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HYBRID RICE FOR FOOD SECURITY IN THE WORLD

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HYBRID RICE TECHNOLOGY FOR FOOD SECURITY IN THE WORLD

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The current world population is over 6 billion and will reach 8 billion in 2030. Meanwhile, the annual loss of land to other use is 10 to 35 million ha, with half of this lost land coming from cropland. Facing such severe situation of population growth pressure plus cropland reduction, it is obvious that the only way to solve food shortage problem is to greatly enhance the yield level of food crops per unit land area through advance of science and technology.

Rice is a main food crop. It feeds more than half or world population. It has been estimated that the world will have to produce 60% more rice by 2030 than what it produced in 1995. Therefore, to increase production of rice plays a very important role in food security and poverty alleviation. Theoretically, rice still has great yield potential to be tapped and there are many ways to raise rice yield, such as building of irrigation works, improvement of soil conditions, cultural techniques and breeding of high yielding varieties. Among them, it seems at present that the most effective and economic way available is to develop hybrid varieties based on the successful experience in China.

It has been proved practically for many years that hybrid rice has more than 20% yield advantage over improved inbred varieties. In recent years, hybrid rice covers 50% or 15 million ha of the total rice area in China. The nationwide average yield of hybrid rice is 7t/ha, about 1.4 t/ha higher than that of inbred varieties (5.6 t/ha). Yearly increased paddy in China due to growing hybrid rice can feed 60 million people each year. Therefore, hybrid rice has been playing a critical role in solving the food problem of China thus making China the largest food self-sufficient country.

China makes increasing progress in development of hybrid rice technology. Following the success of three-line hybrid rice in 1970s, two-line hybrid rice was successfully commercialized in 1995. The extension of two-line hybrid rice has been very fast in these years. The area of two-line hybrid rice was 2.6 million ha. About 18% of total hybrid rice area in 2002. The yield advantage of two-line hybrid rice is 5%-10% higher than that of the existing three-line hybrid rice.

More encouragingly, good results have been achieved in developing super hybrid rice varieties since the initiation of the super rice research program in 1996. Several pioneer super hybrids have a yield advantage of around 20% over current three-line hybrids on commercial scale. The area planted to super hybrid rice was 240,000 ha and the average yield was 9.6 t/ha in 2000. The area under super hybrid rice was increased to 1.4 million ha with an average yield of 9.1 t/ha in 2002. In addition, a two-line super hybrid P64S/E32 and a three-line super hybrid II-32A/Ming86 created a record yield of 17.1 t/ha in 1999 and 17.95 t/ha in 2001, respectively. In the meantime, the grain quality of the super hybrid rice varieties is very good. Now efforts are focused on developing second generation super hybrid rice. Its yield target is 12t/ha on large scale, and good progress has been made. Last year there were five locations with 7ha each in Hunan Province, where the average yield was ove 12t/h. Therefore, the super hybrid rice shows a very bright future. If super hybrid rice covers an annual area of 13 million ha in China and calculating by a yield increase of 2.25 t/ha, it is expected that the annual

increased grains will reach 30 millions tons, which means 75 million people more can be fed every year.

Hybrid rice has been proved to be a very effective approach to greatly increase yield not only in China, but also outside China. Vietnam and India have commercialized hybrid rice for years. Last year about 600,000 hectares were covered with rice hybrids in Vietnam. On average, the yield of rice hybrids is 6.3 t/ha while that of the inbred varieties is 4.5 t/ha. Because of planting hybrid rice on large-scale commercial production, Vietnam becomes the second largest rice export country in Asia. Besides, many other countries, such as the Philippines, Bangladesh, Indonesia, Pakistan, Ecuador, Guineas and the USA, have also achieved great progress in extending hybrid rice technology. Recently, a number of experimental trials and large-scale demonstrations in farmers' field conducted in these countries have shown that hybrid rice can significantly outyield their local CK varieties. For example, in Philippines, under technical assist by FAO, IRRI and our Center, hybrid rice has been commercialized two years ago. Especially a super hybrid rice variety called SL-8 has been developed by my assistant in Philippines, it was planted to about 3000 ha in 2003 and the average yield was 8.5 t/ha, more than doubled the country's average yield. Based on this achievement, the Philippines government has made an ambitious plan, in which the goal is to plant 3 million ha of hybrid rice by 2007. The above facts clearly indicate that hybrid rice technology developed by China is also effective to greatly increase rice yield worldwide.

The ever-forwarding technology improvement by scientists, its dissemination by seed industries and extension workers and the policy and financial support by national and local governments contribute greatly to the success in development and use of hybrid rice technology. And I firmly believe that hybrid rice, relying on scientific and technological advances and the efforts from all other aspects, particularly from FAO and IRRI, will have a very good prospect for commercial production and continue to play a key role in ensuring the future food security worldwide in the new century.

Finally, as the Director General of the China National Hybrid Rice R & D Center, I am very glad to announce here that we will try our best to help other countries to further speed up the development of hybrid rice in the whole world.