gain their forgiveness. 		
Social impact (traffic and immigrant, etc.)	<ul style="list-style-type: none"> ● Road excavation shall have an impact on traffic. Before construction, the consent of the traffic management department should be obtained. Excavation site shall set up isolation binder or board. Persons on duty shall be arranged at the crossroads to direct traffic to guard against the occurrence of traffic accidents. ● Construction of this project does not involve the issue of resettlement and immigrant. 	Contractor	SEPB /Jiading DEPB (Component 2-A) SEPB /Qingpu DEPB (Component 2-B)

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISION ENTITY
Protection of cultural relics	Construction should be stopped and the site should be blocked off immediately once any cultural relics are found, to prevent artificial damage, timely report should be sent to local protection department of cultural relics, and protection measures should be taken with the decision from government.		Jiading cultural relic bureau (Component 2-A) Qingpu cultural relic bureau (Component 2-B)
Environmental Management	<ul style="list-style-type: none"> ● Independent environmental supervision engineers should supervise the whole process of the entire project. ● Demand of civilized construction is asked for the contractor during the bidding process. when call for tender, auditing and manage the technique measures and non- technique measures of the contractor. 		PMO
Staff Training	Civilized construction (contractor, workers). The training system includes training of professional health and safety regulations and contingency plan.		PMO

TABLE 4.2 Operation Phase

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISI ON ENTITY
Component 1-A			
Noise generated by pumps, mixers, grinders and generators	<ul style="list-style-type: none"> ● Choose low-noise equipment with noise level being generally lower than 70 dB (A). Install them at suitable places. ● Choose low-noise submersible pumps, whose noise level is less than ordinary water pumps. Noise level of water pump is an important parameter and should be taken into consideration. ● Low-frequency noise produced when pump is operating can be absorbed by special materials. ● Sound-insulation of pumping room can effectively reduce noise. ● Noise generated by dynamic imbalance of rotating parts of machinery can be adjusted. Noise produced by mechanical and pipe vibration can be solved by adding vibro-damping mount, the use of damping materials and cladding measures. Noise silencers shall be installed to eliminate noise generated by inlet and outlet gas. Silence louvers shall be adopted at air ports. Lubricants and acoustic enclosures can be used to control noise generated by gear friction. ● Choose low-noise generating set and adopt sound-absorb, silence and insulation measures with anti-vibration measures being adopted on the base. Generator room shall adopt sound insulation measures. Noise within the room shall reach the stipulation of health prevention and workers there shall adopt preventive measures. ● Noise at plant boundary shall meet Class 3 standard defined in <i>Emission Standard for Industrial Enterprises Noise at Boundary</i> GB12348-2008. 	Shanghai Bright Holstan Co., Ltd	SEPB /Jinshan DEPB

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISORY ENTITY
Waste gas	<ul style="list-style-type: none"> ● Dust produced in the cut of feed, dry of residues and organic fertilizers could be collected by dust collection devices. ● Hydrogen sulfide contained in biogas can be purified by desulfurization devices. ● Follow the "livestock Emission Standards" to control the concentration of odor and plant trees in the factory boundary to insulate sound and adsorb odor. ● Preventive separation shall be arranged in accordance with the requirements of EIA. Protective area shall be fully greened and set up greenbelt. Planning and construction of houses, schools, hospitals and other sensitive buildings within in the health preventive area are strictly prohibited. ● Stacking, transporting and processing must be strictly managed. ● Dust-removal measures must be adopted in the workshop producing dust. Operators there must have preventive devices. ● The air pollutants from biogas combustion will be emitted by 20 m high exhaust stack. ● Noise at plant boundary shall meet Class 3 standard defined in <i>Emission Standard for Industrial Enterprises Noise at Boundary</i> GB12348-2008. ● The concentration of hydrogen sulfide, ammonia and odor at plant boundary shall meet Class II standard defined in <i>Emission standards for odor pollutants</i> GB14554-93. ● Nitrogen oxide contained in exhaust gas of generator units must meet the Stage II limit provided in <i>Limits and measurement methods for exhaust pollutants from positive ignition (P.I.) engines of vehicles and vehicles equipped with P.I. engines</i> GB14762-2002, sulfur dioxide to meet Class II standard defined in <i>Integrated Emission Standard of Air Pollutants</i> GB16297-1996. 	Ditto	SEPBB /Jinshan DEPB

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Environment of surface water	<ul style="list-style-type: none"> ● Sewage treatment equipment should be strictly managed to ensure that devices are in normal working status and to ensure that the water discharged meets the standard. ● Domestic sewage such as cloth-washing waste water can not be directly discharged into the river or dumped at will. ● In order to reduce non-point pollution, fertilizer application and excessive fertilization shall not be performed before rain. ● Discharging Sewage and livestock wastes in to farm moat is strictly prohibited. ● Rain water after sedimentation can be discharged into the farm moat. ● After expansion of capacity, the wastewater treatment facilities shall suffice to treat liquid fraction from bio-digester and other wastewater produced in the Project, with pollutants contained in the effluent to comply with the <i>Discharge Standard for Municipal Sewerage System</i>. Wastewater is treated by Jinshan Langxi Wastewater Treatment Plant (WWTP). 	Ditto	SEPB /Jinshan DEPB
Solid waste residues	<ul style="list-style-type: none"> ● Residues of sumps and sludge from sedimentation tanks must be regularly collected. Solid wastes shall be treated by the sanitation department in time. ● Sulfur from biogas desulfurization devices and discarded desulfuration agent must be collected for disposal by a qualified organization. ● It is prohibited to stack livestock wastes at any place in the pasture and disposed in sewage pit. ● Domestic garbage shall be collected and treated in time by sanitation department. ● The analysis on heavy metal content of sludge dewatered from WWTP is as per the <i>Solid Waste - Extraction Procedure for Leaching Toxicity (HJ/T299-2007)</i>. 	Ditto	SEPB /Jinshan DEPB
Staff Training	The training system includes training of professional health and safety regulations and contingency plan.	Ditto	PMO

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Component 1-B			
Noise generated by pumps, mixers and grinders	<ul style="list-style-type: none"> ● Choose low-noise equipment with noise level being generally lower than 70 dB (A). Install them at suitable places. ● Choose low-noise submersible pumps, whose noise level is less than ordinary water pumps. Noise level of water pump is an important parameter and should be taken into consideration. ● Noise generated by dynamic imbalance of rotating parts of machinery can be adjusted. Noise produced by mechanical and pipe vibration can be solved by adding vibro-damping mount, the use of damping materials and cladding measures. Noise silencers shall be installed to eliminate noise generated by inlet and outlet gas. Silence louvers shall be adopted at air ports. Lubricants and acoustic enclosures can be used to control noise generated by gear friction. ● Pump room shall adopt sound insulation measures. Noise within the room shall reach the stipulation of health prevention and workers there shall adopt preventive measures. 	Shanghai Shenye Dairy Cooperative	SEPB/ Chongming CEPB

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Ambient air	<ul style="list-style-type: none"> ● Dust produced in the cut of feed, dry of residues and organic fertilizers could be collected by dust collection devices. ● Cow dung will be naturally dried in shed and odor will escape. Ventilation should be strengthened, and the location of drying sheds shall be rationally arranged. ● Follow the "livestock Emission Standards" to control the concentration of odor and plant trees in the factory boundary to insulate sound and adsorb odor. ● Preventive separation shall be arranged in accordance with the requirements of EIA. Protective area shall be fully greened and set up greenbelt. Planning and construction of houses, schools, hospitals and other sensitive buildings within in the health preventive area are strictly prohibited. ● Stacking, transporting and processing must be strictly managed. ● Dust-removal measures must be adopted in the workshop producing dust. Operators there must have preventive devices. 	Ditto	SEPB/ Chongming CEPB
Wastewater	<ul style="list-style-type: none"> ● Domestic sewage such as cloth-washing waste water can not be directly discharged into the river or dumped at will. ● Storage tank and pipelines for liquid organic fertilizers should be strictly managed to prevent land and river from leakage pollution. ● In order to reduce non-point pollution, fertilizer application and excessive fertilization shall not be performed before rain. ● Reservoir tank must be covered to prevent inflow of storm water and spill of liquid organic fertilizer. ● Discharging Sewage and livestock wastes in to farm moat is strictly prohibited. ● Rain water after sedimentation can be discharged into the farm moat. 	Ditto	SEPB/ Chongming CEPB

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Solid waste residues	<ul style="list-style-type: none"> ● It is prohibited to stack livestock wastes at any place in the pasture and disposed in sewage pit. ● Domestic garbage shall be collected and treated in time by sanitation department. 	Ditto	SEPB/ Chongming CEPB
Staff Training	The training system includes training of professional health and safety regulations and contingency plan.	Ditto	PMO
Component 1-C			
Noise generated by pumps, mixers, grinders and generators	<ul style="list-style-type: none"> ● Choose low-noise equipment with noise level being generally lower than 70 dB (A). Install them at suitable places. ● Choose low-noise submersible pumps, whose noise level is less than ordinary water pumps. Noise level of water pump is an important parameter and should be taken into consideration. ● Low-frequency noise produced when pump is operating can be absorbed by special materials. ● Sound-insulation of pumping room can effectively reduce noise. ● Noise generated by dynamic imbalance of rotating parts of machinery can be adjusted. Noise produced by mechanical and pipe vibration can be solved by adding vibro-damping mount, the use of damping materials and cladding measures. Noise silencers shall be installed to eliminate noise generated by inlet and outlet gas. Silence louvers shall be adopted at air ports. Lubricants and acoustic enclosures can be used to control noise generated by gear friction. ● Choose low-noise generating set and adopt sound-absorb, silence and insulation measures with anti-vibration measures being adopted on the base. Generator room shall adopt sound insulation measures. Noise within the room shall reach the stipulation of health prevention and workers there shall adopt preventive measures. 	Chongming ShuxinTown Qianwei Village Committee	SEPB/ Chongming CEPB

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Ambient air	<ul style="list-style-type: none"> ● Dust produced in the cut of feed, dry of residues and organic fertilizers could be collected by dust collection devices. ● Hydrogen sulfide contained in biogas can be purified by desulfurization devices. ● Plant trees in the factory boundary to insulate sound and adsorb odor. ● Stacking, transporting and processing of livestock wastes and stalks must be strictly managed. ● Offensive smell generated from processing workshops shall be emitted by means of ventilation devices. ● Dust-removal measures must be adopted in the workshop producing dust. Operators there must have preventive devices. ● The air pollutants from biogas combustion will be emitted by an exhaust stack. 	Ditto	SEPB/ Chongming CEPB
Wastewater	<ul style="list-style-type: none"> ● Sewage treatment equipment should be strictly managed to ensure that devices are in normal working status and to ensure that the water discharged meets the standard. ● Domestic sewage such as cloth-washing waste water can not be directly discharged into the river or dumped at will. ● Storage tank and pipelines for liquid organic fertilizers should be strictly managed to prevent land and river from leakage pollution. ● In order to reduce non-point pollution, fertilizer application and excessive fertilization shall not be performed before rain. ● Reservoir tank must be covered to prevent inflow of storm water and spill of liquid organic fertilizer. ● Discharging sewage and livestock wastes in to farm moat is strictly prohibited. ● Rain water after sedimentation can be discharged into the farm moat. 	Ditto	SEPB/ Chongming CEPB

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Solid waste residues	<ul style="list-style-type: none"> ● Residues of sumps and sludge from sedimentation tanks must be regularly collected. Solid wastes shall be treated by the sanitation department in time. ● Sulfur from biogas desulfurization devices and discarded desulfuration agent must be collected for disposal by a qualified organization. ● It is prohibited to stack livestock wastes at any place in the pasture and disposed in sewage pit. ● Domestic garbage shall be collected and treated in time by sanitation department. 	Ditto	SEPB/ Chongming CEPB
Staff Training	The training system includes training of professional health and safety regulations and contingency plan.	Ditto	PMO
Component 2-A			
Environment of surface water	<ul style="list-style-type: none"> ● Sewage treatment equipment should be strictly managed to ensure that devices are in normal working status and to ensure that tail water meets the secondary discharge standard described in “Shanghai General Waste Water Discharge Standard”. ● Domestic sewage such as cloth-washing waste water can not be directly discharged into the river or dumped at will. ● Be sure to keep smooth current of rivers. Discharging untreated sewage into river is strictly prohibited. ● Be sure that water plant is under orderly control to prevent foreign water plant from invading. 	Shanghai International Automobile City Newanting United Development Co., Ltd.	SEPB/ Jiading DEPB
Greening and Vegetation	<ul style="list-style-type: none"> ● Strengthen protection of greening landscape along the rivers. ● Finalize measures of soil and water conservation. ● Protect vegetation such as reed on wetland. 	Ditto	SEPB/ Jiading DEPB
Sediments	<ul style="list-style-type: none"> ● Regularly monitor sediments of rivers. 	Ditto	Ditto

