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C H I N A

IRRIGATION WATER CHARGES IN CHINA

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THE IRRIGATION WATER CHARGE IN CHINA

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China has a very long irrigation history. For example, the famous Dujiangyan irrigation works has been operating continuosly for more than 22.3 centuries since its construction and is still efficiently irrigating its 587,000 ha. of land. China's irrigated area is very large too. Official statistics show that there are 44.45 million ha., or 45% of the total cultivated land under irrigation. According to the irrigation water used, the total irrigated area can be divided into 5 different groups: area irrigated with the water comes from reservoirs; diverted from rivers; pumped from surface water; pumped from under ground and miscellaneous. Their relative percentages are 30%, 27%, 19%, 18%, and 6% respectively. The main irrigated crops are rice, wheat, maize and cotton. Rice is the dominant crop in Southern China where climate is warm and humid. Wheat, maize and cotton are the main crops in North China where the climate is semi-arid to semi-humid, and water resources are not very rich. Irrigation in North China under usual condition can increase the crop yielde by quite high percentages, and may double the yields in dry years, while in wet years it may not have any benefits. In North-east China where the winter is quite cold and the summer is rather warm, the profit of growing paddy rice is substantially higher than growing other crops, so rice becomes the dominant crop in the irrigated areas, although it is not the main crop there. The North-west part of China is quite arid, some of that part are so arid that practically no cropping is possible without irrigation. There, the water for irrigation chiefly comes from the melting snow and glaciers on the high mountains where the annual precipitation is much higher than that in the arid plains. However, this kind of water resource is limited.

Chinese irrigation facilities, aside from very small ponds, dikes and simple wells could be possessed by individuals, are all belonged to the public. All the big and medium types of irrigaton works are national properties, and managed by government water conservancy organizations, while the small ones are generally owned by local collective organizations of farmers. In the construction of a national project, as a rule for last 3 decades, the government water conservancy unit constructs the main canals and structures with the farmers' contribution of most of the labors needed; farmers construct the tertiary canals and on-farm works with building materials (steel, cement and wood, etc.) provided by the government. Due to the fact that within last 3 decades the farmers received only some limited allowance for their labors, it has been estimated

that, if one considers the difference between the normal wage the farmers could earn and the allowance they really got as their investment, then the farmers' share of the investment is about equal to the share of the government in most cases. The small irrigation projects have to be approved by the government water conservancy organization first, then, the owner can, generally, get some loans somewhere to construct the project, and sometimes the water conservancy organization may provide the owner with building materials as subsidies.

It should be noted that many water conservancy engineerings have multipurposes. In addition to the irrigation fuction, they may have other functions like flood control, hydro-electric power generation, fishery, etc., as well. In such cases, the irrigation water charge is not the sole source of their incomes. They can collect water charge from other water uses too.

After the completion of construction of an irrigation project, farmers will begin to irrigate their land, and the management office of that project will start to collect water charges from the beneficiaries. That has been very common in China for a very long time. The forms and rates of water charges vary with different projects under different conditions. The irrigation water charge per ha. in rice dominant Dujiangyan works, for example, was 37.5-60-75 kilograms of husked rice plus 1/2 day of labor for annual repairs through the 1940's to the begining of 1980's. The cotton dominant irrigation area Jin-wei canal of Shaanxi province used to charge farmers 3.75-7.5-18.75 kilograms of lint per ha. during 1930's and 1940's. In 1956, it was changed to 10.5 yuan per ha. of irrigation land as basic charge which should be paid no matter whether it is actually irrigated or not, plus 7.5 yuan per ha. for each actual irrigation. That means, if a hactare of cotton land is irrigated twice in that year as the normal practice, the water charge will be 10.5+2*7.5=22.5 yuan. In general, these water charges equaled to approximately 1%-3% of the local normal yield or gross income of that crop at the time when the water charge rate was fixed. It is obvious that these irrigation water charges do not cover the investment recovery, it takes care of only the O & M expenditures under normal conditions, and, at most, add some money to be used for overhaul. Although the Dujiangyan, the Jin-wei canal and some other irrigation works have kept normal operation with such irrigation water charges, there are quite a number of irrigation works in poor finacial states , due to the fact that the rate of water charges was too low and/or it was not fully collected . The result is that the facilities have not been well maintained and operated. Some of them were so poor that they had to ask the government to support them more subsidies.

