ENVIRONMENTAL REPORT

China Research Academy of Environmental Sciences

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1. Introduction

1.1. Purpose and Contents of Report

This Environment Report (the Report) is prepared for the appraisal of the proposed World Bank loan-financed Irrigated Agriculture Intensification Project III (IAIL3, the Project).

The World Bank preparation mission of November 2004 proposed that the environment category of the Project remains to be type B due to the similarities between the Project and Irrigated Agriculture Intensification Project II (IAIL2) in terms of project areas and basic contents. In order to simplify procedures the Bank no longer requires to review a full environmental assessment report for the Project, but requires to 1) assess the actual environmental impacts of the IAIL2 Project; 2) compare the environmental conditions of IAIL3 and IAIL2; and 3) prepare environmental management plan by Project provinces.

In compliance with the above requirements the main contents of the Report include:

1) Overview of the actual environmental impact assessment of the IAIL2 Project;
2) Comparison of environmental conditions and contents between IAIL3 and IAIL2;
3) Clarification on the preparation of Environmental Management Plans for IAIL3;
4) EMP of respective project provinces (attached to the Report).

1.2. Background

Since 1998 the IAIL2 Project had been implemented in 131 counties (cities) of China's five provinces of Hebei, Henan, Shandong, Jiangsu and Anhui and project implementation was completed in end 2002.

Project implementation has improved local agricultural productive conditions, promoted agricultural restructuring, increased farmers' income and improved the level of agricultural technologies, thus achieving remarkable economic, social and ecological benefits. To this end, the State Office for Comprehensive Agricultural Development (SOCAD) has decided to continue to implement the IAIL3 Project in the above five provinces.

Entrusted by SOCAD the China Research Academy of Environmental Sciences has undertaken to conduct environmental impact assessment (EIA) for the Project and prepared the Report according to the requirements of the Bank preparation mission.

2. Overall Assessment of Environmental Impacts of IAIL2 Project

In June 2004 SOCAD prepared the *"Environmental Management Report for the Irrigated Agriculture Intensification Project II"* to be as one of the IAIL2 ICR supporting documents (Reference Document 1). The report summarizes and evaluates the environmental management work, status of implementation of relevant environmental covenants in the Loan Agreement and the actual environmental impacts following project implementation. The Report only outlines the actual environmental impacts of IAIL2.

2.1. Environmental Issues of IAIL2 Project

The main objectives of the project were to increase agricultural production and farmers' income through improvement and rehabilitation of the existing irrigation facilities in the project areas. Main project components include canal lining, constructing on-farm works, rehabilitating existing and building new pumping stations and tube wells, land leveling, improving field passageways and building field drainage network and windbreak shelter belts. The project did not involve the construction of new reservoirs and new main and branch canals. In March 1997 the Bank preparation mission rated the project as Category B in terms of its environmental impacts.

Based on the EIA report of IAIL2 the Project Appraisal Document (PAD) specified that there were no significant environmental issues under the project and, the important environmental issues included 1) likely eutrophication of downstream lakes; 2) likely excessive water diversion from the Yellow River by Shandong Province; 3) likely groundwater overdraft by the provinces of Hebei, Shandong and Henan; 4) incidence of soil salinization in some project areas, and other environmental issues included environmental impacts of construction activities and control over the application of pesticides and chemical fertilizers. These issues are shown in Table 2-1.

Table 2-1: Bank PAD-specified Environmental Issues for IAIL2

Environmental Issues	Significant Environmental Issues	Important Environmental Issues	Other Environmental Issues
Main Contents	None	Downstream Lake eutrophication; Likely excessive Yellow River diversion by Shandong; Likely groundwater overdraft in Shandong; Incidence of soil salinization in some project areas.	Environmental impacts of construction activities; Control over application of pesticides and chemical fertilizers

2.2. Assessment of Actual Environmental Impacts of IAIL2 Project

2.2.1. Significant Environmental Issues

Evidences of project implementation have verified the conclusion in the Bank's PAD of "the Project doesn't involve any significant environmental issues". The project did not see any of them during its implementation and will unlikely see any either in the future.

2.2.2. Important Environmental Issues

I) Lake Eutrophication

The lakes involved in this project mainly include the Hongze Lake, Luoma Lake (Jiangsu Province), Chaohu Lake (Anhui Province) and Nansi Lakes (Shandong Province).

