

Initial Environmental Examination

June 2015

PRC: Le Gaga Holdings Limited Greenhouse
Agricultural Development Project-Zhongshan-Xinlian
Production Base

CURRENCY EQUIVALENTS

(As of 10 March 2015)

Currency Unit – Yuan (CNY)

CNY 1.00 = \$ 0.1597

\$ 1.00 = CNY 6. 2633

ABBREVIATIONS

ADB	–	Asian Development Bank
AP	–	Affected person
API	–	Air Pollution Index
BOD	–	Biochemical Oxygen Demand
CNY	–	Chinese Yuan
COD	–	Chemical Oxygen Demand
DEIA	–	Domestic Environmental Impact Assessment
EIA	–	Environmental impact assessment
EMP	–	Environmental management plan
EPB	–	Environment Protection Bureau
MoA	–	Ministry of Agriculture
MSDS	–	Material Safety Data Sheet
IEE	–	Initial Environmental Examination
GRM	–	Grievance Redress Mechanism
O&M	–	Operation and maintenance
PPE	–	Personnel Protective Equipments
PRC	–	People’s Republic of China
SPS	–	Safeguard Policy Statement
SS	–	Suspended Solids
TEIA	–	Tabular Environment Impact Assessment
TN	–	Total Nitrogen
TP	–	Total Phosphate

WEIGHTS AND MEASURES

kg	–	kilogram
km	–	kilometer
m ²	–	square meter
m ³	–	cubic meter
mg/l	–	Milligrams per liter
Mg/m ³	–	Milligrams per cubic meter
mu	–	Chinese land measuring unit (1 hectare = 15 mu)
ha	–	hectare (10,000 m ²)
t	–	ton (1,000 kg)

NOTES

In the report, “\$” refers to US dollars.

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I. EXECUTIVE SUMMARY

A. Background

1. This project's Initial Environmental Examination (project IEE) report was prepared for the proposed Zhongshan-Xinlian Production Base Project (the project) of Le Gaga Holdings Limited (Hereafter Le Gaga) in Fujian Province, People's Republic of China (PRC). The IEE was prepared in accordance with the requirements of Asian Development Bank's (ADB) Safeguard Policy Statement (SPS,2009) on the basis of the domestic environmental impact assessment (EIA) report prepared by Guangzhou EP Environmental Engineering Ltd. in 2014. And The domestic Tabular EIA report was reviewed and approved by Environmental Protection Bureau (EPB) of Xianyou County of Fujian Province on 9th December 2014.

B. Project Description

2. Le Gaga is planning to invest 80 million CNY to build 815 mu agricultural production base in Xinlian Village, Zhongshan town, Xianyou County, Fujian Province of PRC, with an annual output of 6000 tons pollution-free vegetables. The project will rent 815 mu farmland to construct vegetable greenhouses (600 m²), dormitories (540 m²), two (2) pump rooms and water storage pond (278 m²). It is planned that the operation will be gradually commenced from December 2015, and the whole base will be put into operation in August 2016.

C. Project Rationale and Benefits

The project is expected to reduce a farm's water consumption through the use of drip water irrigation. According to Fujian Water Consumption Norm (DB 35/T722-2007), 70 to 80% of the annual water consumption of a typical agricultural irrigation system (270 m³/mu) can be reduced. The drip water irrigation average consumption ranges from 189 to 216 m³/mu. In addition, the integrated drip irrigation system will supply water and fertilizers based on the demands of plants. The nutrient efficiency will be improved. The major product, tomato will be grown in culture bags so that the nutrient inflation into soil and groundwater will be greatly reduced. Therefore, the project will reduce non-point pollution from agricultural through adoption of such advanced horticulture practices compared with traditional extensive planting methods.

D. Anticipated Environmental Impacts and Environmental Management Plan

The construction of the project will include minor field levelling. It is scheduled to be constructed within seven months period. Workers will be hired locally which will not require construction camp to be set up. Major environmental issues during construction include earthwork, noise pollution, air pollution, surface water pollution and construction waste management. Overall, construction-related impacts are localized, short term, and can be effectively mitigated through the application of good construction and housekeeping practices and implementation of construction phase community and occupational health and safety plans.

3. The potential impacts during operation of the project facilities include improper operation of wastewater treatment facilities, solid waste disposal, especially pesticide and fertilizer bags and containers storage of pesticide, noise from pump operation, occupational health and safety related to application of pesticide. Appropriate mitigation measures and monitoring programs have been developed to address these issues. Project impacts, mitigation measures and impact monitoring are described in an environmental management plan (EMP).

E. Information Disclosure, Consultation and Participation

4. Public consultation for this project was conducted in accordance with the PRC Guideline. Two rounds of information disclosure were conducted by Xianyou County EBP on its website on 25th November 2014 and 2nd December 2014 respectively. No concerns or objections were received during the disclosure. An environmental public consultation workshop was also organized by Le Gaga on 17th March 2015. Five (5) potential affected villager representatives, who are all supportive of the project, attended the workshop.

5. This project IEE will be also disclosed on ADB's website.

F. Grievance Redress Mechanism

6. Le Gaga will establish a grievance redress mechanism (GRM) on site for handling environmental and social complaints, including complaint recording, consultation, issue investigation, mitigation action, follow-up, general timeframe for resolution and delegation of responsibilities. The GRM will address any possible concerns and dissatisfaction of affected groups regarding the social and environmental impact of its subprojects, and seek a proper solution. It should be able to promptly respond to the affected groups, be transparent and free of gender discrimination, and adapt to the cultural traditions of the affected groups and communities. Moreover, it should enable different affected groups to express their opinions, with no fear of reprisal. The E&S General Manager will be responsible for (i) resolving appeals, complaints, and disputes concerning the environmental and social impacts of subprojects which have not been resolved by the plant managers at the subproject level, and (ii) for coordinating, guiding and supervising the subproject companies in handling appeals, complaints, and disputes.

7. The project company will inform the local community and the affected people of the grievance and appeal procedure through public information meetings, the resettlement information brochure and other media, so that they can fully understand their rights for grievance and appeal.

G. Environment Management Plan

8. An EMP has been prepared for the project. It is an essential document to ensure the implementation of mitigation measures. The EMP defines appropriate mitigation measures for the anticipated environmental impacts, and defines the institutional responsibilities and mechanisms to monitor and ensure the compliance with PRC's environmental laws, standards and regulations, and ADB's Safeguard Policy Statement (SPS 2009).

9. EMP supervision and monitoring results will be used to evaluate (i) the extent and severity of actual environmental impacts against the predicted impacts, (ii) the performance of the environmental protection measures or compliance with related rules and regulations, (iii) trends of impacts, and (iv) overall effectiveness of the mitigation measures.

H. Conclusion

10. The project IEE concludes that as long as the environmental mitigation and management measures defined in the EMP are properly implemented, all adverse environmental impacts associated with the project will be prevented, eliminated, or minimized to an acceptable level. The project is feasible from an environment safeguards point of view.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK AND STANDARDS

A. Policy, Legislative Framework for environment impact assessment in PRC

11. The EIA management procedure has been established in the PRC since early 1990s. The domestic environment impact assessment (DEIA) upon which this project IEE is based has been prepared under the provisions of the PRC's EIA law of 2003 and the PRC Management Guideline on EIA categories of Construction Project (2008). The interim Guideline on Public Participation in EIA (2006) has also been a significant development that provides for opportunities to involve the public in the EIA process. This was further strengthened by the Requirements on Preparation of Environmental Impact Report Summary (2012[51], MEP), which requires that the summary of the DEIA reports should be disclosed on local EPB websites. The primary national laws and regulations that governed the EIA studies of the proposed project are provided in Table II-1 and Table II-2 respectively.

Table II-1: Applicable Environmental Laws

No.	Title of the Law	Year Issued
1	Environmental Protection Law	2014 revised
2	Environmental Impact Assessment Law	2003
3	Water Law	2002
4	Water Pollution Prevention and Control Law	2008
5	Air Pollution Prevention and Control Law	2000
6	Noise Pollution Control Law	1996
7	Forestry Law	1998
8	Wild Fauna Protection Law	2004
9	Solid Waste Pollution Prevention and Control Law	2013
10	Water and Soil Conservation Law	1991
11	Cleaner Production Promotion Law	2002
12	Urban and Rural Planning Law	2008
13	Land administration Law	2004
14	Circular Economy Promotion Law	2009

Table II-2: National and Local Administrative Regulations

No.	Regulation	Year Issued
1	Regulation on EIA of Plans and Programs	2009
2	Regulation on Environmental Protection Management for Construction Project	1998
3	Regulation on Protection of Wild Flora	1997
4	Requirements for the EIA Summary of Construction Project	2010
	Regulation on Cultural Heritage Protection	2003
5	Regulation on Classification of Construction Project Environmental Protection Management (MEP)	2009
6	National Biodiversity Strategy and Action Plan (2011-2030)	2010
7	Requirement for Social Risk Assessment of Large Investment Projects	2012
8	The National Biodiversity Strategy and Action Plan (2011-2030)	2010
9	National Regulation for Public Disclosure of EIAs (NDRC)	2012
10	Environmental Protection Supervision Rules for Construction Projects	1998

12. The implementation of environmental laws and regulations is supported by a series of associated management and technical guidelines (Table II-3)

Table II-3: Applicable Environmental Guidelines

No.	Guideline	Year/Code
1	Guideline on Jurisdictional Division of Review and Approval of EIAs for Construction Projects	2009
2	Guideline on EIA Categories of Construction Projects	2008
3	Interim Guideline on Public Consultation for EIA	2006
4	Technical Guideline on EIA: Outline	HJ2.1-2011
5	Technical Guideline on EIA Regarding Surface Water	HJ/T 2.3-1993
6	Technical Guideline on EIA Regarding Atmospheric Environment	HJ 2.2-2008
7	Technical Guideline on EIA Regarding Acoustic Environment	HJ 2.4-2009
8	Technical Guideline on EIA Regarding Ecological Impact	HJ 19-2011
9	Technical Specification on Water and Soil Conservation Plan	GB50433-2008
10	Technical Guideline on Environmental Risk Assessment for Construction Project	HJ/T 169-2004
11	Industrial Restructuring Directory	Revised in 2013

13. The environmental quality standard system that supports and evaluates the implementation of the environmental protection laws and regulations in the PRC is classified into two categories by function (i.e., pollutant emission/discharge standards and ambient environmental standards). The relevant main standards applicable to the project are shown in Table II-4.

