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The new development in rice agronomy and its effects on paddy yield and rice quality in Turkey during last decade

Necmi Beşer
Thrace Agricultural Research Institute (Turkey)

Abstract. Rice yield increased 2.7 ton/ha in 1927 to more than 5 ton/ha in 1999. But some farmers can get more than 10 ton/ha paddy yield. Thus, we can say that there is potential to increase rice paddy yield more than 10 ton/ ha in near future. Improvement in soil preparation, planting methods, irrigation, rice cultivars, fertiliser application, plant protection, certified seed usage, harvest, and drying conditions help Turkish rice compete with imported rice interns of yield and quality. But it is difficult follow these new technologies by small rice farmers.

Introduction

Rice production area ranges between 40 000 ha and 70 ha depending on the water ability and government policies, in the last 50 years. Rice is grown in every part of Turkey, however, Marmara especially Europe part of Marmara (Thrace) and Black sea region are the main rice production areas respectively. Total milled rice production change between 150 000 and 200 000 tons, and this production is not sufficient for domestic consumption, thus, Turkey import reached value of more than that of domestic production in 1992. Since then, rice import of Turkey has continued to increase.
Rice yield increased 2.7 ton/ha in 1927 to more than 5 ton/ha in 1999, but this yield increase not sufficient to meet increasing in consumption. There are many new technologies were introduced to rice production in Turkey to increase paddy yield and rice quality. The new technologies also help Turkish rice to compete with imported rice during past decade.

I – Developments in soil preparation and their effects

After 1990, farmers bought more complicated and bigger machinery for soil preparation. This has given opportunities to farmers prepare their paddy field under every conditions. Laser levelling machine maybe the most useful one. Using laser levelling machine, farmers can prepare very good field for direct seeding. Laser levelling gives farmers opportunity for:

- good seedling setting,
- good water controlling
- reducing water consumption
- having bigger parcel size
- effective fertiliser and pesticide application

As a result farmers can have higher yield with low input. Laser levelling has begun about 5 years ago and nearly half of rice growing field is levelled with laser levelling in Thrace. But for the other regions laser levelling is still very low.

Getting same farmers field together and collective levelling by government are the other important achievement for soil. With these applications, input for rice production is reduced and yield increased, in addition that, quality is increased because farmers can harvest their crop at the best harvesting time because of new reapplication of fields and field roads. Introducing several other new machine also helps farmer for preparation of paddy field very well.

II – Improvement in planting methods

Traditionally, sowing of pre-germinated seed is used as a rice planting method in Turkey. Broadcasting pre-germinated seeds with centrifuge broadcaster machine has begun to increase last decade, depending on good field levelling and field size. Seeding with centrifuge broadcasting is getting increasing especially in Thrace Region of Turkey but the other regions, it is still not very much. Drill seeding pre germinated seed and transplanting of 20 days old seedling also has found applicable, but they are not used because of their labour needs and complicated machine which farmers do not have. It seems that, centrifuge broadcasting of pre-germinated seeds will be used much more in the future, because of climatic conditions in Turkey. This method is also cheap and gives very good results for seedling setting.

Farmers used to sow up to 250 kg/ha seed. Agronomic studies in Thrace Agricultural research Institute have shown that 160-180 kg/ha seed rate is enough for broadcasting pre-germinated seed. This results have been introduced to farmers. This new seed rate reduced farmers input and diseases risk, on the other hand it increased farmer paddy yield and quality.

III – Cultivation of new varieties

Before 1960's mostly local varieties were grown in Turkey. Some Italian varieties were introduced and begun to grown after that time. Baldo, Rocca and Ribe are still grown, but their percentages are getting down after releasing new varieties during last decade. Serhat-92, Sürek-95 and Osmancık-97 were released respectively in 1992, 1995 and 1997. Growing area of Osmancık-97 is increasing very sharply in all rice growing regions of Turkey. It is also very popular variety in rice industry and market. Three new rice varieties (Kıral, Demir, Yavuz) were registered by Thrace Agricultural Research Institute in 2000. These three varieties are also very high yielding varieties.

All varieties released in the last decade are semidwarf, resistant to logging and suitable for combine harvesting. Yield and quality are also higher than traditional rice varieties, it has been reported that some farmers are getting more than 10 tons/ha paddy yield with these new varieties. As result of growing these rice varieties farmers get high quality and yield of paddy. They also reduce harvest costs with harvesting combine machine these semidwarf rice cultivars. We can say that with widening of these varieties, Turkey rice production and yield will increase sharply.

