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CASE STUDY

Asia • China

The Miracle on Saline Land: “Forest-Pulp-Paper Integration” Strategy of Huatai

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Sector • Agriculture

Enterprise Class • Large National Company



Summary

The Chinese paper industry has used straw-pulp made from bulrush, straw and haulm as a major feedstock in the manufacturing of paper since the 1950s, due to a lack of available timber in China. But paper made from straw-pulp is significantly lower in quality and more water intensive and polluting than paper made from wood-pulp. For this reason, the Chinese government introduced policies restricting the use of straw-pulp in the 1990s to encourage Chinese paper manufacturers to use alternate sources.

Huatai Paper Co., Ltd. (Huatai) is the biggest newsprint manufacturer in China. In 2000, they raised funds totaling US\$130 million through an initial public offering (IPO) on the Shanghai Stock Exchange. Soon after the IPO, Huatai started a new strategy that they termed the “Forest-Pulp-Paper Integration,” which would substitute wood-pulp for straw-pulp by mobilizing farmers to plant fast-growing trees. It was designed to supply Huatai with sufficient domestic timber resources for its growing production scale and to hedge against expensive and volatile import timber. Since the strategy was also going to accelerate local economic development, improve the natural environment and increase farmers’ income, it drew strong support and assistance from the local government. To date, the strategy has been successful. Huatai not only optimized the integrity of the material for papermaking and the competitiveness of its products, but also has promoted rural economic growth while reducing negative impacts on the natural environment.

There is vast infertile, saline land in the Yellow River Delta region where Huatai operates. The serious shortage of arable land makes it difficult for farmers to maintain a livelihood. Because of the adaptability of the new seed used in the Forest-Pulp-Paper Integration strategy for growth on saline land, and the sufficient support of technology, funds and irrigation offered by Huatai and local government, thousands of households participating in the project are able to grow their incomes generating tree crops on otherwise infertile land.

The Huatai Paper Company Ltd.

The Huatai Paper Co., Ltd (Huatai) is principally engaged in the manufacture and sale of pulp and paper products. Headquartered in Dawang Town of Guangrao County in Shandong Province, the Company mainly offers paper used in news printing, publishing, writing and drawing, packaging and homes. In 2005, Huatai produced approximately 375,400 tons of newsprint paper and 234,700 tons of writing/drawing paper; they employed approximately 4,930 people and also owned three major subsidiaries.

Huatai was founded by eighteen local residents (most of them farmers) in 1976. By 1999, the company had developed into a large paper manufacturer with nearly US\$30 million in annual revenue. In September 2000, they raised funds of US\$130 million through an initial public



offering (IPO) on the Shanghai Stock Exchange, which generated the necessary capital for further development of the company (see Table 1).

Table 1: Asset condition of Huatai before and after initial public offering

	31 December 1999	31 December 2000
Assets (USD)	117,032,000	285,708,000
Liabilities (USD)	77,830,000	112,929,000
Owners equity (USD)	39,202,000	172,779,000
Assets Liabilities Rate (%)	66.5	39.5
Cash + Deposit (USD)	497.9	12,565.8

Source: Huatai Paper Co.,Ltd. Annual Report (2000)

Opportunities and Challenges



“Central Forest”, one of Huatai’s self-management fast-growing trees model districts. It covers about 60 hectares, and the trees are named “triploid white poplars”

Huatai is located in the Yellow River Delta, which includes over 300,000 hectares of saline land. Because it is too difficult to grow most crops in the poor-quality soil, many farmers in this region are forced to live on a low yield of corn from rare arable land and have been living in poverty for a long time.

Between 1995 and 2000, the domestic demand for newsprint in China grew by 53 percent, to 1.3 million tons annually. In the face of such strong demand, Huatai considered the situation and in 2000,

resolutely decided that the company should become the biggest newsprint manufacturer in China- even in Asia- by 2005. However, there were four main challenges Huatai had to face to realize its vision:

- Production capacity for wood-pulp
- Domestic wood scarcity
- Costly pollution control
- Limited employment opportunities for farmers

PRODUCTION CAPACITY FOR WOOD-PULP

By the end of the 1990s, newsprint had become the most important product in the Chinese paper market. During this time, the competition increased, and performance and quality of the product emerged as the key competitive issues. Prior to 2000, Huatai’s newsprint output was very small, comprising just three percent of the complete machine-made paper output of the company. It would require massive investments to build capacity for newsprint production.