As described in the project EIA, the major pollutant sources that caused above lake eutrophication are industrial wastewater and urban domestic sewage from the project areas (80~90%), and the project areas with irrigation run-off to these lakes accounted for only1-4% of their respective catchment area. Therefore, as shown in the following table, irrigation run-off from the project areas had minor negative impacts on the eutrophication of respective lakes.

In fact, during the implementation of the project, each project province adopted a series of measures to reduce chemical fertilizer run-off, such as balanced fertilizer application to reduce nitrogen and increase potassium, conserving soil moisture and fertility by land leveling, and other integrated water saving measures. After project implementation, compared with the existing load of nitrogen and phosphate of these lakes the actual increase of nitrogen and phosphate in downstream lakes due to irrigation run-off from the project areas was minor. Therefore, the negative impacts due to project implementation on lake eutrophication are negligible.

Take Chaohu Lake with the largest proportion of irrigation run-off area out of its catchment area as an example. According to estimations of Anhui Province, during project implementation, due to the measures taken, including land leveling, conservation of soil fertility and moisture as well as balanced fertilization, loss of chemical fertilizers had been greatly reduced, especially loss of nitrogen and phosphate was estimated to be reduced by 36% and 38% respectively. In other words, the annual increment load of nitrogen and phosphate in the lake by run-off from the project areas accounted for only 0.37% and 0.41% respectively of its total nitrogen and phosphate load. Therefore, as shown in Table 2-3 they had tiny impacts on the lake's eutrophication.

Table 2-2: Comparison of Project Area with Irrigation Run-off to Lakes and Lake Catchment Area

Item/Lakes	Hongze	Luoma	Nansi	Chaohu
Catchment Area□ha□	6,302,000	4,900,000	3,170,000	1,300,000
Project area with irrigation run-off likely reaching the lakes (ha)	67,000	53,000	27,000	55,000
Proportion (%)	1.06%	1.08%	0.85%	4.2%

Table 2-3: Impacts of Nitrogen and Phosphate Losses from Project Areas on Chaohu Lake Eutrophication

Impact of industrial wastewater and urban sewage	90 %
Impact of pollutants from agricultural non-point sources	< 10 %
Total catchment area	1.3 million ha
Project areas with irrigation run-off direct entering into the lake	55,000 ha
Project areas with irrigation run-off direct entering into the lake out of total catchment area	4.2 %
Increase of the nitrogen load by the project out of total nitrogen load of the lake	0.37 %
Increase of the phosphorus load by the project out of total phosphorus load of the lake	0.41 %

Monitoring results of Anhui Provincial Environmental Monitoring Center show from 1998 through 2000 Chaohu Lake was in a status of eutrophication, but its degree was decreasing year by year. Between 2001 and 2002, eutrophication had dropped to the medium level. Although the improvement was largely due to upgraded treatment of industrial wastewater and municipal sewage, the implementation of this project has at least not produced negative impacts on the control of Chaohu Lake eutrophication.

II) Control of Yellow River Diversion by Shandong

During the implementation of the project, the Shandong POCAD took no-increase of irrigation water from the Yellow River as one of the project management objectives. Main measures to fulfill the objective include the followings:

1) Reducing irrigation demand through integrated water saving measures;
2) In areas where groundwater level was high and have bigger exploitation potential more tube wells were built to increase groundwater supply to substitute water from the Yellow River;
3) Combined use of surface water and groundwater, which reduced diversion from the Yellow River and ensured irrigation at the same time.

Table 2-4: Volume of Yellow River Diversion by Shandong Province (1998~2002)

Year	1998	1999	2000	2001	2002	Average
Diversion (10^8 m^3)	81.0	85.2	65.0	64.6	61.0	71.5

The table indicates that during the implementation of the project, Shandong Province diverted an annual average of 7.15 billion m^3 of water from the Yellow River, which was close to the state allocated quota of 7.0 billion m^3 for the province. This indicates that the implementation of the project has not caused negative impacts on diversion from the Yellow River by Shandong Province.

III) Groundwater Resources Protection in Hebei, Henan and Shandong

During project implementation the provinces of Hebei, Henan and Shandong had fulfilled the requirements of the Bank Loan Agreement, including:

1) No new wells were built in groundwater overdraft areas;
2) Permits were obtained for driven well for use of groundwater;
3) Depth of all newly drilled wells did not exceed 50 meters;
4) Groundwater monitoring was conducted.