Table II-4: Applicable Environmental Standards

No.	Standards	Code
1	Surface Water Quality Standard	GB 3838-2002
2	Ambient Air Quality Standards	GB 3095-2012
3	Urban Ambient Acoustic Quality Standard	GB 3096-2008
4	Integrated Emission Standard of Air Pollutants	GB 16297-1996
5	Integrated Wastewater Discharge Standard	GB 8978-1996
6	Ground Water Quality Standard	GB/T 14848-93
7	Emission Standard of Environment Noise for Boundary of Site	GB 12523-2011
8	Noise Limit of Industrial Enterprises	GB 12348-2008
9	Standard for Pollution Control on the Storage and Disposal Site for General Industrial Solid Wastes	GB 18597-2001
10	Emission Standards for Odor Pollutants	GB 18599-2001

B. Applicable ADB and PRC Policies and Assessment Categories

14. ADB's Safeguard Policy Statement (SPS 2009) provides the basis for this Project IEE. All projects funded by ADB must comply with the SPS. The purpose of the SPS is to establish an environmental review process to ensure that projects undertaken as part of programs funded under ADB loans are environmentally sound, are designed to operate in line with applicable regulatory requirements, and are not likely to cause significant environment, health, or safety hazards.

15. The project is classified as Category B by ADB, requiring an initial environmental examination (IEE). Domestically, the project is classified as Category B in accordance with the Guideline on EIA Classification for Construction Projects issued by the PRC's Ministry of Environmental Protection (MEP) in 2008, requiring a tabular environment impact report (TEIA). The TEIA report of the proposed project was prepared by Guangzhou EP Environmental Engineering Ltd. in 2014 and reviewed and approved by Xianyou County EPB on 9th December 2014.

C. Evaluation Standards for the Project

16. **Air Quality Standard.** The PRC ranks air quality into three classes according to "Ambient Air Quality Standard" (GB 3095-1996, amendment in 2000), with Class I as the "best" air quality and Class III the "worst" air quality. According to the Air and Water Quality Function Zonal of Putian Municipality, the project area is categorized as Class II, defined as "moderate to good" air quality. The specific standard values (for Class II) are listed in Table II-5.

Table II-5: Ambient Air Quality Standard (Unit: mg/m³)

Parameter	TSP	PM ₁₀	SO ₂	NO ₂
24-hour Average	0.30	0.15	0.15	0.08
1-hour Average	-	-	0.50	0.12

Source: Ambient Air Quality Standard (GB 3095-1996)

17. **Surface water Quality Standard.** For water quality assessment, the determining standard will be Surface Water Quality Standard (GB3838-2002). It subdivides the water quality into five categories for different environmental functions. Category I is the suitable for head waters and National Nature Reserves. Category II is suitable for drinking water sources in Class I protection areas, habitats for rare aquatic organisms, breeding grounds for fish and crustaceans, and feeding grounds for fish fries. Category III is suitable for drinking water sources in Class II protection areas, wintering grounds for fish and crustaceans, migration routes, water bodies for aquaculture and capture fishery, and swimming activities. Category IV is suitable for general industrial use and non-contact recreational activities. Category V is suitable for agricultural and scenic water uses.

18. The catchment in the project area is classified as Category III. The key parameters for Category III standard is set out in Table II-6.

Table II-6: Surface Water Quality Standard for Category III (Unit: mg/L, pH is dimensionless)

Parameter	pH	DO	COD _{Cr}	BOD ₅	NH ₃ -N
Category III Standard	6-9	≥5	≤20	≤4	≤1.0

Source: Surface Water Quality Standard (GB3838-2002)

19. **Noise.** Noise level in project area shall comply with the Category I Acoustic Ambient Quality Standard (GB3096-2008) (Table II-7).

Table II-7: Acoustics Ambient Quality Standard (Sound level: dB (A))

Function Zone	Category	Standard Maximum Level	
		Day	Night

		(06:00-22:00)	(22:00-06:00 of following day)
Class I	I	55	45

D. Discharge Standards of the Project

20. **Air Pollutant Emissions.** Fugitive emission of particulate matter (such as dust from construction sites) is regulated under PRC's Air Pollutant Integrated Emission Standard (GB 16297-1996), which sets 120 mg/m³ as the maximum allowable emission concentration and ≤ 1.0 mg/m³ as the concentration limit at the boundary of construction sites, with no specification on the particular matter's particle diameter.

21. The Emission Standard of Cooking Fume (GB18483-2001) has specified the minimum removal rate of cooking fume. The treatment device is classified into three levels, based on the size and power of ovens. The project will have one small oven with capacity of 25kW during operation. The maximum emission concentration and minimum removal rate of cooking fume treatment device are shown in Table II-8. The minimum removal rate shall reach 60% at least.

Table II-8: Maximum emission concentration and minimum removal rate of cooking fume treatment device

Scale	Small	Medium	Large
Number of ovens	1-3	3-6	≥6
Power of oven (10 ⁸ J/h)	1.67-5.00	5.00-10	≥10
Maximum allowable emission concentration (mg/m ³)	2.0		
Minimum removal rate of cooking fume treatment device (%)	60	75	85

22. **Water Pollutant Emissions.** Discharge of wastewater from construction sites is regulated under PRC's Integrated Wastewater Discharge Standard (GB 8978-1996). Class I standards apply to discharges into Category III water bodies under GB 3838-2002. Class II standards apply to discharges into Categories IV and V water bodies. Class III standards apply to discharges into municipal sewers going to municipal WWTPs with secondary treatment. The catchment area is classified as Category III therefore requirements of Class I are applicable.

Table II-9: Water Pollutant Discharge Limit in Construction Stage (Unit: mg/L)

Parameter	Class I	Class II	Class III
	(for discharging into Category III water body)	(for discharging into Categories IV and V water body)	(for discharging into municipal sewer)
pH	6 ~ 9	6 ~ 9	6 ~ 9
SS mg/L	70	150	400
BOD ₅ mg/L	20	30	300
COD mg/L	100	150	500

TPH mg/L	5	10	20
Volatile phenol mg/L	0.5	0.5	2.0
NH ₃ -N mg/L	15	25	---
PO ₄ ²⁻ (as P) mg/L	0.5	1.0	---
LAS (= anionic surfactant) mg/L	5.0	10	20

Source: Wastewater Discharge Standard (GB 8978-1996)

23. The municipal wastewater during operation stage will be directed by the sewers to the underground septic tank treatment system. The treated effluent will be reused for agricultural irrigation if it satisfies the Water Quality Standard for Agricultural Irrigation (GB 5048-2005).

Table II-10: Water Quality Standard for Agricultural Irrigation

Parameter	Unit	Dry land
pH	--	5.5-8.5
COD	mg/L	200
BOD ₅	mg/L	100
SS	mg/L	100
Chloride	mg/L	350

24. **Noise.** Construction noise will be assessed against the Emission Standards of Ambient Noise at Boundary of Site (GB 12523-2011) and Class I of Emission Standard for Industrial Enterprises Noise at Boundary (GB 12348-2008) during operation.

Table II-11: Construction Site Noise Limits (Unit: Leq [dB(A)])

Period	Noise Limit	
	Day	Night
Construction	70	55
Operation	55	45

III. DESCRIPTION OF THE PROJECT

25. Le Gaga is planning to invest 80 million CNY to build 815 mu agricultural production base in Xinlian Village, Zhongshan town, Xianyou County, Fujian Province of PRC (see Fig III-1), with an annual output of 6000 tons pollution-free vegetables. The project will rent 815 mu farmland to construct vegetable greenhouses (600 m²), dormitories (540 m²), two (2) pump rooms and water storage pond (278 m²). The detailed construction works are listed in Table III-1. It is planned that the operation will be gradually commenced from December 2015, and the whole base will be put into operation in August 2016. The layout of the production base is illustrated in Fig. III-2.