In 1979, China started her great economic reforms. In 1981, the reforms of water charges, including the irrigation water charge began. At the begining of that year, the former Ministry of Water Conservancy (now M. of W.C. and Hydro-electric Power) conducted a nation-wide investigation on water charges. Since the end of 1981 till the summer of 1985, MWCHP has held many special conferences to discuss and study the water charge problems. And finally in July, 1985, the State Council issued the document "The Principles of Determination, Calculation, Collection and Use of Water Charge of Water Conservancy Works". That marks the begining of the new period in the course of water charge reforms.

A fundamental question in irrigation water charge reforms is the question of traditional concept. For thousands of years, the chinese people consider the water conservancy works as works of public welfare, they did not have any idea of recovering the investment. But now, the construction of irrigation project has been considered just as economic enterprises like factories or mines. It has to be scientifically appraised that it is economical, feasibile, and its investment can be recovered within a resonable period. It is a principle that all the economical enterprises should be able to recover their investment, only then the extent of economic construction can be larger and larger, and the people can get more and more real benefit. If an enterprise can not get back its investment within a reasonable years, how can we develop the next enterprise? If the water conservancy projects can not recover their investment, how can they construct their further projects? For these reasons, the system of collecting water charges, issued by the State Council says, all the water supplied by water conservancy organization should be paid. It says also that the rate of water charge should be determined on the basis of cost calculated. Since farmers contributed their labor without receiving any pay in constructing the water conservancy projects within last 3 decades, the rate of irrigation water charge should be lower than those of other uses---deduct the part of farmers' labor investment in calculating the cost of irrigationg water and determing the rate of its charge, while all the investments should be included in calculating the cost of water for other water uses.

The reform of water charge will also promote the economical utilization of water resources. As the growth of national population and economic construction has been going on with the time, the shortage of water resources, especially in Northen China, becomes seriously conspicuous. The old system of low water charge and the method of fixing the rate of water charge only on irrigated area leads to wasting water and increasing the seriousness of water resource shortage. So the State Council document declears:

1..In general, the water charge should be counted based on

the amount of progressive rate of water charge for water used

2..For agriculture use, it is better to take the combined system to count the water charge---part of it is counted based on the area of irrigation land, that is called basic charge,and the another part of water charge is counted on the amount of water used. Furthermore, it is recommended to use different water prices to calculate the later part of the water charge in different seasons. For example, the Jinwei Canal used another system of collecting irrigation water charges since 1980: basic charge, 6 yuan per ha, plus varying fees for the amount of water used in different seasons: 9 cent/M3 for water, 10.5 cent/M3 for spring and 12 cnet/M3 for summer. The document also allows the use of progressive rate of water charge for water used exceeding a difinite water rate at places short in water resource.

There are 19 provinces, cities and autonomous regions have eracted new systems of collecting water charges since 1982 (see TABLE 1.). The situation is better than before, but there are still many problems to be solved.