In addition, the significance of comprehensive water saving ("real" water saving) was stressed during project implementation through implementing a series of measures including engineering, agronomical and management water saving measures, which has produced remarkable water saving benefits. A with-without-project comparison indicates the project had saved significant amount of water (according to the statistics of another Bank financed project: the Agricultural Water-Saving Project in Hebei Province, water was saved at a rate of 20-30%) and project implementation has to some extent relieved the trend of groundwater overdraft and declining groundwater table.

Table 2-5: Statistics of Precipitation in Project Areas During 1998 to 2002

	Annual average precipitation (mm)							Difference
	1998	1999	2000	2001	2002	5YA	MYA (mm)	(mm)
Hebei	621.0	366.8	521.9	490.9	366.9	473.5	597.8	-124.3
Shandong	766.9	503.2	643.1	538.5	368.9	564.1	664.8	-100.7
Henan	812.3	533.6	894.8	491.3	555.0	657.4	685.7	-28.3

Note: The difference is that between five years average and annual average. It is expressed in positive (negative) value when the five years average is greater (lower) than annual average precipitation. 5YA=five-year average; MYA = multi-year average.

However, due to less precipitation more groundwater was used for irrigation but such use was within the range of water resources balance. Table 2-6 shows groundwater extraction for Hebei, Shandong and Henan during 1998 and 2002.

Table 2-6: Groundwater Extraction in Hebei, Shandong and Henan (1998 – 2002)

	Annual Extraction ($10000m^3$)						Multi-year Resources ($10000m^3$)	Annual Average Difference ($10000m^3$)
	1998	1999	2000	2001	2002	Five years Average		
Hebei	16,103	23,533	17,545	20,359	25,993	20,707	19,947	760
Shandong	46,102	53,822	65,295	85,776	100,141	70,227	92,837	-22,560
Henan	121,517	131,023	103,952	156,445	128,358	128,259	156,675	-28,416

Note: The difference is that between five years annual average and the normal available groundwater resources. Positive value indicates that actual extraction is greater than multi-year average groundwater resources.

The above two tables indicate that although the three provinces had less precipitation during project implementation, only project areas in Hebei Province had extracted more groundwater than the multi-year average value.

Less precipitation had reduced groundwater replenishment, which resulted in declined groundwater table in the project areas. Compared with the multi-year average groundwater depth, groundwater table for 2002 in the project areas of Hebei, Shandong and Henan dropped 2.21 m, 2.09 m and 1.27 m respectively, as shown in Table 2-7.

Table 2-7: Annual Average Groundwater Depth in Project Areas (1998~2002) (m)

Province	1998	1999	2000	2001	2002	5 YA	2002-1998	MYA	2002-MYA
Hebei	6.38	7.38	7.6	7.74	8.59	7.54	2.21	6.38	2.21
Shandong	5.73	6.23	5.94	6.44	8.19	6.51	2.46	6.1	2.09
Henan	7.26	7.95	7.30	7.47	7.87	7.57	0.31	6.60	1.27

Note: 5YA=5-Year Average; MYA=Multi-year Average;

Analysis on multi-year average groundwater depth indicates drop of groundwater table in the project areas of Hebei, Shandong and Henan provinces remained within the normal range. In wet years groundwater can be replenished and the table will rise. The year 2003 was a wet year for Shandong and Henan and was a normal one for Hebei, when groundwater table generally rose. Compared with the situation in 2002, the table in Shandong rose by 3.36 m and compared with the situation at the beginning of project implementation (1998), groundwater table in the project areas rose by 0.9 m and that in Henan went up by 1.16 m to the multi-year average level of.6.6m. Although 2003 precipitation in Hebei was only 30 mm higher than multi-year average, groundwater table rose by 1.24 m. See Table 2-8 for details.