Furthermore, newsprint quality is highly dependent on the main raw material. At that time, nearly 70 percent of the paper-pulp produced by Huatai was made from straw. Generally speaking, the performance of straw-pulp paper is inferior to wood-pulp paper (see Table 2). Therefore, Huatai had to figure out how to increase the proportion of wood-pulp in the raw material rapidly in order to enhance the product competitiveness.

Table 2: Performance of wood paper versus straw-pulp paper

	Breaking length (M)	Folding strength	Surface intensity
All wood-pulp paper	7,500	25	Above 3
40% wood-pulp paper	Around 4,000	15	1.8
20% wood-pulp paper	Around 3,000	8	1.3

Source: Huatai Paper Co.,Ltd.

DOMESTIC WOOD SCARCITY

China lacks forest resources, and in 2000, Chinese forest coverage density was 10.5 percent lower than the world’s average level. The average per capita forest acreage and forest storage was only 21 percent and 13 percent respectively, compared to the world’s average level. In 1993, the Chinese government introduced stricter regulation, decreasing the allowable annual timber harvest by over seven percent between 1993 and 2000. Therefore, to meet the growing demand in the Chinese paper industry, wood-pulp imports increased proportionately and became one of the most important import products for China by the year 2000. But Huatai felt that dependency on imported wood-pulp was too volatile and risky for their growth aspirations (see Table 3).

Table 3: 1994-2000 Scale and average price of import wood-pulp in China

	1994	1995	1996	1997	1998	1999	2000
Total tons imported (tons)	810,000	820,000	1,470,000	1,540,000	2,200,000	3,100,000	3,350,000
Total cost (USD mn)	400.87	672.11	775.00	747.92	923.68	1414.60	2120.97
Average price (USD per ton)	495	820	527	486	420	456	633

Source: China Statistical Yearbook (1995-2001), China Statistics Press

COSTLY POLLUTION CONTROL

The paper industry is known as a high pollution industry, and straw-pulp discharges six to seven times more pollutant than wood-pulp for papermaking.¹ During 1993 to 2000, Huatai

¹ The reasons for this are mainly as follows: First, the black liquor of straw-pulp contains large amounts of silicon, its viscosity is high and the filterability is poor, so the extraction rate of straw-pulp is usually



spent more than US\$30 million for a complete pollution self-treatment system to achieve the minimum pollutant discharge standard required by law. If it did not control or reduce the discharge of the pollutants, the fast growth of Huatai would not be possible.

LIMITED EMPLOYMENT OPPORTUNITIES FOR LOCAL FARMERS

The main founders of Huatai are 18 local residents headed by Mr. Li Jianhua who has been the CEO for over 20 years. They are also the company's biggest stockholder group with Mr. Li Jianhua owning approximately 20 percent of the company. In the beginning of Huatai, the founders pledged to build the local economy and help the local farmers eradicate poverty through developing Huatai.

By the end of 2000, after more than 20 years' growth, Huatai employed more than 2,000 local laborers, significantly improving their income levels. Their families' lives also improved greatly. Still, many local farmers had not obtained employment opportunities and suffered under impoverished conditions. In 2000, the average yearly income of Huatai staff (including wages, bonuses and dividends) was approximately US\$4,000. In the same year, in Guangrao County, the average net income per farmer was only US\$400. This gap deeply disturbed Huatai major stockholders, who wanted to hire more local farmers to increase their incomes and decrease poverty in the area.