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Staff Training	Civilized construction (contractor, workers). The training system includes training of professional health and safety regulations and contingency plan.	Ditto	PMO
Component 2-B			
Environment of surface water	<ul style="list-style-type: none"> ● Sewage treatment equipment should be strictly managed to ensure that devices are in normal working status and to ensure that water discharged meets the standard. ● Domestic sewage such as cloth-washing waste water can not be directly discharged into the river or dumped at will. 	Liantang Town Government and Jinze Town Government, Qingpu District, Shanghai	SEPB/ Qingpu DEPB
Ambient air	<ul style="list-style-type: none"> ● Small volume of offensive smell generated from rural sewage treatment stations shall be emitted by means of ventilation devices. 	Ditto	SEPB/ Qingpu DEPB
Noise	<ul style="list-style-type: none"> ● Choose low-noise equipment with noise level being generally lower than 70 dB (A). Install them at suitable places. ● Choose low-noise submersible pumps, whose noise level is less than ordinary water pumps. Noise level of water pump is an important parameter and should be taken into consideration. ● Low-frequency noise produced when pump is operating can be absorbed by special materials. ● Sound-insulation of pumping room can effectively reduce noise. ● Noise generated by dynamic imbalance of rotating parts of machinery can be adjusted. Noise produced by mechanical and pipe vibration can be solved by adding vibro-damping mount, the use of damping materials and cladding measures. Noise silencers shall be installed to eliminate noise generated by inlet and outlet gas. Silence louvers shall be adopted at air ports. Lubricants and acoustic enclosures can be used to control noise generated by gear friction. 	Ditto	SEPB/ Qingpu DEPB

POTENTIAL IMPACTS	PROPOSED MITIGATION MEASURES	IMPLEMENTATION ENTITY	SUPERVISOR ENTITY
Solid waste residues	<ul style="list-style-type: none"> ● Residues of sumps and sludge from sedimentation tanks must be regularly collected. Solid wastes shall be treated by the sanitation department in time. ● Domestic garbage shall be collected and treated in time by sanitation department. 	Ditto	SEPB/ Qingpu DEPB
Staff Training	The training system includes training of professional health and safety regulations and contingency plan.	Ditto	PMO

4.2 COMPONENT 3

TABLE 4.3 Mitigation Measures for the Component 3

Environment Impact	Mitigation Measures	Responsibility for Implementation	Responsibility for Supervision
Surface water	<p>In the areas of 3 core demonstration bases:</p> <ul style="list-style-type: none"> ● Regularly check application of organic fertilizers; ● Reduce use of chemical fertilizers and prevent N and P from contaminating surface waters; ● Regularly sample and analyze soils, check for improvement of soil fertility; ● Regularly check crops for pests and use low-toxicity pesticides; ● Use physical entrapping, reasonable pesticide application and other green control techniques; ● In order to reduce non-point pollution, fertilizer application and excessive fertilization shall not be performed before rain. ● In order to prevent loss of pesticides and contaminate surface water, pesticides application shall not be performed before rain. ● Regularly monitor surface waters, including COD, NH₃-N and TP. 	Shanghai Agricultural Technology Extension and Service Center	SEPB/ Jinshan DEPB Qingpu DEPB Chongming CEPB
Soil	<ul style="list-style-type: none"> ● Reduce use of chemical fertilizers to prevent soil deterioration. ● Reasonably apply organic fertilizers to improve soil fertility and soil structure. ● Use highly-efficient, low-toxic and low-residual pesticides. 	Ditto	SEPB/ Jinshan DEPB Qingpu DEPB Chongming CEPB
Ecological environment	<ul style="list-style-type: none"> ● Reasonably use pesticides to reduce ecological impact. ● Train village cadres, farmers and pesticide distributors to make them familiar with chemicals that may pose adverse effects to the environment, recommend proper sprinkling methods and equipments; ● Use pesticides with low half-life residuals; ● Use diverse pest control techniques (agricultural/physical, biological and chemical) to ensure that pests will not develop resistance to pesticides; 	Ditto	SEPB/ Jinshan DEPB Qingpu DEPB Chongming CEPB
Occupational and Health	<ul style="list-style-type: none"> ● Train village cadres, farmers and pesticide distributors; ● Effective equipments and operating procedures; 	Ditto	SEPB/ Jinshan DHB Qingpu DHB Chongming

	<ul style="list-style-type: none"> ● Wear PPEs, including long-sleeved clothes, face mask, gloves, trousers and boots; ● Sprinkling methods under static wind conditions; ● Safe storage and lockup of chemicals;and, ● Safe disposal methods of chemicals packaging and wastes. 		CHB
Environmental risks	<p>Below are measures to mitigate potential environment risks arising from use of pesticides:</p> <ul style="list-style-type: none"> ● Train village cadres, farmers and pesticide distributors to make them familiar with chemicals that may pose adverse effects to the environment, recommend proper sprinkling methods and equipments. ● Have village cadres to oversee sprinkling process to ensure that no toxic chemicals are sprinkled at adjacent potable water sources. ● Buy and use reliable and safe sprinkling equipments; ● Use pesticides with low half-life residuals; and ● Use diverse pest control techniques (agricultural/physical, biological and chemical) to ensure that pests will not develop resistance to pesticides; 	Ditto	<p>SEPB/ Jinshan DHB Qingpu DHB Chongming CHB</p>

5 ENVIRONMENTAL MANAGEMENT

5.1 ENVIRONMENTAL SUPERVISION INSTITUTIONS AND MANAGEMENT PLAN

5.1.1 ENVIRONMENTAL SUPERVISION INSTITUTIONS AND RESPONSIBILITY

The environmental supervision institutions are set up in four levels:

(1) At municipal level: Establish Shanghai Project Coordination Team consisting of representatives from Shanghai Development and Reform Commission, Shanghai Environmental Protection Administration, Shanghai Finance Bureau and Shanghai Agricultural Commission. Under the team is the Shanghai GEF Project Management Office.

(2) At district/county level: Establish task forces at Qingpu District, Jiading District, Jinshan District and Chongming County, respectively. The task forces consist of representatives from the environment administration, agricultural commission and water affairs bureau at the same level.

(3) At village/town level: Establish village/town task forces.

(4) PIU: Each PIU sets up an environment oversight team.

Table 5.1 Environmental Supervision Institution and Responsibility

Environmental Supervision Agency	Responsibility for Supervision
Shanghai Project Coordination Group	Examine and oversee implementation of annual work plan of the Project; provide municipal policies and guidance;
Shanghai PMO	Provide supports for preparation and implementation of the Project as assistants of the Coordination Team;
District/County Working Group	Oversee progress of project implementation, and in particular monitor and oversee environment; Provide assistance in implementing the annual work plan; Provide policy support and guidance; Coordinate and help solve disputes arising from project implementation.
Township/Town Working Group	Oversee progress of project implementation, and in particular monitor and oversee environment; Coordinate and help solve disputes arising from project implementation.
Project Implementation Agencies	Be responsible for project implementation activities, including environmental monitoring and oversight; Regularly report to supervising authorities

5.1.2 ENVIRONMENTAL SUPERVISION PLAN

5.1.2.1 Environmental Supervision Plan during Construction Phase

Table 5.2 Environmental Supervision Plan during Construction Phase

Project	Supervision Agency	Supervision Items
Component 1-A	Shanghai Environmental Protection Bureau(SEPB), Jinshan District Environmental Protection Bureau (DEPB) Shanghai Bright Holstein Animal Husbandry Ltd.	<ol style="list-style-type: none"> 1. To monitor and inspect restoration of the environment and the land & vegetation temporary occupied in construction. 2. Oversee and inspect implementation of dust and noise control measures; 3. To monitor and inspect if the treatment and discharge of domestic sewage and oil-bearing sewage produced in construction sites are in line with environmental protection requirements; 4. To monitor and inspect the implementation of environmental protection measures to mitigate disturbances caused by project construction. 5. To monitor and inspect if construction machinery and equipment comply with environmental protection requirement. 6. Check whether warnings are erected at working sites. 7. To monitor and inspect the implementation of mitigation measures put forward in the EIA form and the Environmental Protection Agency approval document.
Component 1-B	Chongming DEPB, Shanghai Shenyue Dairy Cooperative	<ol style="list-style-type: none"> 1. To monitor and inspect restoration of the environment and the land & vegetation temporary occupied in construction. 2. Oversee and inspect implementation of dust and noise control measures; 3. To monitor and inspect if the treatment and discharge of domestic sewage and oil-bearing sewage produced in construction sites are in line with environmental protection requirements; 4. To monitor and inspect if construction machinery and equipment comply with environmental protection requirement. 5. Check whether warnings are erected at working sites. 6. To monitor and inspect the implementation of mitigation measures put forward in the EIA form and the Environmental Protection Agency approval document.
Component 1-C	SEPB, Chongming DEPB, Qianwei Village Shuxin Town	<ol style="list-style-type: none"> 1. Check whether settling tank is provided for civil works and whether discharge meets standards; 2. To monitor and inspect if the cleaning, transporting and piling of sludge are in line with the environmental protection requirement 3. To monitor and inspect the realization of measures to protect water environment on the project

		<p>construction site.</p> <ol style="list-style-type: none"> 4. To monitor and inspect the protection of natural environment on the project construction site. 5. To monitor and inspect the implementation of environmental protection measures to mitigate disturbances caused by project construction 6. To monitor and inspect if construction machinery and equipment comply with environmental protection requirement. 7. Check whether warnings are erected at working sites. 8. To monitor and inspect restoration of the environment and the land & vegetation temporary occupied in construction. 9. To monitor and inspect the implementation of mitigation measures put forward in the EIA form and the Environmental Protection Agency approval document.
Component 2-A	SEPB, Jiading DEPB, New Anting Company	<ol style="list-style-type: none"> 1. To monitor and inspect bed mud dredging, if sedimentation tanks are installed and if it reaches discharging standard. 2. To monitor and inspect if the cleaning, transporting and piling of sludge are in line with the environmental protection requirement. 3. To monitor and inspect the realization of measures to protect water environment on the project construction site. 4. To monitor and inspect the protection of natural wetland on the project construction site. 5. To monitor and inspect the implementation of environmental protection measures to mitigate disturbances caused by project construction. 6. To monitor and inspect if construction machinery and equipment comply with environmental protection requirement. 7. To monitor and inspect greening, vegetation and water plant and if there is a risk of foreign water plant invading. 8. To monitor and inspect restoration of the environment and the land & vegetation temporary occupied in construction.
Component 2-B	SEPB, Qingpu DEPB, Liantang Town and Beiwangbang Village, Qianwei Village and Jintian Village; Jinze Town and Xiezhuang and Luotianbang Village	<ol style="list-style-type: none"> 1. Check whether settling tank is provided for civil works and whether discharge meets standards; 2. Oversee and inspect whether construction wastes and spoils are removed, transported and stored in compliance with environmental protection requirements. 3. To monitor and inspect the realization of measures to protect water environment on the project construction site. 4. To monitor and inspect the protection of natural environment on the project construction site. 5. To monitor and inspect the implementation of environmental protection measures to mitigate disturbances caused by project construction. 6. To monitor and inspect if construction machinery and equipment comply with environmental protection

		<p>requirement.</p> <p>7. Check whether warnings are erected at working sites.</p> <p>8. To monitor and inspect restoration of the environment and the land & vegetation temporary occupied in construction.</p>
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5.1.2.2 Environmental Supervision Plan during Operation Phase

Table 5.3 Environmental Supervision Plan during Operation Phase

Components	Responsibility for Supervision	Supervision Items
Component 1-A	SEPB/ Jinshan DEPB	<ul style="list-style-type: none"> ● To monitor and inspect implementation of control measures on offensive smell and noise pollution during the operation Phase; ● To monitor and inspect if the production and application of organic fertilizer are in line with environmental protection requirements; ● To monitor and inspect if liquid biogas storage and application are in line with environmental protection requirements and if it pollutes water environment nearby farm land applied with liquid biogas; ● To monitor and inspect the implementation of mitigation measures put forward in the EIA form and the Environmental Protection Agency approval document. Emphasis shall be put on the inspection of the implementation of measures on protecting Hongqiao Port.
Component 1-B	SEPB/ Chongming CEPB	Ditto. Emphasis shall be put on the inspection of the implementation of measures on protecting Liuxiao River.
Component 1-C	SEPB/ Chongming CEPB	The same as Component 1-A. To monitor and inspect implementation of environmental protection measures regarding electricity generated by crop stalks.
Component, 2-A	SEPB/ Jiading DEPB	<ul style="list-style-type: none"> ● To monitor and inspect specially if water quality of rivers meets the state stipulated standard. ● To monitor and inspect if the measures to protect river network wetland and landscape along rivers are finalized. ● To monitor and inspect if the water out of the artificial wetland meets the state stipulated standard.

		<ul style="list-style-type: none"> ● To monitor and inspect the variation of biological diversity including plant diversity and animal diversity on the river network wetland area. ● To monitor and inspect if there are biological invading on water plant and slope vegetation.
Component, 2-B	SEPB/ Qingpu DEPB	<ul style="list-style-type: none"> ● To monitor and inspect if water quality of rivers meets the state stipulated standard. ● To monitor and inspect implementation of control measures on offensive smell and noise pollution during the operation Phase. ● To monitor and inspect if the projects operating process is in the normal operation status including if the volume of sewage treatment meets the design standard. ● The focus of monitoring and inspection shall be put on the water quality from the artificial/constructed wetland to see if it reaches the state stipulated discharge standard.

5.2 ENVIRONMENTAL MANAGEMENT INSTITUTIONS AND MANAGEMENT PLAN

5.2.1 ENVIRONMENTAL MANAGEMENT INSTITUTIONS ARRANGEMENT AND RESPONSIBILITY

Environment management items in the construction phase are greatly different from that in the operation phase. The former is temporary and will be ended upon acceptance check of the project, while the latter is of long-term nature and is complicated, and so long as the project is operating, it is necessary to continue management. Therefore, independent organizations should be separately set up for each phase to be responsible for due management. After the end of the construction phase, the corresponding management institution shall be revoked and the management institutions for the operation phase shall start to work. According to the specific circumstances of the work, there will be a transition phase. Table 5.4 and Table 5.5 list the environmental management institutions in construction phase and operation phase respectively.