Table 2-8: 2003 Precipitation and Groundwater Table Recovery in Project Areas

Province	Item	2002	Average in 98-02	2003	Average in 98-03	Multi-year Average
Hebei	Precipitation (mm)	366.9	473.5	628.18	499.3	597.8
	Groundwater depth (m)	8.59	7.54	7.35	7.50	6.38
Shandong	Precipitation (mm)	368.9	564.1	1033.8	642.4	664.8
	Groundwater depth (m)	8.19	6.51	4.83	6.24	6.1
Henan	Precipitation (mm)	555.0	657.4	1024.8	718.6	685.7
	Groundwater depth (m)	7.87	7.57	6.60	7.40	6.60

IV) Soil Salinization

In the North China Plain (Huang-Huai-Hai Plain), where the project is located, large quantities of groundwater have been exploited for agricultural irrigation since the 1970s, which has caused a general decline of groundwater table. In general, conditions of critical groundwater depth (□2.0 meters) for soil salinization have disappeared. Continuous Fresh water irrigation in the project areas has continuously desalted soil. Therefore, secondary salinization could appear only a few low-lying land along the rivers, lakes and coasts as well as few project areas where slightly salty water with the mineralization level 1~2g/L and salty water with the mineralization level of greater than 2g/L were used for irrigation.

Project implementation coincided with drought. Groundwater in the project areas was far deeper than the critical depth for soil salinization, which could not lead to new soil salinization.

According to project design, in areas where groundwater depth was fairly shallow, such as Yucheng City, Pingyuan, Chengwu and Yuncheng Counties in Shandong Province, the project appropriately developed tube well irrigation and adopted rotational well-canal irrigation to prevent soil salinization.

In addition, the project excavated and dredged 154.7879 million m^3 of irrigation and drainage canals (52.4313 million m^3 lateral canals and 102.3566 million m^3 sub-lateral canals), and completed 130.90-million-m^3 excavation of waterlogging drainage canals, forming a relatively complete drainage system in the project areas. A timely drainage of excessive rain and irrigation run-off was thus guaranteed.

During the implementation of the project, each project province conducted regular monitoring on soil salinity. The monitoring results show that since the implementation of the project, no soil salinization problem had occurred in the project areas.

2.2.3. Other Environmental Issues

I) Impacts of Construction Activities

Most of the civil works under this project were canal excavation and lining, construction and rehabilitation of small pumping stations, construction and maintenance of tube wells and small water storage ponds, etc. The works were small and relatively simple and scattered in 131 counties (cities, districts) of the five provinces. Most of the activities were undertaken in already developed farmland areas and the construction period was short (generally within half a year). Environmental problems related to project construction were minor with little impacts.

In addition, during project implementation, for construction of relatively important projects the contractors were required in the contracts to comply with relevant national and local laws, regulations and standards on environmental protection, sanitation and epidemics control and the Engineers were entrusted to supervise the contractors. Therefore, construction of all civil works caused neither major environmental problems nor significant public health problems or public complaints.

II) Control of Fertilizer and Pesticide Application

During project implementation, IPM technologies were widely adopted in the project areas. The integration of disease-resistant varieties promotion with application of pesticides with high efficiency, low toxicity and low residue and bio-pesticides replacing original highly toxic pesticides had effectively improved farmland eco-environment in the project areas. Table 2-9 compares the use of pesticides and chemical fertilizers during and before the project.

Table 2-9: Changes in Application of Pesticides and Their Residues in Soil and Water By Project Province (%)

Province	Reduction of Pesticides Per Unit Area	Reduction of Highly Toxic Pesticides	Increase of Bio-pesticides	Reduction of Pesticides Residue in soil	Reduction of Pesticides Residue in Water
Shandong	60	106	220	26.1	32.7

Anhui	54.9	85.2	146	18	21
Jiangsu	50	80	90	36.7	80.5
Henan	30	85	80	Not Available	6.2
Hebei	47	94.3	82.5	NA	NA

In response to the deficit of phosphate and potassium, particularly potassium, the project provinces carried out a number of measures during the implementation of the project to balance soil fertility, i.e. control of nitrogen (reducing nitrogen application in some project areas), stabilizing phosphate (increasing phosphate application in some areas) and supplementing potassium. Changes in soil fertility in project areas between 1998 and 2002 are summarized in Table 2-10.

Table 2-10: Changes of Soil Fertility in Project Areas between 1998 and 2002

	Without Project			**With Project**		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Hebei	1	0.3	0.25	1	0.4	0.3
Jiangsu	1	0.36	0.2	1	0.26	0.3
Anhui	1	0.38	0.35	1	0.51	0.46
Shandong	1	0.34	0.68	1	0.49	0.66
Henan	1	0.32	0.12	1	0.36	0.18

In addition, advanced fertilizing techniques were disseminated in project areas, such as deep application, mixed application, etc., thus increasing the efficiency of fertilizers, lowering loss of chemical fertilizers and reducing the negative impacts of irrigation run-off on receiving water bodies.