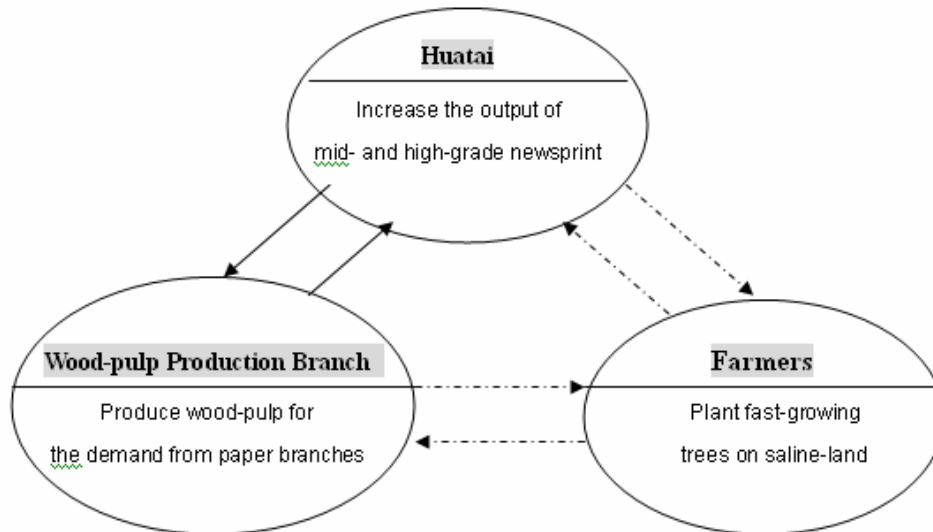
Strategy and Innovation

In order to overcome these challenges, Huatai established a new strategy by the name of "Forest-Pulp-Paper Integration" in 2000. The strategy included three main components (see Chart 1): First, to build new mid- and high-grade newsprint production lines, so that Huatai could significantly increase output, and thus transition the product structure for fast expansion of the company; second, to set up a specialized wood-pulp production branch, while phasing out straw-pulp as soon as possible; third, to mobilize the farmers around Guangrao County and the other adjacent areas, to plant fast-growing trees on saline-land. The last component was designed to both meet the need for raw material and the desire to increase the income of local farmers.

ten percent lower than that of wood-pulp when for papermaking. Second, the alkali returns-ratio of straw-pulp is generally only 65 to 75 percent, while the wood-pulp can reach 90 percent to 98 percent. Third, the amount of water used by straw-pulp in papermaking is about 130 cubic meters per ton, but that of the wood-pulp is only 36 cubic meters per ton, so with the similar output, the amount of sewage caused by the straw-pulp papermaking is three to four times as fast as that of wood-pulp papermaking. Fourth, the straw-pulp is blanched mainly by chlorine, resulting in more toxic pollution than the non-chlorine bleaching of wood-pulp.



Chart 1: Strategy of “Forest-Pulp-Paper Integration”



Note: Each stakeholder has a unique role in the business model.

The solid lines indicate internal relations, and the dashed lines indicate external agreements

This strategy benefits Huatai and the local farmers and the local government. The government stood to gain revenue from increased business income tax, as well as from leasing waste saline-land. It would also see environmental improvements and new local employment opportunities with better incomes for farmers.

Huatai was anxious to establish a wood supply system that could match its growth targets, and met with the government to discuss their strategy. The government was very supportive and agreed to become a strategic partner, recognizing the potential “win-win.” Therefore, under the support of local government, Huatai undertook four innovative measures:

- Contract local farmers to plant fast-growing trees
- Technical assistance
- Government Partnership
- Transitioning from straw-pulp to wood-pulp production

CONTRACT LOCAL FARMERS TO PLANT FAST-GROWING TREES

There are about 300,000 hectares of unproductive saline-land around Guangrao County and adjacent areas. Huitai saw this unfarmed land as an opportunity to grow trees for wood-pulp input, subject to the availability of seedling supply, technical guidance and irrigation. In 2000, Huatai helped the local government create a special planting plan for the region that was suitable for fast-growing trees. According to the plan, 40,000 hectares planted with fast-growing trees would be required to meet Huatai’s demand.



Then, with the coordination of local government, Huatai went into various villages and households to present the opportunity for farmers to plant fast-growing trees on the areas of saline-land identified in the plan. Participating farmers leased the land from the government. Under the terms of the fifteen-year contract, Huatai pledged to purchase the lumber produced by the farmers at a protective price. The protective pricing scheme has three parts: first, if the market price is higher at the appointed time, then Huatai will purchase the lumber according to the market price; second, if the market price is at a periodic low at the appointed time, then the purchase price will be high in certain proportion to the market price; third, if the lumber is produced by farmers who have not signed a contract with Huatai, it will be purchased at the market price. Because of those preferential clauses and the aid from local government which will be discussed later, most farmers chose to sign a contract with Huatai.

TECHNICAL ASSISTANCE

The "Forest-Pulp-Paper Integration" was a new concept in China, and the feasibility of planting fast-growing trees on saline-land was unproven. Farmers were skeptical, yet hopeful, about the potential of their partnership with Huatai. Huatai set up Huatai Woods Limited in 2002, to promote and demonstrate fast-growing tree farms. The company has invested more than US\$10 million in Huatai Woods (from 2002 to 2006). As one of Huatai's subsidiary companies, Huatai Woods has access to technology and management from the Beijing Forestry University, the Nanjing Forestry University, the Shandong Agricultural College and others.