Shanxi, a province in North-China, for example, had in 1981 a total amount of water supplied by the provincial water conservancy organizations of 5,400 million M3, of which, 5,000 million M3 or 93% was for irrigation. The prices of water supplied for different uses were: 0.3-0.5 cent/M3 for irrigation, 2.0-3.0 cent/M3 for industrial and domistic uses of cities and towns. Meanwhile, the costs of water for these water supplying facilities were 3.4-4.1 cent/M3, according to the calculations made. It is obvious then, there were 1.0-2.0 cents deficit for every M3 of water supplied for industrial or domestic uses, and 3.0-3.7 cents short per M3 of water supplied for irrigation use. The differences between the water cost and the water price, which was paid by the government water conservancy organization, were gone to become subsidies to the water using farmers, factories and urban dwellers. Then in 1982, they changed the prices of water to: 6-10 cent/M3 for industrial and domestic use, 0.8-1.5 cent/M3 for gravitational irrigation, 2-8 cent/M3 for pumped water irrigation with a lift of 50-300 M. The total income of water charges collected according to this new system is 2.5 folds compared with the old system. Yet the 0.8 cent/M3 irrigation water charge is only enough to keep O & M that year, and 1.5 cent/M3 still couldn't cover investment recovery, although it might help to pay for repairs or overhauls. The price of water 0.8-1.5 cent/M3 equals approximately to 37.65-70.65 yuan/ha, or about 2.0-4.0% of gross value of crops produced per ha irrigated under normal conditions. It is about in the suitable range of irrigation charge.

This example shows clearly that although the water conservancy organization of Shanxi Province has raised their income of water charge to 2.5 folds as before from executing the

new system of collecting water charge in practice, yet they are still unable to start recovering the investment. That is only an example. We can find by comparing table 1 and table 2 that there are many cases that new prices for irrigation water are still lower than the theoretical water charges which include fully costs of supplying water. In some cases, the differences between these two figures are quite large, indeed.

It is clear, then, we are still on the way of water charge reforms. There is still a long way to go.

First of all, we have to do more explanations in the idoelogical field. It is very difficult to change a traditional idea of thousands of years. The caders of new China since 1949 have devoted their effort to bring benefit to people, and many of the rural people are still poor and backward and needs help, furthermore, most of the irrigation works were built by large amount of farmers' labor without giving the farmers any pay. All these make the situation more complicated and more difficult to convince both the caders and farmers.

Secondly, try to lower the water cost. The more the cost lowers, the easier the recovery of the investment. Ther are many things we can do. To reduce the number of staff members working in management offices and to cut down the administative expenditures are feasible in many cases. To take all possible steps to reduce the loss of water in conveyance and application (to increase the water efficency) is the most practical and important task for most of the irrigation areas. It is now proposed and encouraged in China that all the water conservancy organizations develop their diversified businesses to earn some money in order to increase the total income sufficient for O & M expenditures and investment recovery. There are still other choices and possibilities.

Thirdly, in case there are some special reasons, it is possible that the cost of water of that irrigation works will be too high to be charged fully on water users, if we develop irrigation there. In fact, we have such irrigation schemes. Some of them are gravitational irrigation areas in mountain areas. This kind of irrigation works has not only the very high investment per unit irrigated land, but also the quite high O&M expenditures because they have to build a lot of complicated structures to keep the gravitational water running. And there are some areas irrigated with water pumped up hundreds feet high. In such cases, the power expenditure can be high enough to cost several tenths of gross value of crops produced on that field, although the price of electricity for agricultural use is far lower than those for other uses, and there are some other cases. These and other reasons that cause the irrigation cost very high will lead to the question "are these irrigation

projects really worth to be constructed or maintained?" Generally, this question should be answered independently by the economical benefit of these projects, but in some special cases this question should be answered by the overall benefits of these projects. If projects are decided to be constructed in the latter cases, it may be necesary to have some subsidies. Probably, it will be better that these subsidies taking the "open" form than that of low water charge.

Besides the questions mentioned above, there is still another question remained to be solved properly---to ask water users to pay "resource fee" for water used in places short in water resources. In China, only the users who divert or pump water from reservoirs or "reservoir---regulating" rivers have to pay such fee. Many people agree that persons who pump water from underground in the regions not rich in water resources should pay such fee too, but there is no action taken yet. It is growing clear that if water users were asked to pay resource fee for water they used, then they will definitely improve their water use techniques in order to increase the water use efficiency, and then the overall water supply condition will be improved.