2.3. Environmental Monitoring

During the implementation of the project, the project carried out the environmental monitoring plan in the Project Implementation Plan. The monitoring results during five years' project implementation indicate that due to effective implementation of various environmental protection measures, overall environment quality was rather good and improved year by year. Project implementation has not imposed any significant negative impacts on the environment. Therefore, the project is environmentally sustainable. Basic environmental monitoring conclusions are summarized in Table 2-11.

Table 2-11: Basic Conclusions of Environmental Monitoring

Items	Evaluation Conclusion
1. Environment Quality	
1) Surface irrigation water quality	In general, the quality was good and improved year by year. Water met irrigation requirements.
2) Irrigation run-off quality	The quality met the requirement of irrigation with comprehensive pollution index decreasing year by year, no significant negative impacts on receiving water bodies.
3) Groundwater quality	Quality was good and stable. Secondary mineralization found only in a few spots.
4) Soil pollution	Soil quality was good with single and comprehensive pollution indices decreasing.
5) Farm produce contamination	Good quality farm produce, which met relevant national quality standards.
2. Groundwater Table	
1) Groundwater table	Groundwater table in three provinces generally decreased by 1-2 m but still within the normal fluctuation range.
2) Exploitation volume	Exploitation volume of Shandong and Henan lower than multi-year average available water resources while that of Hebei was slightly higher.
3. Soil Fertility	Soil fertility increased with more rational composition of nitrogen, phosphate and potassium

2.4. Summary Conclusions of IAIL2Environmental Impacts Assessment

1) In compliance with the requirements of the World Bank Loan Agreement, various environmental protection measures were effectively implemented during project implementation, which had ensured realization of environmental objectives.

2) The outputs of project implementation confirmed the conclusion made in the World Bank PAD – "the project doesn't involve any significant environmental issues". During the implementation of the project, the project did not result in any significant adverse environment impacts or will unlikely lead to any in the future.

3) Both SOCAD and POCADs paid close attention to and undertook effective management measures over the four important environment issues specified in the World Bank PAD. As a result, the project did not cause adverse impacts on eutrophication of lakes in project areas; the average annual water volume taken from the Yellow River in Shandong Province was close to the state-allocated quota; the changes of groundwater tables in Hebei, Shandong and Henan provinces remained within normal range, and the implementation of the project did not cause adverse impacts on groundwater resources in the three provinces; and no soil salinization problems occurred in project areas.

4) Existing Chinese laws and regulations on environmental protection and public health were observed during physical construction. No significant environmental impacts were resulted from construction activities.

5) Continuous monitoring on the environment in the project areas proved that the implementation of the project did not cause any significant adverse impacts on the

environment. On the contrary, due to the adoption of a serious of measures including integrated water saving, balanced fertilizing, IPM, expansion of forest coverage, project implementation has to some extent improved the agro-ecological environment in the project areas.

Table 2-12 summarizes the actual assessment on the environmental impacts of IAIL2.

Table 2-12: Summary Conclusions of Environmental Assessment

Items	Status of Completion/Assessment Conclusion
Significant Environmental Issues	No significant environmental issues occurred.
Important Environmental Issues	
1) Lake eutrophication	Minor impacts were found and could be ignored
2) Yellow River diversion for irrigation in Shandong	Diversion from the Yellow River was reduced through comprehensive measures. Shandong did not go beyond the quota
3) Groundwater overdraft	Comprehensive measures were taken to prevent excessive exploitation. Groundwater resources within balanced range.
4) Soil salinization	No soil salinization was found.
Other Environmental Issues	
1) Environment management during construction	Relevant laws and rules were observed during construction. No important environmental problems emerged.
2) Control of pesticides and chemical fertilizers	IPM and balanced fertilizing reduced pesticide residue and loss of chemical fertilizers.
Environmental Monitoring	
1) Environment quality	Five consecutive years' monitoring proved good environment quality.
2) Groundwater table	Continuous monitoring by Shandong, Hebei and Henan found a drop of 1-2 m due to serious drought. It was recovered in 2003.
3) Soil fertility	Survey shows improved soil fertility and composition of N, P and K.