Table 5.4 List of Environmental Management Institutions in Construction Phase

Components	Nature of Management Institution	Persons & Quality Requirements	Responsibility
Component 1-A	No conflict of interest with the project and independent of the construction unit	2 to 4 persons, with appropriate qualifications and experience	<ol style="list-style-type: none"> 1. According to project plans, draw up detailed management plans. Inspect according to the plan and make necessary amendments in accordance with the progress of the project; 2. The person in charge of management shall report to the project leader weekly on the results of environmental management and put forward solutions targeted to the potential environmental issues found in the inspection; 3. According to the plan, tour and check the implementation of mitigation measures regarding environmental impact and be responsible for arrangement of monitoring items to be performed according to the plan; 4. Report to higher authorities on a monthly basis inspection and monitoring results and opinions about issues settled on the spot.
Component 1-B	Ditto	1 ~ 3 persons with appropriate qualifications and experience	Ditto
Component 1-C	Ditto	1 ~ 3 persons with appropriate qualifications and experience	Ditto
Component 2-A	Ditto	1 ~ 2 persons with appropriate qualifications and experience	Ditto

Component 2-B	Ditto	5 ~ 7 persons with appropriate qualifications and experience	Ditto
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Table 5.5 List of Environmental Management Institutions in Operation Phase

Project	Nature of Management Institution	Persons & Quality Requirements	Responsibility
Component 1-A	An environmental management institution mainly composed of environment management representatives authorized by leaders of PIA	2-4 persons, including at least one full-time person.	<p>Be responsible for working out environmental protection management system and monitor its implementation:</p> <ul style="list-style-type: none"> ① disseminate and organize the enforcement of national strategies, policies, decrees and regulations relating environmental protection and do a good job in environmental protection in coordination with local environmental protection department; ② implement environmental management systems of all kinds set up by the competent department of higher-level; ③ inspect regularly environmental protection equipment maintenance to ensure their normal operation. Monitor the implementation of measures about environmental protection put forward in the EIA; ④ lead and organize environmental monitoring in the project operation Phase and build monitoring files; ⑤ register emissions of pollutants, and monitor operation conditions of environmental protection facilities; ⑥ investigate and settle pollution incidents and pollution disputes; ⑦ carry out environmental protection education, technical training and academic exchange activities, improve the quality of staff, extend and use advanced technology and experience.

Component 1-B	Ditto	1-2 persons	Ditto
Component 1-C	Institution at village level	1-2 persons including one village carder	Ditto
Component 2-A	Institution composed of New Anting Company	2-3 persons including one village carder	Be responsible for working out environmental protection management system and monitor its implementation: ① disseminate and organize the enforcement of national strategies, policies, decrees and regulations relating environmental protection and protect river network natural wetland and artificial wetland ; ② implement environmental management systems of all kinds set up by the competent department of higher-level; ③lead and organize monitoring of water environment in the project operation Phase and build monitoring files; ④register emissions of pollutants, and monitor operation conditions of environmental protection facilities; ⑤ lead and organize investigation of biological diversity in the project operation Phase and build investigation files; ⑥ carry out environmental protection education, technical training and academic exchange activities, improve the quality of staff, extend and use advanced technology and experience.
Component 2-B	Institution at village level	1-2 persons including one village carder	The same as those for Component 1-A.
Jinshan Langxia	Environmental management institution at pilot base	1-2 persons from	Be responsible for working out environmental protection management system and monitor its implementation: ① disseminate and organize the enforcement of national strategies, policies, decrees and

<p>Pilot Base A</p> <p>Qingpu Zhujiajiao Pilot Base B</p> <p>Changjiang Farm Pilot Base C</p>	<p>level</p>	<p>each base, including one base leader</p>	<p>regulations relating environmental protection and do a good job in environmental protection of the pilot base in coordination with local environmental protection unit, agriculture commission and other competent departments;</p> <p>② implement environmental management systems of all kinds set up by the competent department of higher-level;</p> <p>③ lead and organize environmental monitoring in the pilot base and build monitoring files;</p> <p>④ register application of chemical, organic, and compound fertilizers, and pesticide; and monitor the application practice;</p> <p>⑤ carry out environmental protection education, technical training and academic exchange activities, improve the quality of staff, extend and use advanced technology and experience about pest control.</p>
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5.2.2 ENVIRONMENTAL MANAGEMENT PLAN

In the phase of construction and operation, the project will give rise to some adverse effects to the environment. Corresponding measures shall be adopted respectively according to the characteristics of the environmental impacts in the construction and operation phases to minimize these impacts to an acceptable level. In order to ensure environmental mitigation measures can effectively play their roles, it is necessary to prepare environmental management plans for each component for the construction and operation phase respectively.

(1) Management of Project Contractors:

- Select qualified contractor with good reputation to ensure that the environmental management plan can be effectively implemented;
- Contractor and construction supervision unit must receive training on environmental protection and environmental management;
- Measures to mitigate environmental impact during construction must be included in the bidding documents of contractor. Related agreements and commitments shall be written in the construction contract.
- Contractor is required to monitor its environmental activities and record the same in files. Project Management Office and the construction supervision group shall monitor and review these records.
- Contractor shall have job posts for environment staff. These staff shall undertake environmental management task after receiving training.
- During the construction phase, contractors shall communicate and negotiate with local masses where the project is located. Every construction unit shall set up a notice board to make open the project overview and construction activities, and contact person and phone number. They shall accept public monitoring, complaints and suggestions about the construction activities.

(2) Environmental Management during the Construction Phase

An independent environmental supervisor should be recruited by the PMO to supervise the whole process of the project, especially on the implementation of pollution control measures.

The construction company should have a staff managing the environmental issues such as the implementation of pollution control measures and coordination with neighborhoods and environmental supervisor.

(3) Environmental Management during the Operation Phase

The main environmental management contents of the sludge treatment project may

include the following aspects:

- Develop the operation management system, establish the environmental goal and index responsible system, clarify and implement the responsibilities of all shifts and positions and link them with the reward and punishment system.
- Compile the operation specification of all operation positions, and specify the operation contents, operation methods, control indexes, safety notices, failure treatment, etc.
- The environmental protection management must receive the pre-job training of professional technologies and skills before the project is started, and can get on duty only after they pass the exams, and are regularly assessed.
- To ensure the normal operation of the treatment project, establish the equipment regular maintenance and repairing system.
- Establish the environmental management archives system, regularly summarize the implementation of the environmental management plan, arrange and file the daily environmental monitoring and analysis data for the convenience of review and assessment, and find new problems, sum up experience and better embody the performance of environmental management.
- Environmental greening and beautification should be enhanced.

5.3 RISKS AND HIDDEN DANGER

(1) Explosion and Deflagration

Component 1-A and 1-C involves production, storage and use of biogas, a flammable and explosive gas. These procedures are exposed to certain risks and hazards. In these areas, smoking and fire are strictly prohibited, and fire hydrants, fire control facilities and lightning arrester are required in accordance with the national standards on fire safety. The fire and explosion emergency plan must be developed, and regular fire drill is required. The probability of explosion and deflagration is very low if employees always keep fire safety in mind.

(2) Disastrous weather

Disastrous weather, such as typhoon, rainstorm and prolonged rain, poses potential dangers to irrigation of liquid organic fertilizers, including the possibility of overflowing the storage tank to contaminate soils and rivers. The breakage of delivery pipes may also cause similar pollution. Thus an emergency response plan should be developed to tackle disastrous weather. The storage tank of liquid organic fertilizers should be large enough to take into account disastrous weather.

(3) Risk Prevention Measures

- Strictly observe the Design Code for Biogas Works at Large-scale Livestock and Poultry Production Farms. Biogas must go through purification systems before entry into the storage tank. Biogas treated in purification systems must meet the following criteria: Methane content is above 55%, and H₂S content is below 20mg/m³.
- Arrangements and layouts in production facilities must follow applicable rules and regulations of the country on fire and explosion prevention. Reserve sufficient clear space between equipments, and provide fire fighting access as required;
- Use technologically advanced, safe and reliable equipments as much as possible, and provide necessary safety and health facilities in workshops as per applicable standards of the country;
- Reliable sealing techniques must be used for equipments, pipes and fittings, so as to assure a fully sealed environment in digester, storage tank and conveyance process to prevent biogas leak;
- The gas storage tank must be designed as per the Safety and Technical Supervision Regulations for Pressure Vessel, and be equipped with relief valves to eliminate the over-pressure hazards;
- For materials that may generate static electricity in workplaces exposed to explosion or fire hazards, take preventive measures against industrial static electricity;
- Provide a fire telephone line in the central control room and the fire watch room to ensure proper communication in emergencies;
- Near the anaerobic digestion tank, provide emergency cabinets, first aid kits, protective masks and clothing, goggles, rubber gloves earplugs and other necessary supplies.
- Increase the safety awareness and develop rules and regulations on environmental protection.

(4) Safety Management and Emergency Plan

- Provide education and trainings for employees to enable them to identify and avoid hazards.
- Strictly follow the environmental accident reporting procedures; immediately report to the government or competent authorities upon detection of any environmental accident, without any concealment or omissions;

- Put in place environmental protection and rescue measures. Setup a leadership team to direct rescue efforts on the scene of accidents, identify causes immediately, develop response and rescue actions and use all resources available to control the pollution accidents to prevent further spreading.
- If biogas leaks and causes fires, immediately report to fire agents and local government and request emergency rescue services. Set up an emergency rescue leadership team composed of firefighters, medical personnel, project technicians and plant leaders to centrally direct fire fighting, and evacuate adjacent people to safe places according to fires and wind direction. Provide first aids to injured people.
- If the liquid fraction from biodigester treatment facilities fail, the liquid fraction from bio-digester must be bypassed to the emergency pond and held there until these treatment facilities all properly repaired. Then transfer slurry from emergency pond to the treatment facilities gradually. The emergency pond shall at least be able to hold a two-day output of liquid fraction from bio-digester. The emergency pond shall be covered to prevent rain and properly treated to prevent leak and seepage. The emergency pond shall be placed higher than the ground level around, with a catch drain provided around to prevent entry of runoff and storm water;
- The Owner shall develop an emergency plan, arrange emergency response personnel to receive trainings and emergency drills, provide safety and health education for workers, and provide people in adjacent areas with education on prevention of environmental risks and accidents, emergency trainings and regular release of relevant information.
- Keep records of emergencies and accidents and maintain a filing and reporting system under management by a specially designated department.

(5) Emergency Plan and Its Particulars

For the emergency plan and its particulars, see the Table 5.6

Table 5.6 The Emergency Plan and Its Particulars

S/N	Item	Description and Requirements
1	Emergency plan area	Targets exposed to hazards: Plant area, storage tank area and environmental protection targets;
2	Emergency organization and personnel	Emergency organizations and personnel of the factory and the local area;
3	Classified emergency response	Define the levels of emergency and classify response procedures;
4	Emergency response supplies	Emergency facilities, equipments and devices;

5	Reporting and communication methods	Define the reporting, communication and notification methods in emergencies as well as traffic assurance and control measures;
6	Environment monitoring, emergency rescue and control measures	Assign a professional team to monitor the scene of accident, assess the nature, parameters and consequences of the accident and provide a basis for decision makers
7	Emergency testing, protection measures, leak removal measures and equipments	Accident scene, adjacent areas, fire control area; control and pollution removal measures, and relevant equipments;
8	Emergency evacuation, exposure control and evacuation plan	Regulations over pollutant exposure of people on the scene of accident or in areas adjacent to the factory or other affected areas, evacuation plan and rescue, medical treatment and public health;
9	Closing procedures and restoration measures for emergencies	Define the emergency closing procedures; Deal with aftermath of accident on the scene; restoration measures; Cancellation of emergency alert in adjacent areas and restoration measures ;
10	Emergency training plan	Arrange employees to participate in trainings and drills after the emergency plan is developed;
11	Public education and information disclosure	Provide public education and trainings and release relevant information in adjacent areas of the factory;

6 ENVIRONMENTAL MONITORING PLAN

6.1 THE OBJECTIVES OF ENVIRONMENTAL MONITORING

For comprehensive and timely mastery of trend of pollution in the project construction and operation Phase, understanding of the impact arising from the project construction on the environmental quality changes and influence range on the place where the project is located, it is a must to conduct environment monitoring and report facts in time to the competent departments, thus providing a scientific basis for environmental management.

6.2 MONITORING INSTITUTIONS

Environmental monitoring in the construction and operation Phase involves air, offensive smell, noise and surface water, etc. It is suggested to ask qualified institutions within districts concerned to do the job.

6.3 MONITORING PROGRAM

According to the results of predicated environmental impact and the characteristics of pollutants emission of the demonstration projects, sound environment, ambient air, surface water environment and soil shall be monitored respectively. Monitoring factors shall be decided based on the pollution characteristic factors adopted in the engineering analysis. Monitoring and analysis shall adopt methods set in the "Environmental Monitoring Technical Specifications" issued by the State Environmental Protection Bureau with assessment standard following the national standard identified in the EIA. Environmental monitoring programs for the construction Phase and operation Phase are as shown in the following.