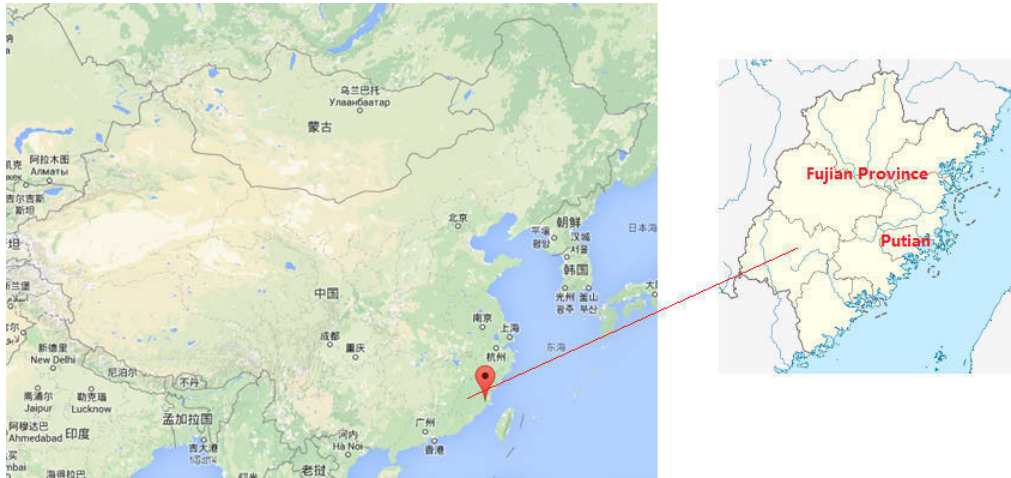


Figure III-1: Location of proposed Zhongshan production base

Table III-1: Proposed works of Zhongshan-Xinlian Production Base

Item	Major works
Greenhouse	600 mu
Dormitory	Floor area 540m ²
Pump room	Floor area : 162m ²
Water storage pond	Floor area: 278m ²

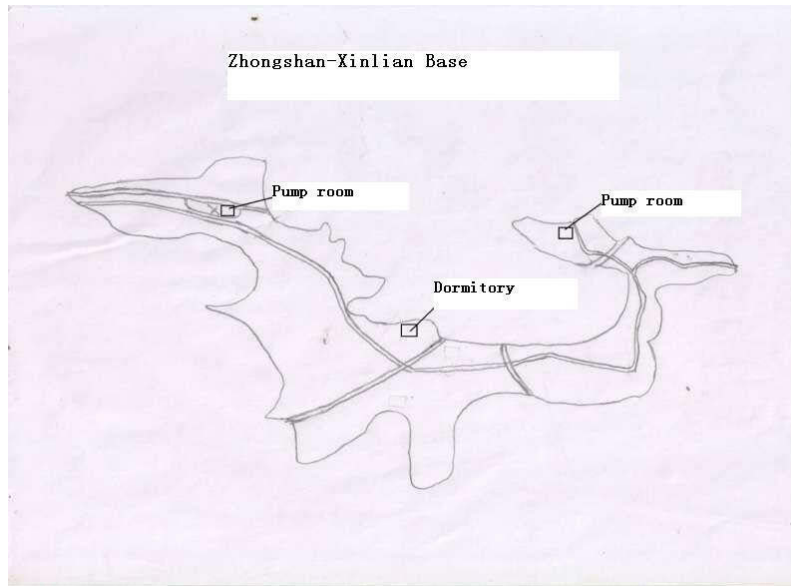


Figure III-2: Layout of proposed Zhongshan production base

26. **Water Supply.** The domestic water demand will be satisfied by the local municipal water supply system. Irrigation water will be abstracted from Yanshou stream nearby. Referring to the Fujian Provincial Industry Water Consumption Quota (DB35/T772-2013), the annual irrigation water consumption is estimated at 600 t/d based on the water quota of 270 m³/mu per year. However, the water quota defined in the DB35/T772-2013 is based on the assumption of open field cultivation and ground surface irrigation. The actual water consumption will be significantly less than the 270 m³/mu per year considering the adoption of greenhouse and advanced drip irrigation.

27. The integrated drip irrigation system will supply water and fertilizers based on the demands of plants. A stock solution consisting of a single fertilizer, or several compatible fertilizers, dissolved in water will be supplied to the vegetables by in-line drip irrigation to ensure precise delivery of water and fertilizer to crop. Electronic conductivity (EC) and pH are monitored on line to control the concentration of nutrients. The major product, tomato will be grown in culture bags.

28. **Wastewater Treatment Facilities.** The wastewater after the treatment of septic tanks using for the irrigation.

29. **Materials.** The raw material usage is estimated by Le Gaga based on previous experiences in similar locations (see Table III-2).

Table III-2: Estimated material usage per year

Raw materials	Usage
Substrate	200 t
Seeds	400 kg
Fertilizer	150 t
Plastic film	72,000 kg
Low toxicity biological pesticides (Toosedarin and matrine)	1.5t
Aperture disk	3480

IV. DESCRIPTION OF THE ENVIRONMENT

A. General

30. This section describes the environmental, (biological and physical), cultural and socioeconomic baseline conditions in the Study Area. This describes (i) the environmental setting where the project will be implemented, and (ii) the environmental conditions which will be influenced (either negatively or positively) by the project. Both of these roles are encompassed by the concept of the “baseline” environment. The baseline includes information on all receptors and resources that were identified during the scoping stage of the Impact Assessment process as having the potential to be affected by the Project.

B. Physical Setting

31. **Location.** The project is located in Zhongshan town, Xianyou County (see Fig III-1). Zhongshan town is located in the northeast of Xianyou County, Xianzhuang road passed by it, 29km far away from the county. 10-15km far away from north of Zhongshan town is Youyang town and Shicang village; 20km far away from south is Bangtou town; east of it is Chengxiang district, 10km far away from east is Changtai town; 15km far away from west is Caixi village. Xianyou County is in district of Putian, Fujian province, People's Republic of China. It close to the Meizhou Bay and Xiuyu Port. It also has National Road 324, Fuzhou-Xiamen Highway, Puyong Highway and Fuzhou-Xiamen Railway in its region. The project area lies within 25°11' to 25° 43'N latitudes and 118° 27' to 118°56'E longitudes. It is located in the middle of the southeast coast.

32. **Topography.** Most of the terrains in Zhongshan town are plains and hills. The proposed site is in relatively flat terrain. The regional tectonic setting is stable. Suitable for planting vegetables.

33. **Climate.** Zhongshan has a monsoonal subtropical marine climate, characterized by long, cool and humid summers and short, mild and dry winters. The average annual temperature is 18.4°C and annual precipitation of 1800-2000 mm.

34. **Hydrogeology.** The project's water area belongs to Yanshou stream. Yanshou stream originated from Linqunan of Xinlian village, go through Jiuli Lake into Putian. The length of the Yanshou stream is 16.8km, drainage area is 109 square km, total height is 339.4m and annual mean runoff is 106 million m³.

C. Ecological Resources

35. The proposed site was surrounded by mountain land and farmlands. The major animal in the project area is microtinae. No rare, threatened, or endangered species under the IUCN Red List have been recorded in the project area as confirmed by domestic TEIA through field survey conducted by EIA institute during November 2014. The field survey conducted was based on the requirement of the PRC Technical Guideline for Environmental Impact Assessment: Ecological Impact (HJ 19-2011) which identifies the project site as cultivated land and not located in environmental sensitive areas.



Figure IV-1: Current vegetation cover of proposed site

D. Physical Cultural Resources

36. No cultural heritage or archaeological sites are recorded within the project area.

E. Socioeconomic Conditions

37. Zhongshan Town covers 128.7 km² of 16 administrative villages, including 24,000 mu cultivated land and 129,600 mu hilly area. The total population of Zhongshan Town is 30,000 by end of 2014.

38. According to the 2014 statistical yearbook of Xianyou County, the GDP of Xianyou County reached 23.99 billion CNY in 2013, increased 12.3%.

F. Environmental Quality Baseline

39. This section presents the environmental quality baseline conditions.

40. **Air Quality Baseline.** According to the Environmental Quality Bulletin of Putian City (Q4, 2014), the average Air Pollution Index (API) of urban area in Putian was 54 that satisfied the requirement of Class II of Ambient Air Quality Standard (GB3095-1996). The project site is located in rural area of Putian. There is no significant industrial development in the project area. The air quality in the project area is assumed better than urban area of Putian and it could be concluded as “Moderate to Good” based on site field

¹ The API level was based on the level of 5 atmospheric pollutants, namely sulfur dioxide (SO₂), nitrogen dioxide (NO₂), suspended particulates (PM₁₀), carbon monoxide (CO), and ozone (O₃). 0-50=good, 51-100=moderate, 101-200=unhealthy, 201-300=very unhealthy, 301-500=hazardous, 500+=emergency.

survey conducted on 17th March 2015 and air quality assessment published in the Environmental Quality Bulletin of Putian City (Q4, 2014).

41. **Surface Water Quality.** The project site is located in Yanshou stream basin. Referring to the routine monitoring data from Environmental monitor station of Xianyou (2012), the water quality of Yanshou stream complies with the requirements of Category III (GB 3838-2002).

42. **Noise.** Noise monitoring was conducted in the boundaries of proposed sites for other three production bases in Zhongshan Town on 21st October 2014 by Xiamen Keyi Testing Technology Ltd. (Figure IV2-IV4) The background acoustic environment of the proposed Xinlian production base is similar with these three bases(Figure IV-5). Referring to the monitoring results conducted for these three production bases (Table IV-1), it could be concluded that the baseline noise levels at Xinlian production base can meet the requirement of Class I of Acoustic Quality Standard (GB 3096-2008).