Huatai Woods' main operations are three: first, to cultivate "triploid white poplar" seedlings to suit the saline soil condition, and sell them to the fast-growing tree farmers. In 2003, more than 90 percent of the farmers who had been contracted to supply Huatai with lumber used the seedlings supplied by Huatai Woods; second, to establish and spread the technology standard of fast-growing trees. At present, all of the basic technology standards that the local farmers reference to plant the fast-growing trees, including transplantation, irrigation, fertilization, grass hoeing, earth loosing, pest-insect control, pruning, white washing and so on, are formulated and generalized by this company; third, to establish the company's self-management fast-growing tree model districts, to demonstrate the farming practices and provide instruction for the general farmers. Until now, the cumulative total of all the demonstration districts is approximately 200 hectares, which involves "the Central forest," "the GuangBei farm," "the Long Juzhen," "the Ming Jixiang," "the LiJin town" and others.

GOVERNMENT PARTNERSHIP

Saline-land contains excess amounts of salt (NaCl and Na_2SO_4) and alkali (Na_2CO_3 and NaHCO_3), which inhibits plant growth. The main methods to enable cultivation of saline-land are desalting with fresh water and chemicals or displacing soil, drive-up, separate below and so on, both of which increase the cost for planting.

Huatai partnered with the local government to help the farmers overcome the technology difficulties and reduce the cost of planting. In addition to the services provided by Huatai



Woods, this partnership gives technical assistance, irrigation services and direct subsidies to the farmers who plant the fast-growing trees.

Regular technical training and instruction by technical experts invited or dispatched by Huatai provides direct and unified pest-insect control service. The local government agricultural science and technology service department also provides the farmers with free regular advisory service and technical guidance. Irrigation service for the farmers is provided by the local government with treated industrial wastewater. The local government finance department offers direct subsidy up to US\$375 per hectare to the farmers for planter allowance. By October 2006, the local government had granted an accumulative total of US\$10 million to local farmers.

TRANSITIONING FROM STRAW-PULP TO WOOD-PULP PRODUCTION

It takes five years for the fast-growing tree to mature for harvesting; Huatai formulated a transition plan from 2001 to 2006 to gradually expand the capacity for wood-pulp paper production according to the change of the demand and the competition (see Table 4).

Table 4: 2001-2006 Huatai new construction projects on wood-pulp papermaking

Year	New Project	Main Product
2001	160 thousand tons newsprint project	Common newsprint
2003	250 thousand tons newsprint project	38-48.8 g/m ² newsprint
2005	400 thousand tons newsprint project	34-60 g/m ² high quality autochion printing paper
2006	450 thousand tons newsprint project	12 # newsprint

Source: Huatai Paper Co. Ltd. Annual Report (2001-2005), Huatai Paper Co. Ltd. Semi-Annual Report (2006).

In order to increase the mid- and high-grade newsprint output as soon as possible, Huatai invested nearly US\$8 million in 2001 to build a facility for de-inking waste-paper-pulp. With this capacity, Huatai closed an original straw-pulp papermaking production line, thus rapidly improving the performance and quality of the newsprint products before the wood-pulp material became available in large quantities. This de-inking waste-paper-pulp facility also contributed to the reduction of pollutant discharge. Even after the comprehensive operation of all the wood-pulp lines, the waste-paper-pulp that this project produces will remain an important supplement to wood-pulp in Huatai's strategy for sustaining growth.