3. Comparison of Environmental Conditions and Environmental Impacts Between IAIL3 and IAIL2

3.1. Comparison of Project Counties (Cities)

As described above IAIL3 will be implemented in the IAIL2 project provinces. With the exception of Jiangsu whose project counties/cities are not changed, project areas in other provinces are adjusted mainly within the counties/cities of IAIL2 and some provinces have selected several new counties/cities. Table 3-1 lists the project counties/ cities under IAIL2 and IAIL3, of whom bold ones are new counties/cities under IAIL3.

Table 3-1: Comparison of IAIL2 and IAIL3 Project Counties/Cities

IAIL2 Project Areas		IAIL3 Project Areas	
Province/ Municipality	**County (City, District)**	**Municipality**	**County (City, District)**
Hebei			
Tangshan	Leting, Luannan,Qian'an, Yutian, Zunhua, Qianxi, Fengnan, Tanghai, Fengrun, Luanxian	Tangshan	Leting, Luannan, Qian'an, Yutian, Zunhua
Qinhuangdao	Funing, Changli, Qinglong, Lulong	Qinhuangdao	
Cangzhou	Renqiu, Wuqiao, Botou, ongguang,Cangxian, Hejian, Qingxian, Nanpi	Cangzhou	Renqiu, Wuqiao, Botou, Dongguang,Cangxian
Hengshui	Jizhou, Zaoqiang, Jingxian, Taocheng, Gucheng	Hengshui	Jizhou, Zaoqiang, Jingxian, Taocheng
Shijiazhuang		**Shijiazhuang**	**Xinji, Jinzhou, Wuji, Zhengding**
Langfang		**Langfang**	**Anci, Guangyang, Yongqing, Wen'an**
Henan			
Nanyang	Yuancheng, Sheqi, Xinye, Fangcheng, Tanghe	Nanyang	Yuancheng, Sheqi, Xinye, Fangcheng
Zhumadian	Suiping□Miyang	Zhumadian	**Runan, Pingyu**
Luoyang	Yanshi, Yichuan, Songxian, Ruyang	Luoyang	Yanshi, Yichuan, Songxian
Kaifeng	Qixian, Lankao, Kaifeng	Kaifeng	Qixian, Lankao, Kaifeng
Shangqiu	Minquan, Suixian□Ningling, Suiyang□Yucheng	Shangqiu	Minquan, Suixian□Ningling, **Liangyuan**
Xinxiang	Changyuan, Fengqiu	Xinxiang	
Puyang	Puyang, Qingfeng, Nanyue	Puyang	
Jiaozuo	Qinyang, Wuzhi, Jiyuan	Jiaozuo	
Pingdingshan		**Pingdingshan**	**Ruzhou**
Xinyang		**Xinyang**	**Pingqiao, Luoshan, Xixian**
Shandong			
Ji'an	Licheng, Zhangqiu, Changqing, Jiyang,Shanghe, Tianqiao	Ji'an	Changqing, Licheng, Zhangqiu, Shanghe
Zaozhuang	Taierzhuang, Yicheng, Xuecheng, Tengzhou	Zaozhuang	Tengzhou, Xuecheng
Jining	Qufu, Yanzhou, Zoucheng, Wenshang, Weishang, Yutai, Jinxiang, Jiaxiang, Liangshan	Jining	Yanzhou, Qufu, Zoucheng, Laingshan
Tai'an	Daiyue, Feicheng, Ningyang, Dongping, Taishan	Tai'an	Daiyue, Feicheng, Ningyang
Dezhou	Yucheng, Lingxian, Qihe, Pingyuan, Wucheng	Dezhou	Yucheng, Qihe, Pingyuan
Heze	Mudan, Juancheng, Yuncheng, Juye, Chengwu, Shanxian	Heze	Yuncheng, **Dingdao**
Weifang		**Weifang**	**Zhucheng, Gaomi,**
Linyi		**Linyi**	**Junan, Yishui**