Figure IV-2: Monitoring Point of NanXing Base

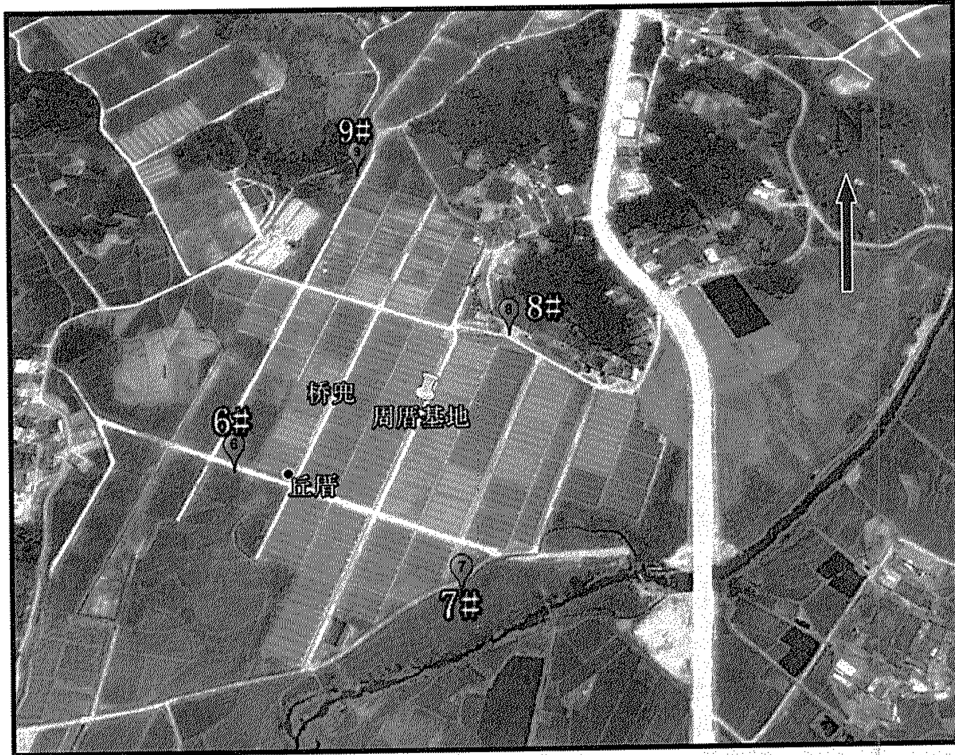


Figure IV-3: Monitoring Point of Zhoucuo Base

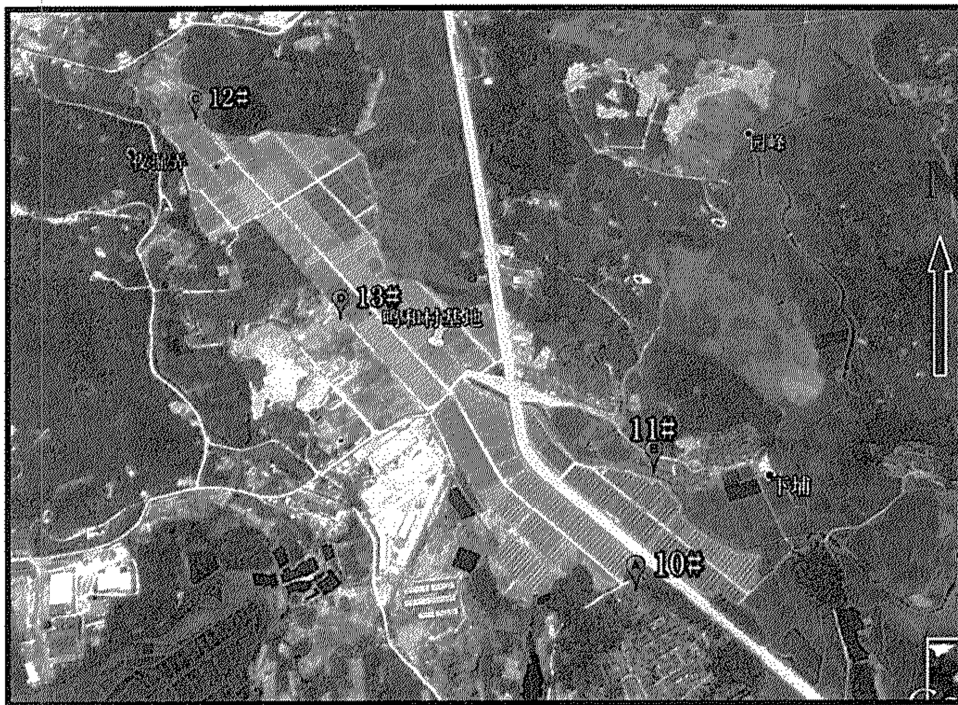


Figure IV-4: Monitoring Point of Minghe Base

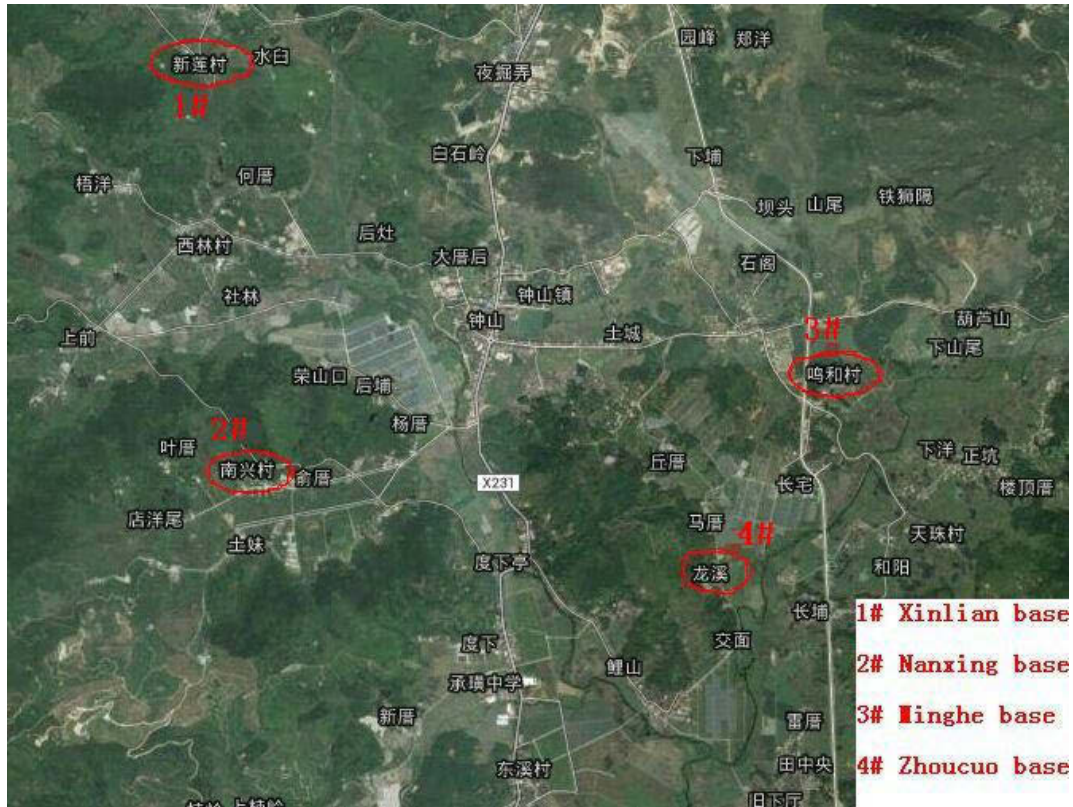


Figure IV-5: Layout of four bases in Zhongshan Town

Table IV-1: Noise baseline monitoring results

Monitoring Point		1#	2#	3#	4#	5#	6#	7#	8#	9#	10#	11#	12#	13#
Results	Day	53.4	52.6	53.7	50.8	50.5	51.5	50.6	53.2	51.1	53	53.2	51.5	51.8
	Night	42.4	42	43.2	40.6	40.1	42	41.1	42.5	40.3	43.7	43.4	40.6	40.3
Class I of GB 3096-2008	Day	55												
	Night	45												

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Project Rationale and Benefits

43. The project is expected to reduce a farm's water consumption through the use of drip water irrigation. The adoption of greenhouse and advanced drip irrigation technology will save 70-80% of the water demand from the traditional irrigation system, according to Fujian Water Consumption Norm (DB 35/T722-2007). The annual water consumption is expected to be reduced from 270 m³/mu to 189-216 m³/mu. In addition, the integrated drip irrigation system will supply water and fertilizers based on the demands of plants. The nutrient efficiency will be improved. The major product, tomato will be grown in culture bags so that the nutrient inflation into soil and groundwater will be greatly reduced. Therefore, the project will reduce non-point pollution from agricultural through adoption of such advanced horticulture practices compared with traditional extensive planting methods.