6.3.1 ENVIRONMENT MONITORING PROGRAM IN CONSTRUCTION PHASE

Table 6.1 Environment Monitoring Program for Component 1-A during Construction Phase

ENVIRONMENTAL ELEMENT		MONITORING POINTS AND QUANTITY	POLLUTANT PARAMETER	MONITORING FREQUENCY	UNIT PRICE (RMB/PIECE)	TOTAL COST (RMB)	IMPLEMENTATION AGENCY	MONITORING AGENCY	SUPERVISION AGENCY
Dust		Construction Point, 2 points	TSP	1 time/quarter, 1day/time, 2 times/day, 2 years	140	4,480Yuan/ two years	Contractor	A licensed monitoring unit	SEPB/Jinshan DEPB
Noise		Factory Boundary, 2 points	Leq dB(A)	1 time/quarter, 1day/time, 2 times/day, 2 years	120	3,840 Yuan/two years			
Water Quality	Surface Water	Hongqiao Port Moat 3 points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	1 time/quarter, 1day/time, 2 times/day, 2 years	550	13200 Yuan/two years			
	Construction Wastewater	Outlet of sedimentation tank	SS, petroleum	1 time/quarter, 2 years	140	1,120 Yuan/two years			
Traffic and sampling					10,000	20,000 Yuan/two years			
Total						4.264 Yuan/two years			

Table 6.2 Environment Monitoring Program for Component 1-B during Construction Phase

Environmental Element		Monitoring Points and Quantity	Pollutant parameter	Monitoring Frequency	Unit Price (RMB/Piece)	Total Cost (RMB)	Implementation Agency	Monitoring Agency	Supervision Agency
Dust		Construction point, 2 points	TSP	1 time/quarter, 1day/time, 2times/day, 1 years	140	2240Yuan	Contractor	A licensed monitoring unit	SEPB/ Chongming CEPB
Noise		Factory Boundary, 2 points	Leq dB(A)	Quarterly, 1day/time, Twice/day, 1 years	120	1,920Yuan			
Water Quality	Surface Water	Liuyao River Moat	COD, BOD, NH ₃ -N, TP Coliform	Quarterly, 1day/time, once/day, 1 years	550	6600Yuan			
	Construction Wastewater	Outlet of sedimentation tank	SS, petroleum	Quarterly, 1day/time, Twice/day, 1years	140	560Yuan			
Soil		Fertilizer applying point of feed field 3 points	Organic matter, TN, TP,K	Twice /year, 1 year	250	1500Yuan			
Traffic and sampling					10,000	10,000Yuan			
Total						22,820Yuan			

Table 6.3 Environment Monitoring Program for Component 1-C during Construction Phase

Environmental Element		Monitoring Points And Quantity	Pollutant Parameter	Monitoring Frequency	Unit Price (RMB/Piece)	Total Cost (RMB)	Implementation Agency	Monitoring Agency	Supervision Agency
Dust		Construction Point, 2 points	TSP	1 time/quarter, 1day/time, Twice/day, 1 years	140	2,240Yuan	Contractor	A licensed monitoring unit	SEPB/ Chongming CEPB
Noise		Factory Boundary, 2 points	Leq dB(A)	1 time/quarter, 1day/time, Twice/day, 1 years	120	1,920Yuan			
Water Quality	Surface Water	Open ditch	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	1 time/quarter, 1day/time, Twice/day, 1 years	550	2,200Yuan			
	Construction Wastewater	Outlet of sedimentation tank	SS, petroleum	1time/quarter, 1 years	140	560Yuan			
Soil		Fertilizer applying point of feed field 3 points	Organic matter, TN, TP, K	Twice /year, 1 year	250	1,500Yuan			
Traffic and sampling					10,000	10,000 Yuan			
Total						18,420Yuan			

Table 6.4 Environment Monitoring Program for Component2-A in Construction Phase

Environmental Element		Monitoring Location	Monitoring Parameters	Monitoring Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Noise		Factory Boundary, 2 points	Leq	1 time/quarter, 1 day/time, 2 times/day, two years	120	3840	Contractor	A licensed monitoring unit	SEPB/Jiading DEPB
Dust		Construction site, two points	TSP	1 time/quarter, 1 day/time, 2 times/day, two years	140	4480			
Water quality	Surface water	River accepting water, two points,	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	2 time/year, 1 day/time, two years	550	44000			
	Construction wastewater	Outlet of sedimentation tank, two points,	SS, , Petroleum,	1 time/quarter, 1 day/time, once/day, two years	140	2240			
Sediments		Sedimentation tank	Pb, Cd, Cu, Zn, Hg and toxicity characteristic leaching	2 time/year, two years	3000	12000			
Traffic and sampling				, two year	10000/year	20000			
Total						46900			

Table 6.5 Environment Monitoring Program for Component 2-B during Construction Phase

Environmental Element		Monitoring Location	Monitoring Parameters	Monitoring Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Noise		Factory Boundary, 2 points	Leq	1 time/quarter, 1 day/time, 2 times/day, one year	120	1920	Contractor	A licensed monitoring unit	SEPB/Qingpu DEPB
Dust		Construction site, two points	TSP	1 time/quarter, 1 day/time, 2 times/day, one year	140	2240			
Water quality	Surface water	River accepting water, two points,	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	1 time/quarter, 1 day/time, one year	550	4400			
	Construction wastewater	Outlet of sedimentation tank, two points,	SS, Petroleum,	1 time/quarter, 1 day/time, once/day, one year	140	1120			
Traffic and sampling				, one year	10000/year	10000			
Total						19680			

6.3.2 ENVIRONMENTAL MONITORING PROGRAM IN OPERATION PHASE
Table 6.6 Environment Monitoring Program for Component 1-A during Operation Phase

Environmental Element		Monitoring Points and Quantity	Pollutant Parameter	Monitoring Frequency	Unit Price (RMB/Piece)	Total Cost (RMB)	Implementation Agency	Monitoring Agency	Supervision Agency
Waste gas	Odor and Dust	Factory Boundary, 2 points	Odor, H ₂ S, NH ₃ , TSP	1 time /summer, 1 day/time, 4 samples/day, 1 year	1200	4,800Yuan	PIA	A licensed monitoring unit	SEPBP/Jinshan DEPB
	Burning flue gas	Outlet of flue gas for Engine and Exhaust stack	Smoke, SO ₂ , NOx	1 time/quarter, 1 day/time, 4 samples/day, 1 year	1500	24,000 Yuan			
Noise		Factory Boundary, 2 points	Leq dB(A)	2 times/a, 1 day/time, 2 times/day, 1 year	120	480 Yuan			
Water Quality	Surface Water	Hongqiao Port Moat 3 points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	2 times/a, 1 day/time, 1 time/day, 1 year	550	3300 Yuan	PIA	A licensed monitoring unit	SEPBP/Jinshan DEPB
	Tail water	Outlet of the wastewater treatment station	COD _{Cr} , BOD ₅ , NH ₃ -N, TP	1 time/ quarter	550	4400 Yuan			

		raw wastewater	Coliform					
Sludge	Sludge dewatered	Pb, Cd, Cu, Zn, Hg Concentration and toxicity characteristic leaching	1 time/ quarter	3000	12000Yuan			
Traffic and sampling				10,000	10,000 Yuan			
Total					5.898Yuan/1 year			

Table 6.7 Environment Monitoring Program for Component 1-B during Operation Phase

Environmental Element		Monitoring Points and Quantity	Pollutant parameter	Monitoring Frequency	Unit Price (RMB/Piece)	Total Cost (RMB)	Implementation Agency	Monitoring Agency	Supervision Agency			
Odor		Factory Boundary, 2 points	Odor, H ₂ S, NH ₃	Once /summer, 1 day/time, 4samples/day, 2 years	1200	9,600Yuan	PIA	A licensed monitoring unit	SEPB/ Chongming CEPB			
Noise		Factory Boundary, 2 points	Leq dB(A)	Twice/a, 1 day/time, Twice/day, 2 years	120	960Yuan						
Water Quality	Surface Water	3 Rivers adjacent to fertilization points;	COD _{Cr} ,BOD ₅ , NH ₃ -N, TP Coliform	Twice/a, 1 day/time, once/day, 2 years	550	6600Yuan						
	Liquid fraction from biodigester	Liquid fraction from biodigester storage tank Raw wastewater	COD _{Cr} ,BOD ₅ , NH ₃ -N, TP Coliform	Quarterly, 1 day/time, once/day, 2 years	550	8800Yuan						
Soil		Fertilizer applying point of feed field , 3 points	Organic matter, TN, TP ,K	Twice/a, 2 years	250	3,000Yuan						
Traffic and sampling					10,000	20,000 Yuan						
Total						48,960Yuan/t wo years						

Table 6.8 Environment Monitoring Program for Component 1-C during Operation Phase

Environmental Element		Monitoring Points And Quantity	Pollutant Parameter	Monitoring Frequency	Unit Price (RMB/Piece)	Total Cost (RMB)	Implementati on Agency	Monitoring Agency	Supervision Agency
Waste gas	Odor and Dust	Boundary, 2 points	Odor, H ₂ S, NH ₃ , TSP	1 time /summer, 1 day/time, 4 samples/day, 2 years	1200	9,600Yuan	PIA	A licensed monitoring unit	SEPB/Chong ming CEPB
	Burning flue gas	Outlet of flue gas	Smoke, SO ₂ , NOx	1 time/quarter, 1 day/time, 4 samples/day, 2 years	1500	48,000 Yuan			
Noise		Factory Boundary, 2 points	Leq dB(A)	2 times/a, 1 day/time, 2 times/day, 2 years	120	960 Yuan			
Water Quality	Surface Water	3 Rivers adjacent to fertilization points;	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	2 times/a, 1 day/time, 1 time/day, 2 years	550	6600Yuan	PIA	A licensed monitoring unit	SEPB/ Chongming CEPB
	Liquid fraction from biogas digester	Liquid fraction from biogas digester storage tank	COD _{Cr} , BOD ₅ , NH ₃ -N, TP , Coliform	1 time/quarter, 1 day/time, 1 time/day,	550	8,800 Yuan			

		Raw wastewater		2year					
Soil	Fertilizer applying point of feed field , 3 points	Organic matter, TN, TP ,K	2 time/a, 2 years	250	3,000Yuan				
Traffic and sampling				10,000	20,000 Yuan				
Total					96,960Yuan/two years				

Table 6.9 Environment Monitoring Program for Component 2-A during Operation Phase

Environmental Element	Monitoring Location	Monitoring Parameters	Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Surface water	Miaojing, Gujing Shenzhaijing Three points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	2 times /year, 1day/time one year	550	3300	International Automobile City Newanting United Development Co. , Ltd	A licensed monitoring unit	SEPB/Jiading DEPB
Sediments	Miaojing, Gujing Shenzhaijing, 3 points	Pb, Cd, Cu, Zn, Hg Concentration and toxicity characteristic leaching	Once/year	3000	9000	Ditto	Ditto	Ditto
Traffic and sampling			one year	10000	10000	Ditto	Ditto	Ditto
Total					22300			

Table 6.10 Environment Monitoring Program for Component 2-B during Operation Phase

Environmental Element		Monitoring Location	Monitoring Parameters	Monitoring Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Noise		Factory Boundary, 12 points	Leq	Twice per year, two years	120	5760	Liantang Town Government and Jinze Town Government, Qingpu District, Shanghai	A licensed monitoring unit	SEPB/Qingpu DEP
Odor		Factory Boundary, 12 points	Odor concentration	Once in summer, two years	700	16800			
Water quality	Surface water	River accepting water, six points,	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	1 time/quarter, 1 day/time, two year	550	13200			
	Tail water	Outlet of tail water, six points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	1 time/quarter, 1 day/time, once/day, two years	550	26400			
Traffic and sampling				two years	10000	20000			
Total						82160			

Table 6.11 Environment Monitoring Program for Integrated Agricultural Pollution Reduction Techniques

Pilot Bases	Environmental Element	Monitoring Location	Monitoring Parameters	Monitoring Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Jinshan Langxia	Surface water	Huigaojing, 1 point	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	Twice/year, 1 day/time, three years	550	3300	Shanghai Agricultural Technology Extension and Service Center	A licensed monitoring unit	SEPB/Jinshan DEPB
	Soil	Soil fertility monitoring points, 10 points	Organic matter TN, TP, K	Twice/year, Three years	250	15000	Ditto	Ditto	Ditto
Qingpu Zhujiajiao	Surface water	Mojiacun River 1 point	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	Twice/year, 1 day/time, three years	550	3300	Ditto	Ditto	SEPB/Qingpu DEPB
	Soil	Soil fertility monitoring points, 10 points	Organic matter TN, TP, K	Twice/year, three years	250	15000	Ditto	Ditto	Ditto
Chongming Changjiang Farm	Surface water	Zhi river, 1 point	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	Twice/year, 1 day/time, three years	550	3300	Ditto	Ditto	SEPB/Chongming CEPB
	Soil	Soil fertility monitoring points, 10 points	Organic matter TN, TP, K	Twice/year, three years	250	15000	Ditto	Ditto	Ditto
Traffic and sampling				Three years	15000	45000			
Total						99900			

Table 6.12 Environment Investigating Program for Integrated Agricultural Pollution Reduction Techniques

Pilot Bases	Investigation Element	Investigating Item	Investigation Parameters (kg/mu)	Investigating Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Investigating Agency	Responsibility of Supervision
Jinshan Langxia Qingpu Zhujiajiao Chongming Changjiang Farm	Application of Organic Fertilizer	Formula fertilization special for rice	Application Volume	Eix times per year, 3day/time, two years	12000/time	144,000	Shanghai Agricultural Technology Extension and Service Cent	A licensed investgating unit	AC(City, Jinshan)
		Formula fertilization special for vegetables							
		Commodity organic fertilizers							
	Application of Chemical Fertilizer	Nitrogen fertilizer	Application Volume	Eix times per year, 3day/time, two years			Ditto	Ditto	Ditto
		Phosphate fertilizer							
		Inorganic compound fertilizer							
	Crop Stalks Back to Field		Reach to 80%	Two times per year,			Ditto	Ditto	Ditto
	Application of Pesticide	Medium toxic pesticides	Application Volume,	Eix times per year, 3day/time, two years			Ditto	Ditto	Ditto
		Low toxic pesticides							
	Application of green preventive technology	Frequency-Vibration type killing lamp						Ditto	Ditto
Sex attractant									
Insect-catching board									

		Spraying devices							
		Green fertilizer and crop rotation							
	Crop Output	Rice	Crop Output	Two times per year,			Ditto	Ditto	Ditto
		Vegetables	Output	Four times per year					
	Traffic			two years	48000/year	96,000			
Total						240,000			

6.4 ESTIMATION OF THE ENVIRONMENTAL MONITORING COST

The Owner shall pay relevant costs of environment monitoring at the rates specified by the municipal government. The Owner and the monitoring entity should enter into relevant agreement or contract. The environment monitoring must be done by external independent environment monitoring station, and the monitoring expenses should be included into the project cost. The estimation of the environmental monitoring cost during the construction phase is shown in Table 6.13, and the estimation of the environmental monitoring cost during the operation phase is shown in Table 6.14. The estimation of the environmental monitoring costs during the construction phase and the operation phase are about RMB 150,520 and RMB 409,260 respectively.