IAIL2 Project Areas		IAIL3 Project Areas	
Province/ Municipality	**County (City, District)**	**Municipality**	**County (City, District)**
Jiangsu			
Municipality	County (City, District, Farm)	Municipality	County (City, District, Farm)
Xuzhou	Fengxian, Peixian, Tongshan, Suining, Pizhou, Xinyi, Jiawang	Xuzhou	Fengxian, Peixian, Tongshan, Suining, Pizhou, Xinyi, Jiawang
Huai'an	Huaiyin, Lianshui, Chuzhou, Hongze, Xuyi, Jinhu	Huai'an	Huaiyin, Lianshui, Chuzhou, Hongze, Xuyi, Jinhu
Yancheng	Xiangshui, Binhai, Funing, Sheyang	Yancheng	Xiangshui, Binhai, Funing, Sheyang
Lianyungang	Donghai, Ganyu, Guanyun, Guannan	Lianyungang	Donghai, Ganyu, Guanyun, Guannan
Suqian	Suyu, Shuyang, Siyang, Sihong	Suqian	Suyu, Shuyang, Siyang, Sihong
Anhi		**Anhi**	
Hefei	Feidong, Changfeng, Feixi	Hefei	Feidong, Changfeng, outskirts
Chaohu	Lujiang, Hexian, Hanshan, Wuwei, Juchao	Chaohu	
Liu'an	Huoqiu, Shouxian, Shucheng, Jin'an, Yu'an	Lu'an	
Anqing	Huaining,Zongyang, Tongcheng, Qianshan, Taihu, Susong, Wangjiang, Anqing Outskirts	Anqing	
Bengbu		**Bengbu**	**Huaiyuan, Wuhe, Guzhen**
Huainan		**Huainan**	**Fengtai, Panji**
Chuzhou		**Chuzhou**	**Dingyuan, Jinjiao, Fengyang, Mingguang, Nanjiao, Tianchang, Langya, Lai'an**

Note: Bold ones refer to new project counties/cities/districts.

Table 3-1 indicates that among the 107 project counties under IAIL3, 73 are former IAIL2 counties and 34 are new ones. Project counties in Jiangsu are exactly the same as IAIL2 and out of the 16 counties in Anhui 14 are new ones.

3.2. Comparison of Environmental Conditions

Environmental conditions of IAIL2 and IAIL3 are compared in details in the environmental reports by province. Below is the summary of comparison made by each of the provinces (See Attachments 1-5 for details):

1) Same as IAIL2, IAIL3 will be implemented in the original irrigated areas;
2) The environmental conditions of 73 IAIL2 counties to be involved under the Project are not changed;
3) Environmental conditions of new additional counties in Hebei, Henan and Shandong are similar to their neighboring IAIL2 counties and there are no obvious or important differences;

4) IAIL3 Henan Component excludes the project counties of Xinxiang, Puyang and Jiaozuo where groundwater resources are relatively short. Therefore, IAIL3 Henan doesn't include groundwater overdraft areas any longer;
5) IAIL3 project areas of Jiangsu are the same as IAIL2 and environmental conditions are also the same;
6) Anhui IAIL3 project areas are between those of IAIL1 and IAIL2 and the environmental conditions of IAIL3 are similar to that if IAIL1 and IAIL2, and there are no new environmental issues.

3.3. Comparison of Project Contents

Table 3-2 compares the main contents of IAIL2 and IAIL3.

Table 3-2: Comparison of IAIL2 and IAIL3 Project Contents

Project Works	IAIL2 Contents	IAIL3 Contents
Water Infrastructure Construction	Canal excavation, bridges, culverts and other structures, constructing new and renovating existing pumping stations, agricultural-use power cable, rural roads, O&M equipment, small storage ponds, tube well repair & maintenance, drilling new tube wells	Canal and ditch excavation & dredging, structures, drainage & irrigation pumping stations, agricultural-use power cable, rural roads, O&M equipment, small storage ponds, tube well repair & maintenance, drilling new tube wells
Engineering Water Saving	Canal lining, underground pipeline, sprinkler and drip irrigation	Anti-seepage canals, low-pressure pipes, sprinkler and micro-(drip) irrigation
Agronomical Water Saving	Land leveling, deep ploughing/soil loosening, return of straw to field, balanced fertilization, training	Land leveling, deep ploughing/soil loosening, return of straw to field, balanced fertilization, training and dissemination
Management Water Saving	WUA, SIDD	WUA, SIDD
Agriculture	Improved-variety breeding and processing, IMP, township agricultural extension centers, township stations for comprehensive agricultural services, agricultural machinery and service stations, agricultural training and agricultural dissemination and extension, barn and sunning ground renovation, fertilizer batching plants	Improved-variety breeding and processing, IMP, county agricultural extension centers, township stations for comprehensive agricultural services, agricultural machinery, agricultural training and agricultural dissemination and extension, **green produce, specialized farmer associations, pilot cooperative operations of farmer dragon-heads**
Forestry	Construction of farmland windbreak shelter belts, nurseries, forestry pest control	Construction of farmland windbreak shelter belts, nurseries, forestry pest control
Institutional Development and Support	Training, study tour, technical assistance, scientific research, MIS, SIDD establishment and WUA development	Training, study tour, technical assistance, scientific research and dissemination, office equipment and MIS system, farmers' associations (including WUA)