B. Screening and Scoping of Potential Impacts

44. **Environmental Impacts Related to the Project.** The potential impacts (positive and negative) and risks were screened during the EIA study process in order to (i) identify the relative significance of potential impacts from the activities of the proposed infrastructure; (ii) establish the scope of the assessment which assists in focusing on major, critical, and specific impacts; and (iii) enable flexibility in regard to consideration of new issues, such as those reflecting the requirements of both the PRC's environmental laws, regulations and standards, and ADB's Safeguard Policy Statement (2009).

45. The anticipated impacts caused by the proposed Zhongshan-Xinlian production base during construction phase include: noise, air pollution (mainly fugitive dust); wastewater discharge, soil erosion; solid waste disposal; and occupational and community health and safety. The potential impacts during operation phase include noise from pumps, waste plastic films and pesticides containers and occupational and community health and safety.

46. The potential environmental sensitive receivers were identified through site survey as presented in Fig.V-1, including residents in Xinlian Village around the production base.



Figure V-1: Distribution of sensitive receivers

The following sections describe the anticipated environmental impacts of the project during the Construction and operational phases.

Environmental Impacts and Mitigation Measures during Construction

1) Noise

47. Most of the noise comes from the machinery in the construction period, such as concrete mixer, excavator and transportation trucks. The following predictive model is used to forecast the noise level in line with Technical Guideline on EIA Regarding Acoustic Environment (HJ2.4-2009).

$$L_i = L_0 - 20 \lg \left(\frac{R_i}{R_0} \right)$$

Where: L_i and L_0 are equipment noise level at R_i and R_0 respectively, dB (A);

48. The predicted noise level with different distances is presented in Table V-1.

Table V-1: Construction equipment noise impact distance (dB)

Distance(m)	5	10	20	30	50	80	100	120	150
Mixer	90	84	78	74.5	70	66	64	62.5	60.5
Excavator	85	79	73	69.5	65	61	59	57.4	55.5
Small crane	80	74	68	64.5	60	56	54	52.4	50.5
Dump truck	75	69	63	59.5	55	51	49	47.4	45.5
Concrete vibrator	85	79	73	69.5	65	61	59	57.4	55.5

The construction site of buildings (dormitory and pump rooms) will be arranged at least 100 m from the residents. As shown in Table V-1, the noise level at 100 m satisfies with the requirement of Emission Standards of Ambient Noise at Boundary of Site (GB 12523-2011) (70 dB during daytime and 55 dB during nighttime) without mitigation measures. The following mitigation measures will be implemented to control impacts of noise:

- Reduce noise level of the equipment: Low noise equipment shall be chosen as practical as possible; locations shall be fixed for earth excavation equipment and transportation machinery; noise shall be reduced by exhaust pipe and muffler and insulating the vibration part of the engine; idle equipment shall be closed immediately; speed of transportation vehicles shall be reduced and honking noise shall be reduced while entering the site.
- Reduce man-made noise: education awareness shall be provided for construction workers for civilized construction, construction materials shall be transported by crane or manually, throwing down from vehicles is not allowed, loud noise should be avoided when piling up steel materials.
- Reduce impact of vehicle transportation noise: avoid transportation at night as practical as possible, reduce speed for large transportation as possible, especially when entering into environmental sensitive area, honking shall be reduced or completely avoided.

2) Air

49. Anticipated source of air pollution from construction activities is dust from ditch digging, tractor road rolling and greenhouse construction. The existing farmland has been already graded, so large scale land leveling and excavation are not expected in the project site. The following mitigation measures are defined to reduce air pollutant emissions.

- Disclose the contacts (including site engineer, Le Gaga project company ESMS manager, telephone number etc.) and dust control measures at the entrance of the site;
- Cover the construction materials during temporary stacking and transport to avoid spillage and dust;
- earthwork, demolition and other construction activities will be reduced during strong windy days;
- Arrange vehicle cleaning facilities with provision of supporting drainage and mud sedimentation facilities;
- No mud and construction waste on the site access road and within 100m of the entrance;
- Arrange one spray trunk and spray water on construction site and roads once per day during peak construction to reduce dust from earthwork excavation, transport, loading and unloading and stacking; spraying may more frequent if the construction site is within 100 m upwind from the village.
- Maintain vehicles and construction machineries to a high standard to ensure efficient running and fuel-burning and compliance with the PRC emission standards for vehicles and machineries (GB17691-2005 and GB11340-2005).

3) Water

50. The construction process will be simple and last for short time. The workers will be hired locally. It will be not necessary to set up construction camp. Mobile toilet will be provided on site. The wastewater will be collected by local farmers as fertilizer.

51. The soil excavated will be stacked far from the ditch to avoid flushing into the water body.

4) Solid Waste

52. **Construction solid waste.** The construction solid waste includes debris, sand, stones, broken brick, wood waste, scrap metal, scrap steel and other debris will be transported to the appointed landfill site if not be reused. The excavated earth of ditches will be all reused for the tractor road.

5) Impacts on Biological Resources

53. As established during environmental baseline assessment, the project site is in the existing cultivated land which cannot sustain high biodiversity due to long term human disturbance activities.

6) Physical Cultural Resources

54. Contractor must comply with PRC's Cultural Relics Protection Law and Cultural Relics Protection Law Implementation Regulations if such relics are discovered, stop work immediately and notify the relevant authorities, adopt protection measures and notify the Security Bureau to protect the site.

C. Environmental Impacts and Mitigation Measures during Operations

1) Water

55. The municipal wastewater estimated an amount of 3495 m³ /a. municipal wastewater after the treatment of septic tanks are using for the irrigation. No wastewater will be drained outside.

Table V-2: Domestic wastewater estimates during operation

Parameters	COD	BOD ₅	SS	NH ₃ -N	Oil
Concentration (mg/L)	400	200	220	35	40
Amount (t/a)	1.40	0.70	0.77	0.12	0.14

56. A stock solution consisting of a single fertilizer, or several compatible fertilizers, dissolved in water is supplied to the vegetables by in-line drip irrigation to ensure precise delivery of water and fertilizer to crop. Electronic conductivity (EC) and pH are monitored on line to control the concentration of nutrients.

57. Low toxic bio-pesticides, such as Toosedarin and Matrine will be used, which are highly efficient. The pesticides are also applied through drip irrigation. Therefore, fertilizers and pesticides carried by surface runoff and infiltration are limited.

Any pesticide leakage will pollute water and soil. The management of pesticide warehouse shall strictly follow Le Gaga's Environmental and Social Management System (ESMS). This includes internal pesticide application and storage manual, which is applicable for all production bases of Le Gaga. The pesticide manual covers the associated risks of the pesticide, transportation and storage procedures, labeling procedure, and proper usage of handling of pesticides.

2) Solid Waste

58. When the project is put into operation, the production base will hire 160 workers, including 15 resident workers. It is estimated that 31.94 t municipal solid waste will be generated annually, base on the assumption that each resident worker could produce 1 kg/d solid waste and each non-resident work could produce 0.5 kg/d solid waste. The municipal solid waste will be transported to a collection point and collected by local sanitation agency regularly.

59. The rotten leaves will be collected for compositing.

60. About 1.5t waste packaging materials will be generated every year. The unrecyclable waste packaging materials will be handled by the local sanitation agency. The pesticide suppliers will retrieve the waste containers.

61. It is estimated that the proposed production base will consume 1500 kg pesticides and 150,000 kg fertilizers, which will generate about 0.9 t/a of waste bags and containers. The pesticide and fertilizer suppliers will retrieve the waste bags and containers. This will be included in the procurement agreement between Le Gaga and suppliers.

3) Noise

62. Noise during operation of the production base is mainly from pumps and distribution room. The noise generated listed in Table V-3.

Table V-3: Noise strength of the mechanical equipment used in proposed production base

No.	Source	5m Strength dB(A)
1	Pump	80-95
2	Electricity distribution room	55-70

63. The pumps and electricity distribution facilities will be placed indoor. Generally, the room can reduce 10 dB. The nearest residential area is about 200 m to the pump. The dormitory is bout 400-500 m away from the pump rooms. In addition, all pumps will only

be operated during daytime. The noise level will be compliant to the Class I of Noise Standards at the Boundary of Industries and Enterprises (GB 12348-2008) which is 55 dB(A) during daytime. The impacts on residents and workers are limited.

4) Air Quality

64. The possible source of air emission during the operations of the project is from the cooking fumes from canteen. The oven will be operated about 4 hours per day. Fume purification device with removal rate above 60% will be installed and operated.

5) Occupational Health and Safety

The occupational exposures to pesticides may be through dermal exposure, and inhalation from spraying operations. The production base will use biological pesticides, such as Toosendainin and Matrine which are extracted from plants, with low toxicity to human. Toosendainin and Matrine are promoted by Ministry of Agriculture (MoA) for pollution-free agricultural products (MoA, No. 194) and are not listed in the WHO Acute Hazard list. Both of them are organic botanical insecticides with the following compositions:

- (1) Toosedarin: 0.6% toosedarin, (CAS:58812-37-6) (emulsion)
- (2) Matrine: 0.3% martrine (CAS:519-02-8), (aqua)

65. Pesticides application will only be conducted by specialized team. In addition, the following measures will be taken:

- Provide safety instructions in each workshop regarding the storage, transport, handling of pesticides;
- Provide material safety data sheet (MSDS) onsite and provide training to the workers on how to use them;
- Provide the necessary personal protective equipment (PPEs) for pesticide application, equipment cleaning, or spill cleanups ;
- Ensure that employees are adequately trained;
- Provide guidelines to limit the exposure time of employees who apply, mix or handle pesticides;
- Assure that employees receive required medical surveillance;
- Distribute the internal agribusiness manual covering proper fertilizer use and pesticide management to all relevant workers.