Table 6.13 The Estimation of the Environmental Monitoring Cost during the Construction Phase

Components	First year RMB	Second year RMB	Source of funds
Component 1-A	21,320	21,320	Owner
Component 1-B	22,820	/	Owner
Component 1-C	18,420	/	Owner
Component 2-A	23,480	23,480	Owner
Component 2-B	19,680	/	Owner
Total	105,720	44,800	

Table 6.14 The Estimation of the Environmental Monitoring Cost during the Operation Phase

Components	First year RMB	Second year RMB	Third year RMB	Source of funds
Component 1 - A	58,980	/	/	Owner
Component 1 - B	24,480	24,480	/	Owner
Component 1 - C	48,480	48,480	/	Owner
Component 2 - A	22,300	/	/	Owner
Component 2 - B	41,080	41,080	/	Owner
Component 3	33,300	33,300	33,300	Owner
Total	228,620	145,340	33,300	

7 ESTIMATION AND FUNDING SOURCE OF ENVIRONMENT

MANAGEMENT COSTS

The GEF SANPRP environment management cost is included into the project budget as a special fund for environment management.

7.1 TOTAL WORKS INVESTMENT

According to estimation, the total investment of this project is RMB 324.691 million, or USD 49.953 million converted on the basis of the exchange rate of 1: 6.5 between US dollar and Renminbi. The total investment for the demonstration project of livestock wastes treatment technology is estimated as RMB 64.185 million (USD 9.8746 million equivalent). The total investment for the wetland wastewater treatment system project is estimated as RMB 23.489 million (USD 3.6137 million equivalent). The total investment estimation of the components is shown in Table 7.1.

Table 7.1 Total Investment Estimation of the Components

Components	Total Investment Estimation	
	Million RMB	Million USD
Component 1-A	36	5.538
Component 1-B	7.465	1.148
Component 1-C	20.72	3.188
Component 2-A	9.88	1.52
Component 2-B	13.609	2.094
Total	87.674	13.488

7.2 PROJECT ENVIRONMENTAL PROTECTION INVESTMENT

Investment in project environment investment includes two parts: Investment in mitigation works and environment management cost. The total environment management cost of GEF SANPRP is RMB2,980,000 (equivalent to USD458,462). Total investment in mitigation works is RMB5,773,200 (equivalent to USD888,184). The two parts amount to RMB8,753,200 (equivalent to USD1,346,646). The environmental management expenses budget is shown in Table 7.2, and the investment budget of the environmental engineering measures is shown in Table 7.3.

Table7.2 Environmental Management Cost Estimation of the Components

Components	Cost Estimation	
	RMB	USD
Component 1-A	700,000	107,692
Component 1-B	300,000	46,154
Component 1-C	600,000	92,308
Component 2-A	380,000	58,462
Component 2-B	500,000	76,923
Component 3	500,000	76,923
Total	2,980,000	458,462

Table7.3 Investments of the Components on Environmental Engineering Measures

Components	Total Investment	
	RMB	USD
Component 1-A	1,077,500	165,769
Component 1-B	70,000	10,769
Component 1-C	372,000	57,231
Component 2-A	3,840,000	590,769
Component 2-B	413,700	63,646
Total	5,773,200	888,184

8 STAFF TRAINING

To assure smooth and efficient environment management, trainings should be provided for employees on relevant expertise and skills. In addition to introducing importance of the Project to all employees, the trainings specific to working positions should be provided. Environment management training and experience exchange are recommended once a year. Training plan should be developed for each sub-project. Table 8.1 lists the training plan for environment protection personnel.

Table 8.1 Training Programme for Environmental Protection Staff

Components	Phase	Content of Training	Staff	Training Time	Total Cost (RMB)
Component 1-A	Construction Phase	Environmental management	4	Once before implementation	10,000Yuan
	Operation Phase	Environmental management, environment protection and monitoring	5	Once/year, 2days	54,000Yuan
Component 1-B	Construction Phase	Environmental management	2	Once before implementation	5,000Yuan
	Operation Phase	Environmental management, environment protection and monitoring	2	Once/year, 1 day	10,000Yuan
Component 1-C	Construction Phase	Environmental management	2	Once before implementation	5,000Yuan
	Operation Phase	Environmental management, environment protection and monitoring	3	Once/year, 1 day	15,000Yuan
Component 2-A	Construction Phase	Environmental management	2	Once before implementation	5,000 Yuan
	Operation Phase	Environmental management, environment protection and monitoring	3	Once/year, 1 day	5,000 Yuan
Component 2-B	Construction Phase	Environmental management	5	Once before implementation	5,000Yuan
	Operation Phase	Environmental management, environment protection and monitoring	10	Once/year, 1 day	10,000Yuan
Component 3		Environmental management	12	Twice per year, 2day/time	30,000Yuan
		Environment investigating and monitoring	15	Twice per year, 2day/time	40,000Yuan
Total					194,000Yuan

9 INFORMATION MANAGEMENT

9.1 INFORMATION EXCHANGE

The EMP requires that there are necessary information exchanges among the departments and posts instituted by the PMO, owner, contractor, and operator. Meanwhile, it requires that relevant information should be reported to the outside (such as the related sides, the publics, etc.).

Internal information exchanges can be conducted through various means like meetings, internal reports, but there must be one formal meeting every month and all the information exchanges should be recorded and put into files. External information exchanges should be conducted once every half year or every one year and the information exchanges with the coordinating units must be recorded and put into files.

9.2 INFORMATION RECORDING SYSTEM

A perfect recording system must be established to ensure the effective operation of the environmental management system and recording on the following aspects must be kept:

- Requirements of laws and regulations;
- Environmental pollutant parameter and relevant environmental impact;
- Training;
- Examining, checking and maintaining activities;
- Data monitoring;
- Effectiveness of rectifying and preventive measures;
- Examination and approval;
- Assessment;
- Other important information.

9.3 REPORTING MECHANISM

The contractor, operator, monitoring unit, environmental supervision engineers and the PMO should record the progress the implementation of the project, the implementation of EMP, and the result of monitoring and report it on time to the relevant departments. The reporting consists of the following aspects:

- The project environmental supervision engineer will record in great detail on a monthly basis the implementation of EMP and submit the weekly and monthly records in time to the project owner and the municipal project office. The weekly and monthly reports should contain the implementation of the environmental protection

measures, and progress of environmental monitoring and the data monitored.

- The contractor and operator will record in great detail the progress of the project and the implementation of EMP on a quarterly basis and report it in time to the PMO and the EPB concerned.
- The monitoring unit, after completing the entrusted monitoring tasks, will submit in time the monitoring report to the contractor (operator) and environmental supervision engineer.
- The PMO will send the project progress report to Shanghai EPB in time. The project progress report prepared by the PMO (such as the monthly, quarterly and annual reports) must contain the content of the progress of EMP, such as the progress and effect of the implementation of EMP, in particular, the results of environmental monitoring.
- In case incidents in serious violation of regulations on environmental protection should occur, the environmental supervision engineer and the PMO will report them to the local competent department of environmental protection. If necessary, the incidents will be reported to higher authorities.
- The EMP implementation report of the project must be submitted to the World Bank before March 31, the next year. The report may contain generally the following aspects:
 - (1) The implementation of the training plan;
 - (2) The progress of the project;
 - (3) The implementation of the environmental protection measures of the project;
 - (4) The progress of environmental monitoring and the major monitored results;
 - (5) If there are complaints from the public, the content of the complaints, the ways to solve the problems and the degree of satisfactions of the public will be recorded.
 - (6) EMP implementation plan for next year.

10 SUMMARY EMP OF THE COMPONENTS

10.1 COMPONENT 1-A

10.1.1 ABSTRACT OF EMP

TABLE 10.1 SUMMARY OF EMP FOR COMPONENT 1-A

Construction Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/Parameters	Monitoring Frequency	Monitoring Location
Dust	Strictly implement "Shanghai Dust Pollution Control Management Method"; Water along the transport routes and materials easy to produce dust; Materials should be put in appropriate places with covers or shall be watered to reduce dust; In transportation, covering shall be conducted to prevent overflow or dust; Vehicles entered on to the construction site should have their speed limited. Road surface shall be maintained clean and wet to reduce dust. It is prohibited to use air compressor to remove dust on vehicles and equipment; Within 30 days after the project is put into operation, the construction unit should level the construction site and remove soil, and piled materials.	4480	Contractor	SEP/B/Jinshan DEPB	TSP	1 time/quarter	Construction Point
Wastewater	Waste water collection tank, oil separator and sedimentation tank shall be set up in the equipment washing area and waste water shall go into the waste water collection tank. Sedimentation tanks shall be set up for the treatment of mixed rain water, mud water and accumulated water on the site up to the standard before	14320	Contractor	SEP/B/Jinshan DEPB	SS, Petroleum, BOD NH ₃ -N, COD _{Cr} , TP, Coliform	1 time/quarter	Outlet of sedimentation tank Hongqiao Port Moat

	report the case to the local department concerned.						
Environmental Management	Independent environmental supervision engineers should supervise the whole process of the entire project. Demand of civilized construction is asked for the contractor during the bidding process. when call for tender and tender, auditing and manage the technique measures and non- technique measures of the contractor.	60000	Contractor	PMO			
Staff Training	Civilized construction (contractor, workers). The training system includes training of professional health and safety regulations and contingency plan.	10000	Contractor	PMO			
Operation Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/ Parameters	Monitoring Frequency	Monitoring Location
Waste Water	It is prohibited to discharge livestock wastes and washing waste water into the farm moat. After expansion of capacity, the wastewater treatment facilities shall suffice to treat liquid fraction from bio-digester and other wastewater produced in the Project, with pollutants contained in the effluent to comply with the <i>Discharge Standard for Municipal Sewerage System</i> . Wastewater is treated by Jinshan Langxi Wastewater Treatment Plant (WWTP). Prevent leakage of pipelines; Rain water and sewage shall be separated, so as the clean water and waste water; Do a good job in seepage control in livestock farm, sewage storage area and livestock wastes treatment area.	7700	Shanghai Bright Holstan Co., Ltd.	SEP/B/Jinshan DEPB	NH ₃ -N,, COD _{Cr} , TP BOD ₅ Coliform	a.& b: 2 time/a c: 1 time/quarter	a. Hongqiao Port, b Moat, c Outlet of the wastewater treatment station, raw wastewater
Noise	Noise at the plant boundary shall be in conformity with category III standard of "Noise Standard for Industrial Enterprises Boundary "(GB12348-2008). Choose low-noise equipment and install sound insulation and sound elimination devices. Plant trees along the plant boundary.	480	Shanghai Bright Holstan Co., Ltd.	SEP/B/Jinshan DEPB	Leq	2 time/year	Factory Boundary
Waste gas	Biogas generated by anaerobic digestion shall be	28800	Shanghai Bright	SEP/B/Jinshan DEPB	Odor, H ₂ S, NH ₃	1 time/summer	Factory