Note: Bold parts refer to new additional contents.

The comparison reveals that while improving, strengthening and rehabilitating the original irrigated agricultural regions, the main contents of the two projects are basically the same, including canal lining, constructing on-farm works, rehabilitating existing and building new pumping stations and tube wells, land leveling, improving field passageways and building field drainage network and windbreak shelter belts, which will not lead to new environmental issues.

New additional contents under the Project include: 1) "green" farm produce; 2) specialized farmer associations; and 3) pilot cooperative operations of farmer dragonheads. In terms of component selection, those with livestock breeding, high water consumption, heavy pollutions and use of wild resources are ruled out. The "green" farm produce, farmer-dragonhead cooperative operational organizations and specialized farmer associations are to plant, process and market their respective local dominant agricultural products and there will be no components involving livestock breeding, high water consumption and heavy pollutions and therefore, thus there will be no corresponding environmental issues.

4. Clarification on Preparation of IAIL3 Environmental Management Plan

4.1. Environmental Issues

The above comparison between IAIL3 and IAIL2 projects in terms of environmental conditions and contents show that the environmental issues involved in IAIL3 are the same as those in IAIL2:

1) There are no significant environmental issues;
2) Dam safety and integrated pest management are listed as separate work items of the Project and will not listed as environmental issues;
3) General environmental issues include (different issues and different focus for each of the provinces):

- Water resources protection
- Volume of diversion from the Yellow River (Shandong)
- Irrigation water quality
- Groundwater quality
- Soil quality
- Environmental impacts of irrigation discharge/farmland ruff-off
- Secondary soil salinization
- Environmental impacts of construction activities
- Planting of farmland windbreak shelter belts

4.2. Clarification on Preparation of Environmental Management Plan

1) Since the five provinces under the IAIL3 Project vary greatly in natural conditions and differ in focuses on environmental issues, according to the requirements of the Bank preparation mission separate EMPs by province are prepared to make the plans more targeted at environmental issues and facilitate their implementation by each of the provinces;
2) In view of the successful implementation of IAIL2 and that the natural conditions of the project areas and contents of IAIL3 are basically the same as IAIL2, IAIL3 EMP is prepared based on the experience and lessons learned from IAIL2, which will further improve the EMP for the Project.
3) Compared with IAIL2 EMP, IAIL3 EMP has got the following features:
   - Emphasizing water resources protection as the priority of environmental management work in the project areas;
   - Identifying environmental issues involved in the Project, based on which the objectives and contents of environmental management are decided, making the EMP more targeted and applicable;
   - Emphasizing analysis, evaluation and application of environmental monitoring data/results;
   - Clarifying environmental management agencies, their respective responsibilities and costs and sources of funding for EMP implementation;
   - Making necessary adjustments to the items, parameters, venue and frequency of environmental monitoring program;
   - In light of the current model for construction management of physical projects in China, the environmental protection measures to be implemented by the Contractor are summarized and incorporated into the contract in the form of "Rules for Construction Environmental Protection, with its implementation being supervised by the site Engineer entrusted by the Project Management Office (PMO). Environmental protection measures for construction activities will not be detailed in the EMP.

Attachment 1: Hebei Environment Report and Environmental Management Plan
Attachment 2: Henan Environment Report and Environmental Management Plan
Attachment 3: Shandong Environment Report and Environmental Management Plan
Attachment 4: Jiangsu Environment Report and Environmental Management Plan
Attachment 5: Anhui Environment Report and Environmental Management Plan