TABLE 1. IRRIGATION WATER CHARGE OF 19 PROVINCES CITIES AND AUTONOMOUS REGIONS

Provinces City or Autonomous Regions	Irrigation Water Charge					Water Charge for Other Uses	
	Basic Charge yuan/ha	Varying Charge for Cereal Crops		Varying Charge for Cash Crops		Indusrial use cent/M3	Domestic use cent/M3
		based on the amount of water used cent/M3	based on the area irrigated yuan/ha	based on the amount of water used cent/M3	based on the area irrigated yuan/ha		
Guangzhou		0.5-0.8	30-75	30% higher than that of cereal crops		2.0-3.0	2.0-2.5
Guangdong		0.5-0.7	52.5-75				
Guangxi	7.5	0.6-0.7		1.3-1.5		2-3,4-6	5-6
Guizhou		0.5	37.5-52.5	0.8	45-60	2-4	2-10
Sichuan	9.0-15	0.3-0.8	22.5-52.5			0.4-1.0,2-5	0.5-2.0
Zhejiang		0.8-1.2	45-75	1.2-1.6	60-90	2-6	1.6-4.8
Anhui	7.5-15	0.4-0.6				2	1
Jiangsu		0.1-0.15	15-22.5			0.13,0.7	0.2
Shandong		0.8-1.2	45-75	1.0-2.0		1.5-3.0,4-7	
Henan	3.0-7.5	0.2-0.5	45-105			.1-.2,0.7-1.	0.4-0.6
Shaanxi		1.0-1.5	30-60		60-90	1-2,5-8	2-4
Hebei	4.5-7.5	0.5-0.8				0.8-1,4-5	0.8-1.0
Beijing		0.6				1.5-4.0	0.5
Shanxi		0.8-1.5				6-10	6-10
Liaoning		0.8				3-5	0.5-1.5
Inner Mogolia		0.5-0.6	30-36	0.6-0.7	37.5-45	2-4	4-8
Gansu		0.6	37.5	0.7		2	3

TABLE 2. COST OF WATER CALCULATED
for SOME WATER SUPPLYING ENGINEERING

Province or City the Irrigation Engineering Locates	Name of Water Supplying Engineering and water Cost cent/M3
Guangdong	Longjing 0.44 , Gongping 0.815
Guangxi	Qiaoxing 0.501, Jiangkou 0.470
	Dajiang 2.005*
Yunnan	Feijinghai 0.595, Songhuaba 2.11
Guizhou	Maomaodong 2.835, Guijiahu 1.867
	Gongnongping 8.594*
Hunan	Baima 1.1, Red Flag 4.202
Jiangxi	Bingyuan 0.498
Fujian	Xixi 1.34, Dongchuan 1.422, Jinjiang 3.642*
Zhejiang	Hongqiao 6.131, Hengjin 0.285
	Qiantangjiang 6.322*
Jiangsu	Zaoguazha 0.338, Shahe 0.69
Anhui	Guniubei 1.57, Huanglishu 2.708, Zuozhen 2.16*
Hubei	Majiahe 3.781, Shitasi 1.372*
Sichuan	Quanmin 3.47, Yuejin 1.151
Shandong	Jindou 1.776, Longmenkou 1.833
Henan	Yinhuang 0.547, Zhifang 7.476
Shaanxi	Jinwei 1.533, Dongfanghong 3.587*
Shanxi	4 areas 2.116, 10 areas 4.956
	9 stations 6.369*
Hebei	Huangpizhuang 0.679, Wushi 1.21
Tianjin	Yuqiao 0.417, Beidaguan 3.745, Dangu 2.859*
Beijing	Guanting & Miyun 1.985
Liaoning	Dalingtun 1.21, Nanhexan 2.255*
Jilin	Longtou 3.148, 9th Station 0.967*
Heilongjiang	Yinren 1.56, Yuelai 2.515*
Inner Mongolia	Yinjinhe 1.308, Dunkou 1.945*
Ningxia	Sanying 6.819, Tongxin 9.10*
Gansu	Suleihe 0.89, Yuanyangchi 0.86
	Jintaichuan 7.5*
Qinghai	Beichuan 1.055
Xinjiang	Baichengzi 1.012

* pumped water