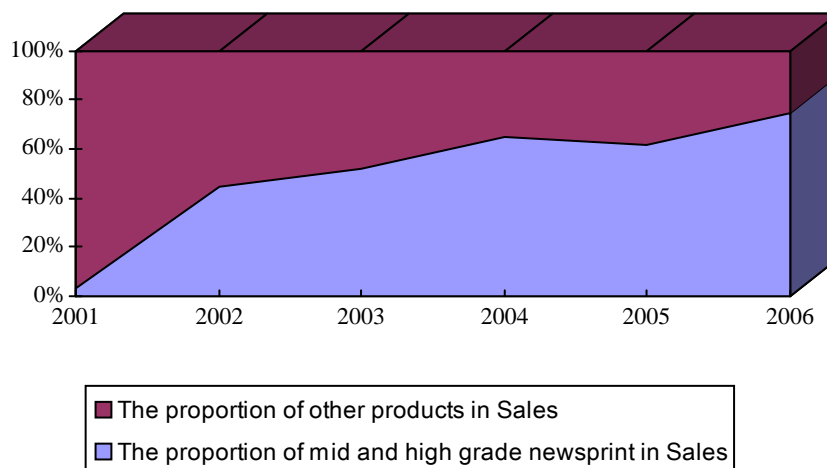
Initial Achievements

By 2005, the "Forest-Pulp-Paper Integration" strategy showed signs of success. The first batches of fast-growing trees were harvested, and the Huatai wood-pulp papermaking project was ready for production.

PRODUCT TRANSFORMATION

Huatai's output of mid- and high-grade newsprint increased dramatically since 2002; its proportion of the total sales of the company also surpassed 60 percent very quickly as each new capital project came online, increasing the available production capacity. Huatai hoped to further increase the proportion of sales of the mid- and high-grade newsprint to 75 percent in 2006 (see Chart 2).

Chart 2: Structure of Huatai Sales (2001-2006)



Source: Huatai Paper Co. Ltd. Annual Report (2001-2006)

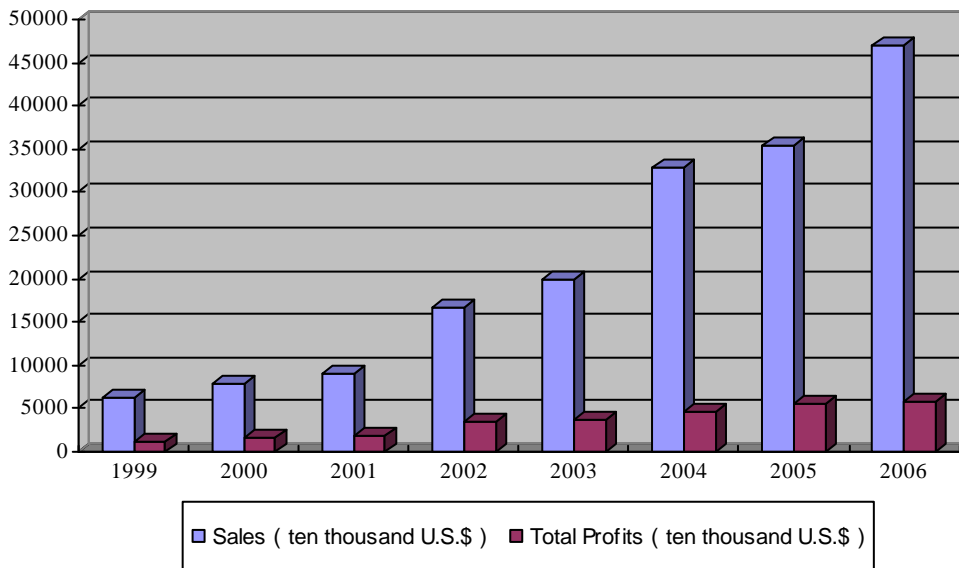
Moreover, the newsprint production line with output of 250,000 tons per year, put into production by Huatai in 2003, is the most advanced line in Asia. It has the single biggest output capacity, the most advanced equipment, the quickest vehicle speed, widest paper capability and highest quality scale newsprint production line in the world.

GROWTH TARGETS ACHIEVED

With four newsprint projects put into production, and the output of the mid- and high-grade newsprint growing fast, Huatai realized the high-speed expansion in enterprise scale in six years. In 2006, the sales of Huatai totalled US\$470 million, with profits of about US\$58 million, 640 percent and 410 percent more than those in 1999, respectively.