	<p>collected for desulfurization and dehydration treatment;</p> <p>Dust generating process such as grinding, drying shall be treated using bag-room;</p> <p>Structures smelling odor shall strengthen ventilation;</p> <p>Plant trees along the plant boundary;</p> <p>Hydrogen sulfide contained in the biogas shall undergo desulfurization treatment.</p> <p>Health preventive separation distance shall be 300 meters. Protective area shall be fully greened and set up greenbelt.</p> <p>The air pollutants from biogas combustion will be emitted by 20 m high exhaust stack.</p> <p>Pretreatment workshops and other odor sources shall be provided with sealing, odor collection and other measures. The extracted odor shall be emitted at height after deodorization.</p> <p>Dust-removal measures must be adopted in the workshop producing dust. Operators there must have preventive devices.</p> <p>The concentration of hydrogen sulfide, ammonia and odor at plant boundary shall meet Class II standard defined in <i>Emission standards for odor pollutants GB14554-93</i>.</p> <p>Nitrogen oxide contained in exhaust gas of generator units must meet the Stage II limit provided in <i>Limits and measurement methods for exhaust pollutants from positive ignition (P.I.) engines of vehicles and vehicles equipped with P.I. engines GB14762-2002</i>, sulfur dioxide to meet Class II standard defined in <i>Integrated Emission Standard of Air Pollutants GB16297-1996</i>.</p>		Holstan Co., Ltd.		TSP, Smoke, SO ₂ ,NO _x		Boundary
Solid Wastes	<p>Sulfur from biogas desulfurization devices and discarded desulfuration agent must be collected for disposal by a qualified organization.</p> <p>It is prohibited to stack livestock wastes at any place in the pasture and disposed in sewage pit.</p>	12000	Shanghai Bright Holstan Co., Ltd.	SEPB/Jinshan DEPB	-	-	-

	<p>Solid wastes shall be collected and disposed by category.</p> <p>The analysis on heavy metal content of sludge dewatered from WWTP is as per the Solid Waste - Extraction Procedure for Leaching Toxicity (HJ/T299-2007).</p>						
Training	<p>Production workers, management staff should receive necessary qualification inspection and pre-professional technical training. The training system includes training of professional health and safety regulations and contingency plan.</p>	54000	Shanghai Bright Holstan Co., Ltd.	PMO			

10.1.2 ABSTRACT OF MONITORING PLAN

TABLE 10.2 SUMMARY OF MONITORING PLANS FOR COMPONENT1-A

POTENTIAL IMPACT		MONITORING LOCATION	EMP BUDGET IN RMB	RESPONSIBILITY FOR IMPLEMENTATION	MONITORING AGENCY	MONITORING PARAMETERS	MONITORING FREQUENCY	RESPONSIBILITY OF SUPERVISION
Construction Phase								
Dust		Construction site, two points	4,480 Yuan/two years	Contractor	A licensed monitoring unit	TSP	1 time/quarter, 2 time/ day, 2 years	SEPB/Jinshan DEPB
Water quality	Surface water	Hongqiao Port Moat 3 points	13200Yuan/two years			BOD ₅ , NH ₃ -N, COD _{Cr} , TP Coliform	1 time/quarter, 1 time/ day, 2 years	
	Construction Wastewater	Outlet of sedimentation tank	1,120 Yuan/two years			SS, Petroleum,		
Noise		Factory boundary, two points	3,840 Yuan/two years			Leq	1 time/quarter, 2 time/ day, 2 years	
Traffic and sampling			20,000 Yuan/two years					
Operation phase								
Water quality	Surface water	a. Hongqiao Port b Moat 3 points	3300Yuan/year	Shanghai Bright Holstan Co., Ltd	A licensed monitoring unit	BOD ₅ , COD _{Cr} , TP NH ₃ -N, Coliform	2 times/year	SEPB/Jinshan DEPB

	Tail water	Outlet of the wastewater treatment station, raw wastewater	4400Yuan/year			BOD ₅ , COD _{Cr} , TP NH ₃ -N, Coliform	1 time/ quarter	
Noise		Factory boundary, two points	480Yuan/year			Leq	2 times/year	
Waste gas	Odor and Dust	Factory boundary, two points	4,800 Yuan/year	Shanghai Bright Holstan Co., Ltd	A licensed monitoring unit	Odor, H ₂ S, NH ₃ ,TSP	1 time /summer, 1 day/time, 4 samples/day, 1 year	
	Burning flue gas	Outlet of flue gas for engine and exhaust stack	24,000 Yuan			Smoke, SO ₂ ,NO _x	1 time /quarter, 1 day/time, 4 samples/day, 1 year	
Sludge		Sludge dewatered	12000Yuan	Ditto	Ditto	Pb,Cd,Cu,Zn,Hg, Concentration and toxicity characteristic leaching	1 time/quarter, one years	
Traffic and sampling			10,000 Yuan					
Total		101,620Yuan/three years						

10.2 COMPONENT 1-B

10.2.1 ABSTRACT OF EMP

TABLE 10.3 SUMMARY OF EMP FOR COMPONENT 1-B

Construction Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/ Parameters	Monitoring Frequency	Monitoring Location
Dust	Strictly implement "Shanghai Dust Pollution Control Management Method"; Water along the transport routes and materials easy to produce dust; Materials should be put in appropriate places with covers or shall be watered to reduce dust; In transportation, covering shall be conducted to prevent overflow or dust; Vehicles entered on to the construction site should have their speed limited. Road surface shall be maintained clean and wet to reduce dust. It is prohibited to use air compressor to remove dust on vehicles and equipment; Within 30 days after the project is put into operation, the construction unit should level the construction site and remove soil, and piled materials.	2400	Contractor	SEPB/ Chongming CEPB	TSP	1 time/quarter	Construction Point
Wastewater	Waste water collection tank, oil separator and sedimentation tank shall be set up in the equipment washing area and waste water shall go into the waste water collection tank. Sedimentation tanks shall be set up for the treatment of mixed rain water, mud water and accumulated water on the site up to the standard before discharging. Regularly monitor surface waters,	6320	Contractor	SEPB/ Chongming CEPB	SS, Petroleum , BOD NH ₃ -N, COD _{Cr} , TP;Coliform	1 time/quarter	Liuyao River Moat Outlet of sedimentation tank
Noise	Vehicles and equipment needs maintenance and repair to make them reach related standard. High-noised construction operation is prohibited from 10:00 at	1920	Contractor	SEPB/ Chongming CEPB	Leq	1 time/quarter	Factory boundary

	night to 6:00 in the morning. Choose low-noise equipment and regularly repair and maintain construction machinery; For a strong-noise structure, such as room for generators, sound- insulation should be considered in the building design.						
Solid Wastes	Mud on the wheels of vehicles must be cleaned in time. No garbage buried pit shall be set up on the construction site. Spoil and building garbage produced in the construction should be handled in accordance with "Management and Regulation of the Shanghai Municipality Regarding Disposal of Building Garbage and Engineering Spoil". In case toxic and hazardous wastes are produced, construction should be suspended and the EP and health department shall be contacted in time. Construction can be restarted after safety measures are adopted.	-	Contractor	SEPB/ Chongming CEPB	-	-	-
Ecological Impact	Wanton felling of trees shall be prohibited in the construction period; Adopt soil and water conservation mitigation measures; Restore vegetation and plant trees after the completion of project.	-	Contractor	SEPB/ Chongming CEPB	-	-	-
Public Health and Safety	Strengthen hygiene and safety of dormitories of construction workers and provide simple medical conditions; Strengthen education and training on prevention of infectious diseases.	-	Contractor	Shanghai Health Bureau/ Chongming County Health Bureau	-	-	-
Social Impact	Construction activities shall be well planned to reduce impact on public service facilities and residents.	-	Contractor	SEPB/ Chongming CEPB	-	-	-
Cultural Relics	In case cultural relics are found, protect the site and report the case to the local department concerned.	-	Contractor	SEPB/ Chongming CEPB			
Environmental Management	Independent environmental supervision engineers should supervise the whole process of the entire project. Demand of civilized construction is asked for the contractor during the bidding process, when call for tender, auditing and manage the technique measures and non- technique measures of the contractor.		Contractor	PMO			
Staff Training	Civilized construction (contractor, workers). The training system includes training of professional health and safety regulations and contingency plan.	5000	Contractor	PMO	-	-	-
Operation Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/	Monitoring Frequency	Monitoring Location

					Parameters		
Wastewater	It is prohibited to discharge livestock wastes and washing waste water into the farm moat. These shall be collected and used as liquid organic fertilizer after anaerobic treatment; Liquid fraction from bio-digester is revered as liquid fertilizer to farmlands. Do not irrigate before rain and prevent leakage of pipelines; Cover the storage tank to prevent overflow; Rain water and sewage shall be separated, so as the clean water and waste water; Do a good job in seepage control in livestock farm, sewage storage area and livestock wastes treatment area.; Regularly monitor surface waters;	15400	Shanghai Shenye Dairy Cooperative	SEPB/Chongming CEPB	NH ₃ -N,, COD _{Cr} , TP BOD ₅ , Coliform	a.& b: 2 time/a c: 1 time/quarter	a. Rivers b. Liquid fraction from biodigester storage tank, raw wastewater
Noise	Noise at the plant boundary shall be in conformity with the standard of "Noise Standard for Industrial Enterprises Boundary "(GB12348-2008). Choose low-noise equipment and install sound insulation and sound elimination devices. Plant trees along the plant boundary.	960	Shanghai Shenye Dairy Cooperative	SEPB/Chongming CEPB	Leq	2 time/year	Factory Boundary
Odor and Dust	Dust generating process shall be treated using bag-room; Structures smelling odor shall strengthen ventilation; Plant trees along the plant boundary; Health preventive separation distance shall be 500 meters.	9600	Ditto	SEPB/Chongming CEPB	Odor, H ₂ S, NH ₃	1 time/summer	Factory Boundary
Solid Wastes	It is prohibited to stack livestock wastes at any place in the pasture and disposed in sewage pit. Solid wastes shall be collected and disposed by category.	-	Ditto	SEPB/Chongming CEPB	-	-	-
Soil	Follow-up monitoring and management shall be conducted on farmland applied with liquid fraction from biodigester organic fertilizer and solid organic fertilizer.	3000	Ditto	SEPB/Chongming CEPB	Organic matters, TN, TP,K	2 time/year	Fertilizer application point on feed field
Training	Production workors, management staff should receive necessary qualification inspection and pre-professional technical training.	10000	Ditto	PMO			

10.2.2 ABSTRACT OF MONITORING PLAN

TABLE 10.4 SUMMARY OF MONITORING PLANS FOR COMPONENT 1-B

Potential Impact	Monitoring Location	EMP Budget in RMB yuan	Responsibility for Implementation	Monitoring Agency	Monitoring Parameters	Monitoring Frequency	Responsibility of Supervision
Construction Phase							
Dust	Construction site, two points	2240	Contractor	A licensed monitoring unit	TSP	Quarterly	SEPB/Chongming CEPB
Wastewater	Outlet of sedimentation tank Liuyao River, Moat 3 points	7160			SS, Petroleum, BOD ₅ , NH ₃ -N, COD _{cr} , TP Coliform	Quarterly	
Noise	Factory boundary, two points	1920			Leq	Quarterly	
Soil	Fertilizer application point on feed field	1500			Organic matters, TN, TP, K	Twice per year, 1 year	
Traffic and sampling		10000					
Operation phase							
Wastewater	a: 3 Rivers adjacent to fertilization points; b: Liquid fraction from biodigester, raw wastewater	15400	Shanghai Shenyue Dairy Cooperative	A licensed monitoring unit	NH ₃ -N, COD _{cr} , TP, BOD ₅ , Coliform	a: Twice per year b: Quarterly	SEPB/Chongming CEPB

Noise	Factory boundary, two points	960			Leq	Twice per year	
Odor and Dust	Factory boundary, two points	9600	Shanghai Shenye Dairy Cooperative	A licensed monitoring unit	Odor, H ₂ S, NH ₃	Once per year (Summer)	SEPB/Chongming CEPB
Soil	Fertilizer application point on feed field.3 points	3000			Organic matters, TN, TP, K	Twice per year, two years	
Traffic and sampling		20000					
Total	71,780 Yuan/three years						

10.3 COMPONENT 1-C

10.3.1 ABSTRACT OF EMP

TABLE 10.5 SUMMARY OF EMP FOR COMPONENT 1-C

Construction Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/Parameters	Monitoring Frequency	Monitoring Location
Dust	Strictly implement "Shanghai Dust Pollution Control Management Method"; Water along the transport routes and materials easy to produce dust; Materials should be put in appropriate places with covers or shall be watered to reduce dust; In transportation, covering shall be conducted to prevent overflow or dust; Vehicles entered on to the construction site should have their speed limited. Road surface shall be maintained clean and wet to reduce dust. It is prohibited to use air compressor to remove dust on vehicles and equipment; Within 30 days after the project is put into operation, the construction unit should level the construction site and remove soil, and piled materials.	2240	Contractor	SEPB/ Chongming CEPB	TSP	1 time/quarter	Construction Point
Wastewater	Waste water collection tank, oil separator and sedimentation tank shall be set up in the equipment washing area and waste water shall go into the waste water collection tank. Sedimentation tanks shall be set up for the treatment of mixed rain water, mud water and accumulated water on the site up to the standard before discharging. Regularly monitor surface waters;	2760	Contractor	SEPB/ Chongming CEPB	SS, Petroleum, BOD, NH ₃ -N, COD _{Cr} , TP, Coliform	1 time/quarter	Open ditch Outlet of sedimentation tank
Noise	Vehicles and equipment needs maintenance and repair to	1920	Contractor	SEPB/	Leq	1 time/quarter	Factory