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Legislative Framework for Public Consultation and Information Disclosure

66. Relevant provisions in the Environmental Protection Law of PRC and the Regulations on the Administration of Construction Project Environmental Protection (Order of the State Council, No. 253) require that domestic environmental impact assessments shall solicit the opinions of units concerned and inhabitants of a proposed project construction site. The PRC National Development and Reform Commission (NDRC) issued a requirement for “Social Risk Assessment of Large Investment Projects” in August 2012, which emphasizes the importance of public consultation in an effective manner, and requires that the results of public consultation are clearly summarized in the domestic safeguards reports, including the dates of consultations, number of stakeholders, who the stakeholders are, and the comments received.

67. ADB’s Safeguard Policy Statement (2009) also has detailed and strict requirements on meaningful participation, consultation and information disclosure. The consultation process for this project therefore followed both the PRC requirements and the ADB requirements.

68. In line with ADB’s SPS and Public Communications Policy, Le Gaga commits that its subproject companies will make relevant information (whether positive or negative) about social and environmental safeguard issues available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public and civil society organizations, so they can provide meaningful inputs into project design and implementation.

B. Information Disclosure and Public Consultation to Date

69. The information of the proposed Zhongshan Production Base was disclosed on the website of Xianyou County EPB on 25th November 2014, including the full report of the draft DEIA, contact details of Le Gaga and the EIA institute to solicit public comments on the preliminary findings of the EIA (<http://www.xianyou.gov.cn/huangbao/govinfo/permit/webinfo/2014/1416819321789698.htm>)(see Fig. VII-1).

70. During information disclosure on Xianyou County EPB, Le Gaga and Xianyou County EPB did not receive any written or oral feedbacks or objections from public.

71. Xianyou County EPB undertook a second round disclosure on approval of the project during 2nd to 8th December 2014 (<http://www.xianyou.gov.cn/huangbao/govinfo/permit/webinfo/2014/1417440600800765.htm>). The information disclosed includes project information, requirements on mitigation measures, and contacts of Xianyou County EPB (see Fig. VII-2).



Figure VI-1: First Round of Information disclosure by Xianyou County EPB



Figure VI-2: Second Round of Information disclosure by Xianyou County EPB

C. Public Consultation

72. A small scale environmental public consultation workshop was organized by Le Gaga on 17th March 2015 supported by General manager of E&S. Potential affected villagers were consulted during the workshop. Five (5) villager representatives attended the consultation. All attendees were supportive to the project.



Figure VI-3: Public consultation on environmental and social aspects for the proposed production base

D. Future Information Disclosure and Public Consultation Program

73. Information disclosure and public consultation relating to environment safeguard will continue throughout the project implementation. The project's environmental information will be disclosed by the local EPB and ADB as follows:

- The project IEE will be disclosed on the project website at www.adb.org;
- All annual environmental and social performance monitoring reports of Le Gaga will be available at www.adb.org;
- Environmental completion acceptance inspection result will be disclosed on the website of Xianyou County EPB at <http://www.huangbao.xianyou.gov.cn/huangbao/index.htm>

VII. GRIEVANCE REDRESS MECHANISM

74. Le Gaga, together with the subproject company, will establish a grievance redress mechanism (GRM) on site for handling environmental and social complaints, including complaint recording, consultation, issue investigation, mitigation action, follow-up, general timeframe for resolution and delegation of responsibilities. The GRM will address any possible concerns and dissatisfaction of affected groups (e.g. communities, workers) regarding the social and environmental impact of its subprojects, and seek a proper solution within a specified time frame. It should be able to promptly respond to the affected groups, be transparent and free of gender discrimination, and adapt to the cultural traditions of the affected groups and communities. Moreover, it should enable different affected groups to express their opinions, with no fear of reprisal. The E&S General Manager will be responsible for (i) resolving appeals, complaints, and disputes concerning the environmental and social impacts of subprojects which have not been resolved by the plant managers at the subproject level, and (ii) for coordinating, guiding and supervising the subproject companies in handling appeals, complaints, and disputes.

75. Each subproject company will inform the local community and the affected people of the grievance and appeal procedure through public information meetings, and other media, so that they can fully understand their rights for grievance and appeal.

76. The project company will inform the local community and the affected people of the grievance and appeal procedure through public information meetings, the resettlement information brochure and other media, so that they can fully understand their rights for grievance and appeal. All complaints submitted and actions implemented will be properly documented and be included in the grievance register.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

77. The EMP defines appropriate mitigation measures for the anticipated environmental impacts, and defines the institutional responsibilities and mechanisms to monitor and ensure the compliance with PRC's environmental laws, standards and regulations, and ADB's Safeguard Policy Statement (SPS 2009).

78. EMP supervision and monitoring results will be used to evaluate (i) the extent and severity of actual environmental impacts against the predicted impacts, (ii) the performance of the environmental protection measures or compliance with related rules and regulations, (iii) trends of impacts, and (iv) overall effectiveness of the mitigation measures.

A. Organizations and Their Responsibilities for EMP Implementation

79. The E&S General Manager reports to Le Gaga's senior management. E&S General Manager has oversight for environmental and social issues, ensures that resources are made available for environmental and social management, and should sign and submit the annual environmental and social performance report to ADB. S/he should ensure that ADB is notified if and when there is material environmental or social safeguards non-compliance. S/he should ensure that ADB is notified if and when the responsible staff has been changed or replaced with new staff.

80. At the corporate office, an E&S officer will assist the E&S General Manager in effective safeguards planning and implementation. During subprojects preparation and implementation period, the safeguards team at the corporate office will be responsible for the environment and social issues, and will prepare IEE and Social Compliance Audit Report, supervise the effective implementation of the EMP; coordinate periodic environmental and social impact monitoring according to the approved monitoring plan; coordinate the project level GRM; prepare annual environment progress reports and submit them to ADB; conduct public consultation and inspect implementation of mitigation measures. Implement the ESMS system at both the holding company and Project Company levels.

81. An E&S manager of Project Company is appointed to implement the environment and social safeguards at Project Company and prepare and submit the annual environment and social impact monitoring report to the E&S General Manager.

82. Construction contractors engaged by the Project Company will be responsible for implementing the mitigation measures during construction under supervision of the Project Company and Corporate office. In their bids, contractors will be required to respond to the environmental management requirements defined in the EMP. After project completion, environmental management responsibilities will be handed over to the Project Company.

B. Summary of Potential Impacts and Mitigation Measures

83. Table VIII-1 summarizes the potential impacts and environment safeguard issues of the production base during pre-construction, construction and operation as identified by the environmental impact assessments and set out in this IEE, as well as corresponding mitigation measures designated to minimize those impacts and address these issues.

Table VIII-1: Potential Impacts and Mitigation Measures during Design, Construction, and Operation Phases of the Project

Item	Impact Factor	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Implementing Agency	Supervising Agency
Design Phase					
Design of production base	Noise	Noise from production base	<ul style="list-style-type: none"> Technical design of the production base must be able to contain the operational noises from pumps. 	Designer	LE GAGA, Project Company
Construction phase					
	Impact on water quality	Wastewater production	<ul style="list-style-type: none"> Mobile toilet will be provided on site. The earth excavated will be stacked far away from the ditch to avoid flushing into the water body. 	Contractor	LE GAGA, Project Company, local EPB
	Impact on air quality	dust	<ul style="list-style-type: none"> Disclose the contacts (including site engineer, Le Gaga project company ESMS manager, telephone number etc.) and dust control measures at the entrance of the site; Cover the construction materials during temporary stacking and transport to avoid spillage and dust; No earthwork, demolition and other construction activities during strong windy days; Arrange vehicle cleaning facilities with provision of supporting drainage and mud sedimentation facilities; No mud and construction waste on the site access road and within 100m of the entrance; Arrange one spray trunk and spray water on construction site and roads once per day during peak construction to reduce dust from earthwork excavation, transport, loading and unloading and stacking; spraying will be frequent when the construction activities are within 100 m upwind from the village. Maintain vehicles and construction machineries to a high standard to ensure efficient running and fuel-burning and compliance with the PRC emission standards for vehicles and machineries (GB17691-2005 and GB11340-2005). 	Contractor	LE GAGA, Project Company, local EPB
	Impact on acoustic environment	Increase of noise level	<ul style="list-style-type: none"> Reduce noise level of the equipment: Low noise equipment shall be chosen as practical as possible; locations shall be fixed for earth excavation equipment and transportation machinery; noise shall be reduced by exhaust pipe and muffler and insulating the vibration part of the engine; idle equipment shall be closed immediately; speed of transportation vehicles shall be reduced and honring noise shall be reduced while 	Contractor	LE GAGA, Project Company, local EPB