IV – Improvement in fertilizer application

Most of farmers are getting use optimum doses of fertiliser, as a result of transferring research results on fertiliser to farmers. Especially, time and dose of nitrogen in rice growing is very important. A lot of research were undertaken at Thrace Agricultural Research Institute on fertiliser in last decade and found optimum doses and application time for all registered varieties. Before these results, some farmers were used very low doses of Nitrogen, on the other hand, some farmers were used up to 250-300 kg N/ha, and then they clip the upper leaves of rice to avoid logging. Optimum nitrogen doses for Turkish rice varieties ranges between 140-160 kg/ha and Nitrogen should be given at least two times. It is also very critical to give N fertiliser after 50-60 days of direct seeding (at booting stage).

With, application of Nitrogen within the advised doses, farmers get high yield and quality paddy with low cost. They also can prevent their crop from blast epidemic.
There is not any problem in Phosphor doses, the problem is the application way of Phosphor, unfortunately, some farmers are still gives Phosphor after seeding.

The other important fertiliser is Zinc for rice production in Turkey. As a result of project undertaken, some regions which have zinc deficiency are found. Zinc application has been widening at Marmara Region very rapidly in last three years. There is not synchronised maturity, if there is zinc deficiency, thus, farmers may have grain kernels at various moisture content at harvest. Thus, moisture change between kernel reduces especially head rice yield during drying. Farmers can get higher yield and quality of paddy with Zinc application in last 3 years in Marmara Region.

V – Improvement in irrigation

Rice is irrigated with river, underground or dam water in Turkey. Some river's water has been more polluted in last 10 years and their water level also decreased below the critical level in some years. On the other hand, quality and quantity of water used in rice farming is increased with building new dams and underground water pumps. Farmers are less depend to rivers than they were 10 years ago. Quality of river water is also increased with giving supplemental water from dams to rivers in Thrace Region during rice growing period.

Improvement in water sources rather than river sources reduced the risk in rice production. Development in water sources, watering and levelling machines and techniques helped to farmers to use less and quality water. As a result, farmers are get more yield using less water.

VI – Improvement in plant protection

Blast, bakane, helminthosporium, barnyard grass, red rice and some insects cause economic loses at paddy field in Turkey. The first blast epidemic was seen in 1995, and than in 1997 in Turkey, immediately after first blast epidemic in 1995, Thrace Agricultural Research Institute and Extension services of Edirne Province trained alot of farmers against to blast. Information on seed treatment, foliar application of fungucide, low nitrogen rate and rotation were given to farmers to prevent their crop from blast epidemic.

The second important disease of rice is bakane in Turkey. Although, Rocca rice variety is resistant to bakane, most of the cultivars are not, thus, there is need to chemical control it. Research results about control of bakanae are also transferred to farmers and now farmer can control it with benomyl. Seed treatment with benomyl reached very high percent among farmers during last decade. With this application their paddy yield and quality were increased.

Weed control is done much more effectively with introducing new generation environment friendly chemicals such as, Guliver, Nomine, Chlinger, Londax, Sindax etc. and application techniques. The rate of aircraft for pesticide application especially herbicide application has been increased very well among rice farmers in last three years.

VII – Improvement in certified seed use

Foundation and certified seed are produced by Thrace Agricultural Research Institute and there are also several other companies but they produce or import only certified seed . Government begun to pay about 0.40 $/kg to certified seed producer to attract companies enter rice seed production three years ago. Tharace Agricultural Research Institute, Directorate of State Farm and 5 private companies are now producing certified seed in 2000. Support for rice certified seed producer is about 0.15$/kg in 2000 and it will be not any subvention after 2001.

Increase in certified seed uses is improved rice quality and quantity very much., because of reduction blast, bakanae, A. bessei and red rice infestation in paddy field.

VIII – Improvement in harvest and drying conditions

Introduction of high technology combine harvester and dryer were done very fast in last ten years to Turkish rice production. Before this; farmer cut their crop with hand or machine and harvest it with harvester. But, it has estimated that, combine harvester has been reached about more than % 90 in 2000.

Introduction of new technologies brought some new problems. Head rice yield was decreased because farmers could not managed well, the optimum harvest moisture and drying conditions. They are more careful about on harvest moisture content now, but, there are still some problems. Using new combine harvester and dryer help farmer reduced their cost but it brought some problem on quality, especially on head rice yield.

Paddy drying with paddy dryer also brought some problems. As it is known, fast drying at unproper conditions reduces head rice yield, this is seen at small farmers crop, because small farmer have to hire dryer.

IX – Results

There is improvement at rice production technologies in Turkey. Paddy yield and rice quality were increased by introducing new rice production methods. Competition of Turkish rice was also increased by them. It can be said that Turkish rice yield will be near 10 ton/ha in near future, because same farmer can harvest more than 10 ton/ha paddy yield with using good production technologies from soil preparing to drying.
The problem is that most of the rice farm is very small to follow these new technologies and buy this new machines. Big size farms are mostly located in Thrace and Marmara Region and new technologies firstly enter from these region.

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