

Superior and yet Not Sown? The Impact of Improved Winter and Spring Wheat Varieties in Turkey

Wheat is one of the major agricultural commodities in Turkey. The country is among the 10 largest wheat producers in the world. The Turkish Agricultural Research Directorate and ICARDA/CIMMYT wheat improvement program initiated a study on the adoption of five new winter and spring wheat varieties (Ceyhan-99, Demir-2000, Karahan-99, Pehlivan, and Saricanak-98) developed and released by the national breeding program and through international collaboration in the past 10 years. The results are based on a 2007 survey of 781 households in Adana, Ankara, Diyarbakir, Edirne, and Konya provinces. The five new wheat varieties are being compared to old improved varieties released prior to 1995 that are also still grown by farmers.

Producer preferences for variety characteristics are critical to adoption. Understanding these criteria allows breeders to effectively set priorities and target breeding strategies. The characteristics that scored highest among the surveyed wheat growers were high yields and resistance to drought, followed by the varieties' ability to fetch high market prices, and adaptation to local production conditions, such as drought and frost resistance.



Turkish farmers in their wheat fields - wheat contributes 53% to household income among growers of new wheat varieties.

More productive and stable

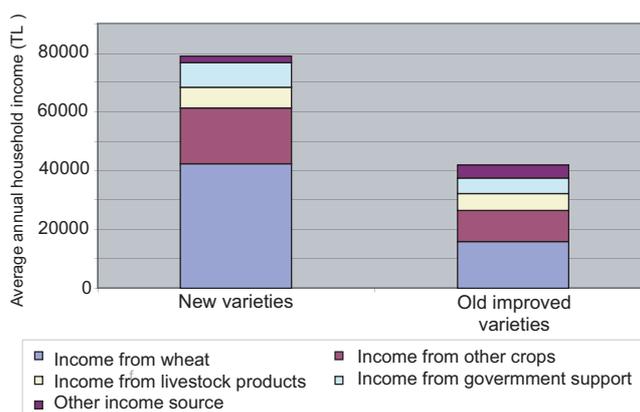
Under rainfed conditions, the new varieties gave more than double the yield of older varieties: 3541 kg/ha, compared to 1654 kg/ha. Regional variation exists: while the yield difference between new and old varieties under rainfed conditions in the plateau region is 73% (2407 kg/ha versus 1394 kg/ha), in low-land region it is only 13% (3739 kg/ha compared to 3302 kg/ha). New varieties show the lowest coefficients of variation among all reported wheat varieties under rainfed conditions (28%), compared with 61% for the old varieties, i.e. they provide more stable yields.

More profitable too

The average gross margin per unit of land was almost 2.2 times higher for the new varieties compared to the old ones (858 USD/ha versus 392 USD/ha). But there is variability: while Ceyhan, Pehlivan, Saricanak and Karahan outperformed all other wheat varieties, Demir was less profitable than the old varieties because of its comparatively low yield.

Wheat significantly contributes to total household income among the growers of new varieties with 53%, as well as those growing the old varieties, where it accounts for 37%. Adoption of the new varieties significantly increases household incomes: among growers of the new varieties incomes are 80% higher than among growers of the old varieties.

Estimated average household income composition of growers of new and old wheat varieties



Adoption of new varieties increases incomes

Based on their household assets farmers were classified into wealth quartiles. The comparison indicates that households in the lowest wealth quartile (poor farmers) significantly increased their per capita income by one third through the adoption of the new varieties, compared to those in the same wealth quartile using the old varieties – the same potential increase was also shown for the richest farmers.

Evidence does not explain the low adoption rates

While the yield potential and profitability of the new varieties over the old ones was clearly demonstrated through the survey results, their degree of adoption was low. The five new varieties were grown on an aggregate 15 % of the total wheat growing area –



On-farm trial plots - five new wheat varieties were monitored for their adoption potential.



It takes tea and talking - farmers and Turkish extension officer discussing the potential of the new wheat varieties.

while 49% of the area under wheat is still cultivated with old varieties. In Ankara, and Konya provinces, adoption rates were well below 10%, while in Edirne and Diyarbakir the new varieties were grown on about 30 percent of the wheat growing area. There was no significant difference in adoption among poor and wealthy farmers. Reasons for the low adoption differed among varieties: some Saricanak producers thought that its yield declined over time, while others felt Ceyhan was susceptible to frost and said its seed was expensive. Some Pehlivan users perceived it as susceptible to diseases. Improved seed production and extension systems that target the varieties to specific agro-climatic environments could further enhance adoption and production results.

Using these adoption figures, a benefit of 24 million US\$ to the national income was estimated for 2007 through the use of new wheat varieties; about 90% of it came from rainfed areas. The benefit could be even greater if factors limiting adoption are identified and removed.

Further work is needed

Survey results presented here suggest that the new wheat varieties are superior to the old varieties and that adoption has the potential to substantially improve household income. An analysis of the factors preventing a wider adoption of the new varieties is planned. This will include an identification of potential improvements in the seed production system and in the information dissemination process, led by the national extension agency in Turkey. Also, the scientific evidence behind farmers' perceptions of yield decline in relation to replacement rates, frost intolerance, susceptibility to diseases, and high seed prices will be investigated. This future work is expected to help extend the benefits of these new varieties to other small-scale farmers and improve rural livelihoods in Turkey.



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International Center for Agricultural Research in the Dry Areas



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