Item	Impact Factor	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Implementing Agency	Supervising Agency
			<ul style="list-style-type: none"> entering the site. Reduce man-made noise: education shall be provided for construction workers for civilized construction, construction materials shall be transported by crane or manually, throwing down from vehicles is not allowed, loud noise should be avoided when piling up steel materials. Reduce impact of vehicle transportation noise: avoid transportation at night as practical as possible, reduce speed for large transportation as possible, especially when entering into environmental sensitive area, honking shall be reduced or completely avoided. 		
	Solid waste	Municipal solid waste from workers camps, construction solid waste	<ul style="list-style-type: none"> The construction solid waste will be transported to landfill if cannot be reused. The transport vehicles need to follow a specified route and time and should be covered by tarp to prevent spill. The contractor needs to provide appropriate number of garbage bins at suitable location. The municipal solid waste will be delivered to landfill site by the sanitation agency regularly. 	Contractor	LE GAGA, Project Company, local EPB
Impact on socio-economic resources	Physical cultural resources	Damage to unearthed cultural relics	<ul style="list-style-type: none"> Contractor must comply with PRC's Cultural Relics Protection Law and Cultural Relics Protection Law Implementation Regulations if such relics are discovered, stop work immediately and notify the relevant authorities, adopt protection measures and notify the Security Bureau to protect the site. 	Contractor	LE GAGA, Project Company, local Cultural Relics Bureau
Operation phase					
Impact on physical resources	Impact on water quality	Failure to operate the wastewater treatment facility	<ul style="list-style-type: none"> Install oil trap and integrated wastewater treatment facility; Ensure proper O&M systems are in place and equipment in good working order and also ensure backup power system available; Provide operational training to the operator The management of pesticide warehouse shall strictly follow Le Gaga's internal pesticide application and storage manual which applicable for all production bases of Le Gaga. 	Operator	LE GAGA, Project Company, local EPB
		Pesticide leakage			
	Impact on air quality	Failure to operate the fume purification device	<ul style="list-style-type: none"> Maintain the fume purification device in good working order and ensure removal rate no less than 60%. 	Operator	LE GAGA, Project Company, local EPB
	Impact on	Equipment noise	<ul style="list-style-type: none"> Maintain all pumps in good working order. 	Operator	LE GAGA, Project

Item	Impact Factor	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Implementing Agency	Supervising Agency
	noise				Company, local EPB
	Solid waste	Improper solid waste disposal	<ul style="list-style-type: none"> The municipal solid wastes should be collected and transported by sanitation department timely. Rotten leaves will be used for composting The waste container and bags of pesticide and fertilizer will be retrieved by suppliers 	Operator	LE GAGA, Project Company, local EPB
Occupational and community health and safety			<ul style="list-style-type: none"> Post safety instructions in each workshop regarding the storage, transport, handling of pesticides; Provide MSDS onsite and provide training to the workers on how to use them; Provide the necessary PPEs for pesticide application, equipment cleaning, or spill cleanups ; Ensure that employees are adequately trained; Provide guidelines to limit the exposure time of employees who apply, mix or handle pesticides; Assure that employees receive required medical surveillance; Distribute the internal agribusiness manual covering proper fertilizer use and pesticide management to all relevant workers. 	Operator	LE GAGA, Project Company, local health and safety authority

EPB=environmental protection bureau;

84. Those that are temporary measures particularly during the construction stage, such as dust suppression, use of quiet / low noise powered mechanical equipment will need to be included in the tender documents, otherwise they are not budgeted by the contractor and they won't be done.

85. Those that will permanently become part of the infrastructure such as noise reduction materials for production base will need to be included in the design, otherwise they won't be built. Environmental investments are listed in Table VIII-2. The environmental investment is 325,000 CNY, accounting for 0.4% of the total investment.

Table VIII-2: Environmental Investment for the production base

Aspects	Facility	Cost Estimate (Unit: 10,000 CNY)
Air	Cooking fume treatment, Exhaust fan	1
Water	Irrigation pipe network, oil separation tank, Septic-tank	25
Noise	Noise insulation and absorption facilities	5
Solid waste	Collection and storage	1.5
Total		32.5

C. Environmental Inspection, Monitoring and Reporting

86. Table VIII-3 shows the environmental monitoring program specifically designed for this project, defining the requirements on the scope, location, parameter, duration and frequency of monitoring during operational stages.

87. During construction and operation, the E&S manager of the Project Company will undertake daily inspection on the implementation of environmental mitigation measures.

88. Monitoring will also be periodically conducted by the local environmental authorities in the framework of their legal mandate to check compliance with applicable environmental regulations. They will be responsible for undertaking regular and random environmental monitoring and inspection activities before, during, and after construction as well as in the event of emergencies.

Table VIII-3: Environment Monitoring Plan

Type	Monitoring Location	Monitoring Items	Monitoring Frequency
During Construction			
Air	at the construction boundary that on downwind direction	TSP	Once during construction peak
Noise	Boundaries of construction sites	Equivalent continuous A sound level	2 (1 in daytime, 1 in night time) samples at each boundary; once per month during construction period

Soil erosion	Construction site	Check the implementation of soil erosion protection measures defined in Table VIII -1.	Quarterly during construction
During Operation			
Air	Canteen cooking fume	Cooking Fume	Annually
Noise	1m outside of production base	Equivalent continuous A sound level	2 (1 in daytime, 1 in night time) samples at each boundary quarterly
Wastewater	Outlet of septic tank wastewater treatment system	COD _{cr} , BOD ₅ , SS, NH ₃ -N, oil	Annually

89. Environmental acceptance monitoring and reporting. Within three months after construction completion, or no later than 1 year with permission of the local EPB, environmental acceptance monitoring and audit report of completion of project shall be: (i) prepared by a licensed environmental monitoring institute in accordance with the PRC Regulation on Project Completion Environmental Audit (MEP, 2001), and (ii) reviewed for approval of the official commence of individual component operation by environmental authorities. The environmental acceptance reports will indicate the timing, extent, effectiveness of completed mitigation and of maintenance, and the needs for additional mitigation measures and monitoring during operations.

Table VIII-4: Proposed Project "Three-Simultaneity" Environmental Protection Inspection Checklist

Type	Treatment	Requirements
Wastewater	i) Municipal wastewater is treated by septic tank wastewater treatment system. The effluent is reused for agriculture irrigation; ii) Install oil separation tank for the canteen wastewater; iii) Strictly control use of pesticides. High toxic pesticides are banned.	Effluent shall comply with Irrigation Water Quality Standards (GB 5084-2005)
Air	i) Install cooking fume purification facility	Comply with Cooking Fume Emission Standard (GB 18483-2001): The removal rate shall be 60% at least; Maximum allowable emission: 2.0 mg/m ³
Noise	i) Use of low noise equipment and various noise reduction practices; ii) Maintain the pumps in good condition; iii) No operation during nighttime;	Noise at boundary shall comply with Emission Standard of Environment Noise for Boundary of Construction Site (GB12348-2008) Class I standard.
Solid Waste	Waste collection classification, collection and transportation by local sanitation agency	Removal rate shall be 100%
	The pesticide and fertilizer suppliers will retrieve the waste bags and containers	

90. **EMP compliance reporting.** Le Gaga will report to ADB the environmental and social compliance of the project through annual environmental and social performance report, including the implementation of EMP.

IX. CONCLUSION

91. During the preparation of domestic EIA and project IEE, potential environmental impacts were carefully assessed and addressed. The domestic EIA was prepared by Guangzhou EP Environmental Engineering Ltd. in 2014 and reviewed and approved by Xianyou County EPB on 9th December 2014.

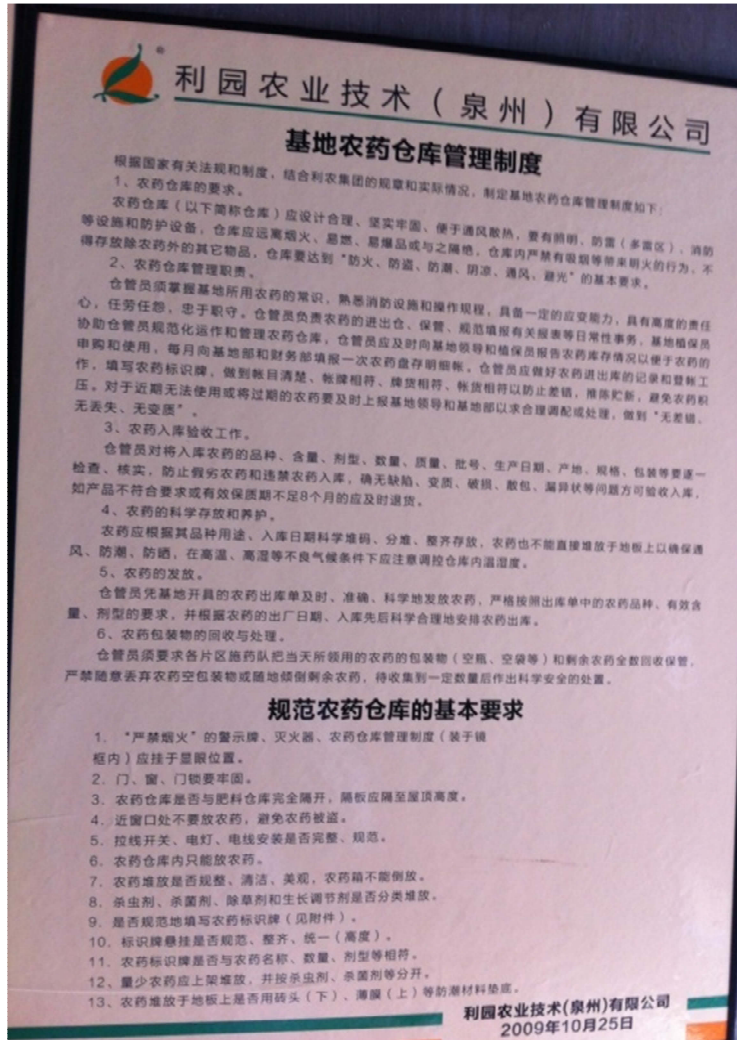
92. Major safeguards issues during construction include significant earthwork and soil erosion, noise pollution, air pollution, surface water pollution, inadequate construction waste management, and occupational and community health and safety. Overall, construction-related impacts are localized, short term, and can be effectively mitigated through the application of good construction and housekeeping practices and implementation of construction phase community and occupational health and safety plans. Appropriate mitigation measures and monitoring programs have been developed to address these issues.