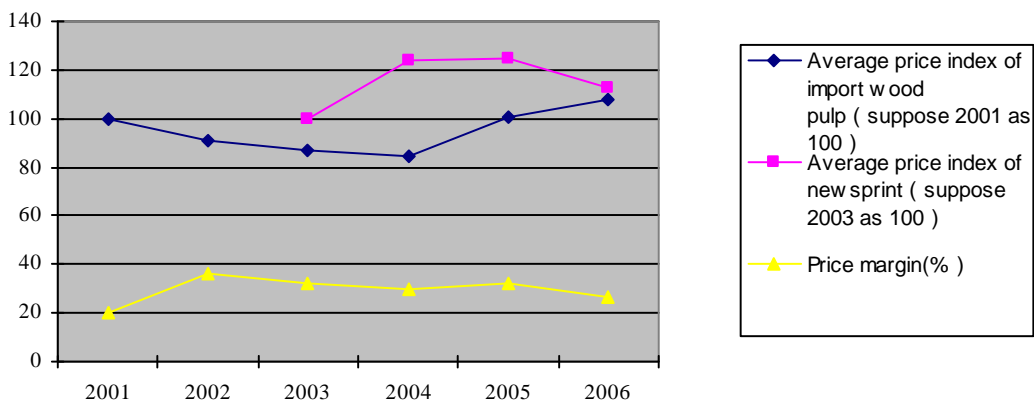
Chart 3: Increase of Huatai Sales and Total Profits (1999-2006)



Source: Huatai Paper Co. Ltd. Annual Report (2000-2006).

The cost of domestically sourced wood-pulp is usually 30 percent lower than that of the imported wood-pulp, and Huatai has been gradually phasing in domestically sourced wood-pulp from the local farmers, as well as the self-made wood-pulp from the demonstration forests. In 2006 it met 80 percent of the needs for all the wood-pulp. With this model, Huatai not only saved money, it also avoided the risk of import prices. Chart 4 illustrates that, since 2002 and relative to the fluctuation of the import wood-pulp price and the newsprint price, Huatai maintained a price margin of nearly 30 percent and also enjoyed a narrower range. For example, in 2006 when price of wood-pulp import rose by 6.9 percent and the newsprint price falls by 9.7 percent on average, the price margin of Huatai newsprint only dropped 5.2 percentage points compared to that of 2005.

Chart 4: Fluctuation of Huatai Newsprint Sale Price, Ratio of Sales and Import Wood-Pulp Price



Source: China Statistical Yearbook (2002-2006)



SOCIAL AND ENVIRONMENTAL IMPACTS

By 2006, the Guangrao county and adjacent areas had planted 40,000 hectares of fast-growing trees (which is in line with the plan), and over 80 percent of the trees entered the cutting period. Moreover, the local farmers also contracted with the government to plant fast-growing trees in “three along” (along roads, along rivers, along ditches) and “three around” (around the city, around the town, around the village). This not only increased the land utilization efficiency, but also beautified and improved the environment.

The planting of fast-growing trees has also increased the farmers' incomes. In 2006, Huatai had contracts with 6,000 households planting the fast-growing trees. The average planting area of each household is about 6.7 hectares. Under normal conditions, each hectare of fast-growing trees should produce about 120 m³ of lumber every five years, and the present purchase price is about US\$85/m³. This means that the gross income of each hectare of the fast-growing trees harvested may be US\$10,200 (for five years). Deducting the plantation cost of about US\$5,000, the net income of each hectare of fast-growing trees may exceed US\$5,000. That is to say, if a household of farmers (including four people) plants 6.7 hectares of fast-growing trees at the same time, then the net income may amount to about US\$34,840 after five years, and the average net income every year may be about US\$6,968, or about US\$1,742 per person. Although the income is generated only once every five years, the average net income per person for rural China is only US\$400. Thus, the contracts with Huatai are significant in reducing poverty in for these farmers.

Since the closure of the straw-pulp production line in 2003, the amount of pollutant discharge of Huatai has reduced significantly because of the relatively low pollutant discharge from wood-pulp compared to straw-pulp papermaking. As a result, there is now excess available treatment capacity of the pollution treatment system that was built in the 1990s.

Conclusion

As creator of the “Forest-Pulp-Paper Integration” strategy and the biggest newsprint manufacturer in China, the success of Huatai provides other companies in the industry with a remarkable example. In fact, this innovation has attracted the Chinese government’s attention since 2004. The National Development and Reform Commission (NDRC) plans to make a recommendation and an introduction of Huatai’s innovations. The innovative strategies and implementations of Huatai has influenced the sustainable development of the Chinese paper industry, proving that the strategic integration of environmental and social issues can be profitable, while helping to reduce poverty and improve the natural environment. In addition, the initial success of Huatai offers some new thoughts to the economic development and ecological improvement of the saline-land around Middle and Lower Reaches of the Yellow River with tens of thousands of square kilometers.



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September 2007

The information presented in this case study has been reviewed and signed-off by the company to ensure its accuracy. The views expressed in the case study are the ones of the author and do not necessarily reflect those of the UN, UNDP or their Member States.

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