	<p>make them reach related standard.</p> <p>High-noised construction operation is prohibited from 10:00 at night to 6:00 in the morning.</p> <p>Choose low-noise equipment and regularly repair and maintain construction machinery;</p> <p>For a strong-noise structure, such as room for generators, sound- insulation should be considered in the building design.</p>			Chongming CEPB			boundary
Solid Wastes	<p>Mud on the wheels of vehicles must be cleaned in time.</p> <p>No garbage buried pit shall be set up on the construction site.</p> <p>Spoil and building garbage produced in the construction should be handled in accordance with "Management and Regulation of the Shanghai Municipality Regarding Disposal of Building Garbage and Engineering Spoil".</p> <p>In case toxic and hazardous wastes are produced, construction should be suspended and the EP and health department shall be contacted in time. Construction can be restarted after safety measures are adopted.</p>	-	Contractor	SEPBB/ Chongming CEPB	-	-	-
Ecological Impact	<p>Wanton felling of trees shall be prohibited in the construction period;</p> <p>Adopt soil and water conservation mitigation measures;</p> <p>Restore vegetation and plant trees after the completion of project.</p>	-	Contractor	SEPBB/ Chongming CEPB	-	-	-
Public Health and Safety	<p>Strengthen hygiene and safety of dormitories of construction workers and provide simple medical conditions;</p> <p>Strengthen education and training on prevention of infectious diseases.</p>	-	Contractor	Shanghai Health Bureau/ Chongming County Health Bureau	-	-	-
Social Impact	<p>Construction activities shall be well planned to reduce impact on public service facilities and residents.</p>	-	Contractor	SEPBB/ Chongming CEPB	-	-	-
Cultural Relics	<p>In case cultural relics are found, protect the site and report the case to the local department concerned.</p>	-	Contractor	SEPBB/ Chongming CEPB	-	-	-
Retirement of old digestion tank	<p>After the Project is completed, the existing biogas plant will be removed. Residuals in the biogas digester will be used as raw materials of organic fertilizers, construction wastes will be disposed of according to requirements of the Construction Wastes Management Office, and its site will</p>	-	Contractor	SEPBB/ Chongming CEPB			

	be prepared and afforested.						
Environmental Management	Independent environmental supervision engineers should supervise the whole process of the entire project. Demand of civilized construction is asked for the contractor during the bidding process. When call for tender, auditing and manage the technique measures and non- technique measures of the contractor.		Contractor	PMO			
Staff Training	Civilized construction (contractor, workers). The training system includes training of professional health and safety regulations and contingency plan.	5000	Contractor	PMO	-	-	-
Operation Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/Parameters	Monitoring Frequency	Monitoring Location
Wastewater	It is prohibited to discharge livestock wastes and washing waste water into the farm moat. These shall be collected and used as liquid organic fertilizer after anaerobic treatment; Liquid fraction from bio-digester is revered as liquid fertilizer to farmlands. Do not irrigate before rain and prevent leakage of pipelines; Cover the storage tank to prevent overflow; Rain water and sewage shall be separated, so as the clean water and waste water; Do a good job in seepage control in livestock farm, sewage storage area and livestock wastes treatment area.	15440	Chongming ShuxinTown Qianwei Village Committee	SEPB/ Chongming CEPB	NH ₃ -N,, CODcr, TP BOD ₅ , Coliform	a. : 2 time/a b: 1 time/quarter	a. rivers b . Liquid fraction from biodigester storage tank, raw wastewater
Noise	Noise at the plant boundary shall be in conformity with category I of the standard of "Noise Standard for Industrial Enterprises Boundary "(GB12348-2008). Choose low-noise equipment and install sound insulation and sound elimination devices. Plant trees along the plant boundary.	960	Ditto	SEPB/ Chongming CEPB	Leq	2 time/year	Factory Boundary, 2 points
Waste gas	Biogas generated by anaerobic digestion shall be collected for desulfurization and dehydration treatment; Dust generating process shall be treated using bag-room; Structures smelling odor shall strengthen ventilation; Plant trees along the plant boundary; Health preventive separation distance shall be 500 meters. The air pollutants from biogas combustion will be emitted by an exhaust stack.	57600	Ditto	SEPB/ Chongming CEPB	Odor, H ₂ S, NH ₃ TSP ,Smoke, SO ₂ ,NOx	1 Period/summer, 1 time/day, 2 years	Factory Boundary, 2 points

Solid Wastes	Sulfur from biogas desulfurization devices and discarded desulfuration agent must be collected for disposal by a qualified organization. It is prohibited to stack livestock wastes at any place in the pasture and disposed in sewage pit. Solid wastes shall be collected and disposed by category.	-	Ditto	SEPB/ Chongming CEPB	-	-	-
Soil	Follow-up monitoring and management shall be conducted on farmland applied with liquid fraction from biodigester organic fertilizer and solid organic fertilizer.	3000	Ditto	SEPB/ Chongming CEPB	Organic matters, TN, TP, K	2 time/year	Fertilizer application point on feed field
Training	Production workers, management staff should receive necessary qualification inspection and pre-professional technical training. The training system includes training of professional health and safety regulations and contingency plan.	15000	Ditto	PMO			

10.3.2 ABSTRACT OF MONITORING PLAN

TABLE 10.6 SUMMARY OF MONITORING PLANS FOR COMPONENT 1-C

POTENTIAL IMPACT	MONITORING LOCATION	EMP BUDGET IN RMB	RESPONSIBILITY FOR IMPLEMENTATION	MONITORING AGENCY	MONITORING PARAMETERS	MONITORING FREQUENCY	RESPONSIBILITY OF SUPERVISION
Construction Phase							
Dust	Construction site, two points	2,240Yuan	Contractor	A licensed monitoring unit	TSP	Quarterly	SEPB/Chongming CEPB
Wastewater	a. Open ditch b. Outlet of sedimentation tank	2,760Yuan			a., BOD ₅ NH ₃ -N, COD _{cr} , TP, Coliform b. SS, petroleum		
Noise	Factory boundary, two points	1,920Yuan			Leq		
Soil	Fertilizer applying point of feed field, 3 points	1,500Yuan			Organic matter, TN, TP,K	Twice /year	
Traffic and sampling		10,000 Yuan					
Operation phase							
Wastewater	a:3 Rivers adjacent to fertilization points; b:Liquid fraction from	15400	Chongming ShuxinTown Qianwei Village	A licensed monitoring unit	NH ₃ -N, COD _{cr} , TP, BOD ₅ , Coliform	a.: Twice per year b: Quarterly	SEPB/Chongming CEPB

		biodigester , raw wastewater		Committee			
Noise		Factory boundary, two points	960 Yuan			Leq	Twice per year
Waste gas	Odor and Dust	Factory boundary, two points	9,600 Yuan	Chongming ShuxinTown Qianwei Village Committee	A licensed monitoring unit	Odor, H ₂ S, NH ₃ ,TSP	Once per year (Summer)
	Burning flue gas	Outlet of flue gas	48,000 Yuan			Smoke, SO ₂ ,NOx	1 time/quarter
Soil		Fertilizer application point on feed field.3 points	3000				Organic matters, TN, TP,K
Traffic and sampling			20,000 Yuan				
Total	115,380 Yuan/three years						

10.4 COMPONENT 2-A

10.4.1 ABSTRACT OF EMP

TABLE 10.7 SUMMARY OF EMP FOR COMPONENT 2-A

Construction Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/Parameters	Monitoring Frequency	Monitoring Location
Dust	Materials should be put in appropriate places with covers or shall be watered to reduce dust; In transportation, covering shall be conducted to prevent overflow or dust.	4480	Contractor	SEPBJiading DEPB	TSP	1time /quarter	Construction point
Wastewater	Sedimentation tank shall be set up for sludge waste water in dredging area. Water on the upper level can be discharged after sedimentation of slurry. Regularly monitor surface waters;	6600	Contractor	SEPBJiading DEPB	SS, Petroleum, NH ₃ -N, CODcr, TP BOD ₅ , Coliform	a. 1time/year b. 1time/quarter	a. Miaojing, Gujing, Shenzhaijing, b. Outlet of sedimentation tank
Noise	Vehicles and equipment needs maintenance and repair to make them reach related standard; Simple sound barrier shall be installed when construction is taking nearby residential area.	3840	Contractor	SEPBJiading DEPB	Leq	1time /quarter	Construction site boundary
Sediments	As for the sediment mud, if the toxic leaching test (<i>Identification standard hazardous wastes- leaching toxicity identification</i> (GB5085.3—2007) shows that it conforms to the agricultural use requirements, it can be used for farmland or afforestation. As for the mud, if the test finds that its toxicity exceeds the limitation, it should be deemed as solid waste and committed to qualified unit for disposal.	16000	Contractor	SEPBJiading DEPB	Pb, Cd, Cu, Zn, Hg Concentration and toxicity characteristic leaching	1time /quarter	Sedimentation tank
Solid Wastes	Solid wastes shall be moved in time according to related regulations to avoid secondary pollution.	-	Contractor	SEPBJiading DEPB	-	-	-
Ecological Impact	Wanton felling of trees shall be prohibited in the	-	Contractor	SEPBJiading DEPB	-	-	-

	construction period; Adopt soil and water conservation mitigation measures; Restore vegetation and plant trees after the completion of project.						
Public Health and Safety	Strengthen hygiene and safety of dormitories of construction workers and provide simple medical conditions; Strengthen education and training on prevention of infectious diseases.	-	Contractor	Shanghai Health Bureau/Jiading District Health Bureau	-	-	-
Social Impact	Construction activities shall be well planned to reduce impact on public service facilities and residents.	-	Contractor	SEP/BI/Jiading DEPB	-	-	-
Cultural Relics	In case cultural relics are found, protect the site and report the case to the local department concerned.	-	Contractor	SEP/BI/Jiading DEPB	-	-	-
Environmental Management	Independent environmental supervision engineers should supervise the whole process of the entire project. Demand of civilized construction is asked for the contractor during the bidding process. When call for tender, auditing and manage the technique measures and non- technique measures of the contractor.		Contractor	PMO			
Staff Training	Civilized construction (contractor, workers). The training system includes training of professional health and safety regulations and contingency plan.	5000	Contractor	PMO			
Operation Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/Parameters	Monitoring Frequency	Monitoring Location
River Surface Water	Be sure to keep smooth current of rivers. Discharging untreated sewage into river is strictly prohibited. Be sure that water plant is under orderly control. Regularly monitor water quality of rivers accepting tail water.	3300	Shanghai International Automobile City Newanting United Development Co., Ltd.	SEP/BI/Jiading DEPB	NH ₃ -N, COD _{Cr} , TP, BOD ₅ , Coliform	2 time /year	Miaojing, Gujing, Shenzhajing
Water Plant	Strengthen management and prevent foreign plant invading.	-	PIA	SEP/BI/Jiading DEPB	-	-	-
Slope Greening and Artificial Wetland	Strengthen protection of greening landscape along the rivers. Finalize measures of soil and water conservation. Protect vegetation such as reed on wetland.	-	Ditto	SEP/BI/Jiading DEPB	-	-	-

Wastewater	Be sure of the normal operation of artificial wetland and the artificial wetland of underflow type is in good working conditions. Regularly monitor water quality of outlet to ensure that tail water reaches discharge standard before going to Miaojing river.		Ditto	SEPB/Jiading DEPB			
Sediments	Regularly monitor sediments of rivers.	9000	Ditto	SEPB/Jiading DEPB	Cd,Cu,Zn,Hg, Concentration and toxicity characteristic leaching	1 time/year	Miaojing, Gujing, Shenzhajing
Training	Management staff should receive necessary qualification inspection and pre-professional technical training. The training system includes training of professional health and safety regulations and contingency plan.	5000	Ditto	PMO			

10.4.2 ABSTRACT OF MONITORING PLAN

TABLE 10.8 SUMMARY OF MONITORING PLANS FOR COMPONENT 2-A

Construction Phase								
Environmental Element	Monitoring Location	Monitoring Parameters	Monitoring Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Noise	Factory Boundary, 2 points	Leq	1 time/quarter, 1 day/time, 2 times/day, two years	120	3840	Contractor	A licensed monitoring unit	SEPB/Jiading DEPB
Dust	Construction site, two points	TSP	1 time/quarter, 1 day/time, 2 times/day, two years	140	4480	Ditto	Ditto	Ditto
Surface water	River accepting water, two points,	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	1 time/year, 1 day/time, two years	550	4400	Ditto	Ditto	Ditto
Construction wastewater	Outlet of sedimentation tank, two points	SS, Petroleum	1 time/quarter, 1 day/time, once/day, two years	140	2240	Ditto	Ditto	Ditto
Sediments	Sedimentation tank	Pb, Cd, Cu, Zn, Hg, Concentration and toxicity characteristic leaching	2 time/year, two years	3000	12000	Ditto	Ditto	Ditto
Traffic and sampling			Two year	10000/year	20000			
Total					46960			
Operation Phase								

Environmental Element	Monitoring Location	Monitoring Parameters	Monitoring Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Surface water	Miaojing Creek, Gujing Creek, Shenzhaijing Creek, three points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	2 time/year, 1 day/time, one year	550	3300	Shanghai International Automobile City Newanting Joint Development Co., Ltd	A licensed monitoring unit	SEPB/Jiading DEPB
Sediments	Miaojing, Gujing, Shenzhaijing, 3points	Pb,Cd,Cu,Zn,Hg, Concentration and toxicity characteristic leaching	1 time/year, 1 year	3000	9000	Ditto	Ditto	Ditto
Traffic and sampling			One year	10000	10000	Ditto	Ditto	Ditto
Total					22300			
Total Estimate					69260			