93. The main potential adverse impacts during operation of the project facilities include improper operation of wastewater treatment facilities, solid waste disposal, especially pesticide and fertilizer bags and containers, storage of pesticide, noise from pump operation, occupational health and safety related to application of pesticide.

94. Mitigation measures and a monitoring program are defined for all identified impacts, and are included in the EMP of the project IEE. The EMP sets out the procedures and plans to carry out mitigation measures and monitoring during sequential stages of the project including design, construction and operation. For each impact, appropriate mitigation measures are described. Monitoring and supervision will be undertaken to ensure that environmental impacts will be minimized to acceptable levels.

95. The project IEE concludes that as long as the environmental mitigation and management measures defined in the EMP are properly implemented, all adverse environmental impacts associated with the project will be prevented, eliminated, or minimized to an acceptable level. The project is feasible from an environment safeguards point of view.

Attachment 1: Le Gaga Internal Pesticide Management Procedures and Requirements





利园农业技术（泉州）有限公司

蔬菜基地安全用药管理制度

为进一步贯彻执行国家《农药合理使用准则》和《无公害农产品生产基地管理细则》，于2004年6月1日制定《基地植物保护管理制度》。

一、建立一支稳定的植保队伍

由一名植保专职植保员兼气象员1-2名和专业药剂队，植保员应具备与基地业务相应的专业知识和操作技能，对《基地植物保护管理制度》的执行负有直接责任，并负责基地主要病虫害预测预报、农药的选购、农药的安全科学使用（使用配方由植保员、技术员共同制定）、田间用药的监督管理、农药残留监测（磷卡法），实施植保关键技术试验和生产全过程农药使用情况记录卡的规范填写、送报。

二、农药采购要合理规范

1. 编制农药采购计划时，必须根据该基地的作物动态和基地不同蔬菜病、虫、草害发生情况，参照预测预报资料和有气象变化趋势，明确主要防治对象，进行估算总需量（同时开发的业务或蔬菜，同一农药的不重复计算的总需量），然后填报具有针对性且品种结构合理的农药品种和数量，数量不超过3个月实际可能使用量，原则上先进报先用。

2. 选购农药来源必须具有合法经营资质的经销商，同时必须选种有农药合格证、登记证、有效含量、生产日期、保质期、生产厂家的农药，严禁采购无证、假冒和资料不全伪劣农药品种，不得采购国家和地方政府明令禁止的农药，违规操作者，除货款自理和承担由此产生的后果外，按货款额的三倍罚款，重犯者给予辞退处理，若有与外人“以药换药”者，给予解聘农药价值10倍罚款并开除。

3. 农药采用定期申报采购的方式，提前七天申报，如遇突发性和紧急或自然灾害的预防性用药则可不受申报限制。

4. 采购农药品种应严格执行计划采购，使用，凡过期的农药由基地自行负责报废并列入成本。

三、农药科学安全使用

1. 农药的施用有指导、有责任制，每次防治前基地领导与技术人员集中研究病虫害防治方法，农药施用前必须参考上次配方制定新配方，必须以安全、有效、经济为目的，对农药专业人员进行新技术培训，建立药剂员责任制，以确保用药质量；同时，应严格规范记录账簿，以便分清责任。

2. 蔬菜生长期中，同一种农药使用次数不得超过《农药合理使用准则》规定的次数，同时必须交替使用，生产出口产品必须根据出口标准的常用农药种类和剂量技术规范实施。

3. 农药混配施用，必须在技术人员指导下，根据农药混配原则实施，不得盲目混用，禁止“中药方”式的混用，避免增加农残检测难度，凡混配产品为复配制剂，数量只能再与一种其他单剂的混用，杀虫剂与杀菌剂混用或杀虫剂与除草剂混用或杀虫剂与除草剂混用，不得超过三种，同时，必须严格执行并记录安全间隔期，对混用农药者视情节轻重，给予通报、扣发奖金、罚款等方式处理。

4. 严格遵守农药后安全处理程序，蔬菜农药的空包、空袋必须交回仓库安全处理，不得弃放田间，药桶必须洗净，剩余农药必须交回仓库，严禁就地倾倒剩余药液，田间突发重病的农药包装物，给予责任人罚款处理。

四、农药质量监控

1. 生产全过程必须严格遵守安全生产间隔期，执行蔬菜采收通知书制度，每一种蔬菜的每块田必须建立农药档案，包括农药名称、药剂名称、施用时间、施用次数（混配应与各自用量或倍数）。

2. 严禁农残超标产品上市，必须建立农药质量的自控和自控制度，重视农药当家品种和进口国家的农残标准要求安全使用和监控，必须记录每次施用次数及合格次数，超出次数与药残超标不符或连续两次超出农残超标标准的，应及时查明原因并追究责任。

3. 定期对基地的产品进行农残不定期抽查，采收上市的产品必须填写生产过程“农药使用情况记录卡”，并经检测人签字，以备抽查，对伪造“记录卡”者将给予严肃处理，凡农残超标产品上市者，须承担由此造成后果的责任，该类产品严禁再次选送，违者按情节给予罚款、警告、直至辞退处理。

五、农药的保管与废弃

1. 建立农药专用仓库，由植保员和社会监督员管理，农药必须分类堆放、上架存放和悬挂标识牌，应做好防潮、防晒、防盗，库存农药有效保质期应及时通报有关人员，避免长期积压。

2. 每周30日盘点一次，药剂逐一进销，一律用基地发放的规范格式填写，不得形迹、隐瞒或造假，不得将库存国家和地方政府明令禁止农药，混仓与台必须建立台账，以便送报。

3. 仓管员变动，必须办理交接手续，逐一核对无误后，接收人签收生效，不遗留隐患。

六、加强保密工作

有关植保资料必须妥善保管，不得向他人泄露植保管理方法和技术资料，不得复制内部技术资料交予他人使用。

七、植保员、技术员年度考核制度

由基地组织有专家、基地总经理参加的考核小组，对植保员和技术员进行量化考核，考核内容为：①对两个《制度》执行情况；②对病虫害管理水平和基础工作规范化操作水准；③违规操作次数与事故次数；④工作效率与执行生产试验任务质量。

植保员年度考核评分标准：

一、量化考核项目：

1. 操作不规范：一切规章不模范，现场实施，安全防护不模范，违反农药采购规定者每次扣0.5-2.0分。

2. 违规操作：滥用农药，不遵守安全间隔期，不执行产品上市前农残检测者每次扣1.5-3.0分。

3. 责任心过失：不执行病虫害预测预报制度，应急技术储备不力，药害、混用农药知情不报，违规操作知情不报者每次扣2.5-3.5分。

4. 执行力与执行力：对进行植保新技术实施不力、不模范，不及时对其违规行为行为者每次扣2.0-4.0分。

5. 违规行为：不遵守《植保管理制度》，没有及时发现田间病虫害和杂草数据不力，造成一定程度损失者（重大损失者另行处理）每次扣3.0-5.0分。

二、基地综合考评分

1. 工作态度、工作责任心、敬业精神（最高评9分）。

2. 业务水平、遵守纪律、敬业精神、工作效率（最高评12分）。

3. 团结合作精神（最高评6分）。

4. 创新有实效（新技术、新方法、新发现）（最高评13分）。

Attachment 2: Minutes of Environmental and Social Public Consultation

Project Title	Le Gaga Holdings Limited Greenhouse Agricultural Development Project-Zhongshan Xinlian Production Base
Subject	Environmental and social impact public consultation
Data of workshop	17 th March 2015
Location	Village hall of Xinlian Village, Xianyou County, Putian, PRC
Attendees	<p>Chenhang-Le Gaga ESMS manager Yan Shengren- ESMS manager of Le Gaga (Putian) Branch Gao Hongyao-Manager of Zhongshan Production Base</p> <p>Villagers of Zhongshan town: -Lin Xinzhaoy -Lin Hengxiang -Xie Jinxi -Xie Yuantao -Lin Qingsheng</p>
Main content	<ol style="list-style-type: none"> 1. Le Gaga ESMS manager briefly introduced the proposed project to the villagers; 2. Le Gaga ESMS manager introduced the anticipated potential environmental and social impacts of the proposed project; 3. Le Gaga ESMS manager explained Le Gaga's GRM to the villagers; <p>The villagers expressed welcome to Le Gaga to invest in Zhongshan as the project will bring additional income for the villagers and promote local economic development without sacrifice of environmental benefits. All villagers consulted were supportive to the project.</p>