10.5 COMPONENT 2-B

10.5.1 ABSTRACT OF EMP

TABLE 10.9 SUMMARY OF EMP FOR COMPONENT 2-B

Construction Stage							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/Parameters	Monitoring Frequency	Monitoring Location
Dust	Strictly implement "Shanghai Dust Pollution Control Management Method"; Water along the transport routes and materials easy to produce dust; Materials should be put in appropriate places with covers or shall be watered to reduce dust; In transportation, covering shall be conducted to prevent overflow or dust; Vehicles entered on to the construction site should have their speed limited. Road surface shall be maintained clean and wet to reduce dust. It is prohibited to use air compressor to remove dust on vehicles and equipment; Within 30 days after the project is put into operation, the construction unit should level the construction site and remove soil, and piled materials.	2240	Contractor	SEP/B/ Qingpu DEPB	TSP	1 time/quarter	Construction Point (2 points on average)
Wastewater	Waste water collection tank, oil separator and sedimentation tank shall be set up in the equipment washing area and waste water shall go into the waste water collection tank. Sedimentation tanks shall be set up for the treatment of mixed rain water, mud water and accumulated water on the site up to the standard before discharging. Regularly monitor surface waters;	5620	Contractor	SEP/B/ Qingpu DEPB	SS, Oil, BOD, NH ₃ -N, CODcr, TP, Coliform	1 time/quarter	River accepting waste water (2 points on average) Outlet of sedimentation tank
Solid Wastes	Mud on the wheels of vehicles must be cleaned in time. No garbage buried pit shall be set up on the	-	Contractor	SEP/B/ Qingpu	-	-	-

	<p>construction site.</p> <p>Spoil and building garbage produced in the construction should be handled in accordance with "Management and Regulation of the Shanghai Municipality Regarding Disposal of Building Garbage and Engineering Spoil".</p> <p>In case toxic and hazardous wastes are produced, construction should be suspended and the EP and health department shall be contacted in time.</p> <p>Construction can be restarted after safety measures are adopted.</p>			DEPB			
Noise	<p>Vehicles and equipment needs maintenance and repair to make them reach related standard.</p> <p>High-noised construction operation is prohibited from 10:00 at night to 6:00 in the morning.</p> <p>Simple sound barrier shall be set up when construction is taking nearby residential area.</p>	1920	Contractor	SEPB/ Qingpu DEPB	Leq	1 time/quarter	Factory boundary (2 points on average)
Ecological Impact	<p>Wanton felling of trees shall be prohibited in the construction period;</p> <p>Adopt soil and water conservation mitigation measures;</p> <p>Restore vegetation and plant trees after the completion of project.</p>	-	Contractor	SEPB/ Qingpu DEPB	-	-	-
Public Health and Safety	<p>Strengthen hygiene and safety of dormitories of construction workers and provide simple medical conditions;</p> <p>Strengthen education and training on prevention of infectious diseases.</p>	-	Contractor	Shanghai Health Bureau/Qingpu District Health Bureau	-	-	-
Social Impact	<p>Construction activities shall be well planned to reduce impact on public service facilities and residents. Road excavation will affect road traffic and persons on duty shall be arranged at the crossroads to direct traffic to guard against the occurrence of traffic accidents.</p>	-	Contractor	SEPB/ Qingpu DEPB	-	-	-
Cultural Relics	<p>In case cultural relics are found, protect the site and report the case to the local department concerned.</p>	-	Contractor	SEPB/ Qingpu DEPB	-	-	-
Environmental Management	<p>Independent environmental supervision engineers should supervise the whole process of the entire project.</p> <p>Demand of civilized construction is asked for the</p>		Contractor	PMO			

	contractor during the bidding process. When call for tender, auditing and manage the technique measures and non- technique measures of the contractor.						
Staff Training	Civilized construction (contractor, workers).The training system includes training of professional health and safety regulations and contingency plan.	5000	Contractor	PMO			
Operation Period							
Potential Impact	Mitigation Measures	EMP Budget in RMB	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/ Parameters	Monitoring Frequency	Monitoring Location
Wastewater	Be sure of the normal operation of sewage pump station and the constructed wetland of underflow type is in good working conditions. Regularly monitor water quality of outlet to ensure that tail water reaches discharge standard before going to river accepting waste water. Regularly monitor water quality of rivers accepting tail water.	39600	Liantang Town Government and Jinze Town Government, Qingpu District, Shanghai	SEPB/ Qingpu DEPB	SS, Oil, BOD, NH ₃ -N, COD _{cr} , TP, Coliform	2 time/year	River accepting waste water and tail water outlet
Noise	Choose low-noise equipment; Install sound insulation and sound elimination devices; Plant trees along the plant boundary.	5760	Ditto	SEPB/ Qingpu DEPB	Leq	2 time /year	Station Boundary,
Odor	Small volume of offensive smell generated from sewage treatment stations shall be emitted by means of ventilation system on the roof. Pay attention to well ventilation; Plant trees.	16800	Ditto	SEPB/ Qingpu DEPB	Odor	Once summer, in	Station Boundary,
Solid Wastes	Residues of grille and sludge from sedimentation tanks must be regularly collected. Solid wastes shall be treated by the sanitation department in time. Filler of artificial filtration tank shall be replaced regularly and shall be regarded as solid wastes and sent for disposal by qualified unit to avoid secondary pollution.	-	Ditto	SEPB/ Qingpu DEPB	-	-	-
Training	Management staff should receive necessary qualification inspection and pre-professional technical training. The training system includes training of professional health and safety regulations and contingency plan.	10000	Ditto	PMO			

10.5.2 ABSTRACT OF MONITORING PLAN

TABLE 10.10 SUMMARY OF MONITORING PLANS FOR COMPONENT 2-B

Construction Phase							
Environmental Element	Monitoring Location	Monitoring Parameters	Monitoring Frequency	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Noise	Factory Boundary, 2 points	Leq	1 time/quarter, 1 day/time, 2 times/day, one year	1920	Contractor	A licensed monitoring unit	SEPB/Qingpu DEPB
Fly dust	Construction site, two points	TSP	1 time/quarter, 1 day/time, 2 times/day, one year	2240	Ditto	Ditto	Ditto
Surface water	River accepting water, two points,	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	1 time/quarter, 1 day/time, one year	4400	Ditto	Ditto	Ditto
Construction wastewater	Outlet of sedimentation tank, two points	SS, Petroleum	1 time/quarter, 1 day/time, once/day, one year	1120	Ditto	Ditto	Ditto
Traffic and sampling			one year	10000			
Total				19680			
Operation Phase							
Environmental Element	Monitoring Location	Monitoring Parameters	Monitoring Frequency	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Odor	Factory Boundary,	Odor concentration	Once in summer, two years	16800	Liantang Town	A licensed	SEPB/Qingpu

	12 points				Government and Jinze Town Government, Qingpu District, Shanghai	monitoring unit	DEPB
Noise	Factory Boundary, 12 points	Leq	Twice per year, two years	5760	Ditto	Ditto	Ditto
Surface water	River accepting water, six points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	1 time/quarter, 1 day/time, 2 times/day, one year	13200	Ditto	Ditto	Ditto
Tail water	Outlet of tail water, six points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	1 time/quarter, 1 day/time, once/day, two years	26400	Ditto	Ditto	Ditto
Traffic and sampling			two years	20000	Ditto	Ditto	Ditto
Total				82160			
Total Estimate				101840			

10.6 COMPONENT 3

10.6.1 ABSTRACT OF EMP

Table 10.11 EMP Summary Table for Integrated Agricultural Pollution Reduction Techniques

Implementation Stage						
Potential Impacts/ Issues	Mitigation Measures	EMP Budget (RMB)	Responsibility for Implementation	Responsibility for Supervision	Monitoring Indicators/ Parameters	Monitoring Frequency
Surface water	<ul style="list-style-type: none"> ● Regularly check application of organic fertilizers; ● Reduce use of chemical fertilizers and prevent N and P from contaminating surface waters; ● Regularly sample and analyze soils, check for improvement of soil fertility; ● Regularly check crops for pests and use low-toxicity pesticides; ● Use physical entrapping, reasonable pesticide application and other green control techniques; ● In order to reduce non-point pollution, fertilizer application and excessive fertilization shall not be performed before rain. ● In order to prevent loss of pesticides and contaminate surface water, pesticides 	9900	Shanghai Agricultural Technology Extension and Service Center	SEPB/ Jinshan DEPB Qingpu DEPB Chongming CEPB	COD _{Cr} , BOD ₅ , NH ₃ -N, TP Coliform	Twice per year, Three years

	<p>application shall not be performed before rain.</p> <ul style="list-style-type: none"> ● Regularly monitor surface waters, including COD, BOD, NH₃-N, TP and Coliform. 					
Soil	<ul style="list-style-type: none"> ● Reduce use of chemical fertilizers to prevent soil deterioration. ● Reasonably apply organic fertilizers to improve soil fertility and soil structure. ● Use highly-efficient, low-toxic and low-residual pesticides. ● Reduce use of chemical fertilizers to prevent soil deterioration. ● Reasonably apply organic fertilizers to improve soil fertility and soil structure. ● Use highly-efficient, low-toxic and low-residual pesticides. 	45000	Ditto	Ditto	Organic matter, TN, TP, K	Twice per year, Three years
Ecological environment	<ul style="list-style-type: none"> ● Reasonably use pesticides to reduce ecological impact. ● Train village cadres, farmers and pesticide distributors to make them familiar with chemicals that may pose adverse effects to the environment, recommend proper sprinkling methods and equipments; ● Use pesticides with low half-life residuals; ● Use diverse pest control techniques (agricultural/physical, biological and chemical) to ensure that pests will not develop resistance to pesticides; 	—	Ditto	Ditto	—	—

Occupational and Health	<ul style="list-style-type: none"> ● Train village cadres, farmers and pesticide distributors; ● Effective equipments and operating procedures; ● Wear PPEs, including long-sleeved clothes, face mask, gloves, trousers and boots; ● Sprinkling methods under static wind conditions; ● Safe storage and lockup of chemicals;and, ● Safe disposal methods of chemicals packaging and wastes. 	—	Ditto	SEPB/ Jinshan DHB Qingpu DHB Chongming CHB	—	—
Environmental risks	<p>Below are measures to mitigate potential environment risks arising from use of pesticides:</p> <ul style="list-style-type: none"> ● Train village cadres, farmers and pesticide distributors to make them familiar with chemicals that may pose adverse effects to the environment, recommend proper sprinkling methods and equipments. ● Have village cadres to oversee sprinkling process to ensure that no toxic chemicals are sprinkled at adjacent potable water sources. ● Buy and use reliable and safe sprinkling equipments; ● Use pesticides with low half-life residuals; and ● Use diverse pest control techniques (agricultural/physical, biological and chemical) to ensure that pests will not develop resistance to pesticides; 	-	Ditto	SEPB/ Jinshan DEPB Qingpu DEPB Chongming CEPB	—	—

10.6.2 ABSTRACT OF MONITORING PLAN

Table 10.12 Environment Monitoring Program for Integrated Agricultural Pollution Reduction Techniques

Pilot Bases	Environmental Element	Monitoring Location	Monitoring Parameters	Monitoring Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Monitoring Agency	Responsibility of Supervision
Jinshan Langxia; Qingpu Zhujiajiao; Chongming Changjiang Farm	Surface water	Huigaojing; Mojiacun River; Zhi river; 3 points	COD _{Cr} , BOD ₅ , NH ₃ -N, TP, Coliform	Twice/year, 1day/time, three years	550	9900	Shanghai Agricultural Technology Extension and Service Center	A licensed monitoring unit	SEPB/Jinshan DEPB/ Qingpu DEPB/ Chongming CEPB
	Soil	Soil fertility monitoring points, 30 points	Organic matter TN,TP, K	twice/year, three years	250	45000	Ditto	Ditto	Ditto
Traffic and sampling				three years	15000	45000			
Total						99900			

10.6.3 ABSTRACT OF INVESTIGATING PLAN

Table 10.13 Environment Investigating Program for Agricultural Non-point Pollution Control Technology Demonstration

Pilot Bases	Investigation Element	Investigating Item	Investigation Parameters (kg/mu)	Investigating Frequency	Unit Price (RMB/Time)	EMP Budget in RMB	Responsibility for Implementation	Investigating Agency	Responsibility of Supervision		
Jinshan Langxia; Qingpu Zhujiajiao; Chongming Changjiang Farm	Application of Organic Fertilizer	Formula fertilization special for rice	Application Volume	Eix times per year, 3day/time, two years	12000/time	144,000	Shanghai Agricultural Technology Extension and Service Center	A licensed investgating unit	AC(City, Jinshan)		
		Formula fertilization special for vegetables									
		Commodity organic fertilizers									
	Application of Chemical Fertilizer	Nitrogen fertilizer	Application Volume	Eix times per year, 3day/time, two years			Ditto	Ditto	Ditto		
		Phosphate fertilizer									
		Inorganic compound fertilizer									
	Crop Stalks Back to Field		Reaching 80%	Two times per year,			Ditto	Ditto	Ditto		
	Application of Pesticide	Medium toxic pesticides	Application Volume,	Eix times per year, 3day/time, two years			Ditto	Ditto	Ditto		
		Low toxic pesticides									
	Application of green preventive technology	Frequency-Vibration type killing lamp							Ditto	Ditto	Ditto
		Sex attractant									
		Insect-catching board									
Spraying devices											

		Green fertilizer and crop rotation							
	Crop Output	Rice	Crop Output	Two times per year,			Ditto	Ditto	Ditto
		Vegetables	Output	Four times per year					
	Traffic			Two years	48000/year	96,000			
Total						240,000			

Figure: Locations of GEF Shanghai Agricultural and Non-point Pollution Reduction Project

