

Farmers' Adaptability to Climatic Changes

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1. Introduction

Much talk and writing is heard and seen on these days about the forthcoming climatic change which will affect everything on life as we know it today. Supposedly, these expected shifts in climate will change the way we live; from what we wear to what we eat, mostly in an adverse way. In the core of this environmental debate there is one very important player; *the farmer*. What will they do if everything they call life, that is farming-living side by side to nature- changes? Will they be able to adapt to the new environs? Can they adjust to higher/lower temperatures, less rainfall/water availability? If yes, how?

Mediterranean region is one of the most often named zones among all the worst case climate change scenarios. This region is expected to be worst affected by variations in climate. Adana region -located on the eastern Mediterranean- with its fertile lands and abundant water resources play a foremost role in Turkish agriculture. It produces, for example, 55% of total maize and 60% of total citrus production of Turkey. Its farmers are one of the most productive and efficient as well as modern, eager to adapt to new technology. Average yields are one of the highest in Turkey. The farmers of this region can and do compete with farmers of richer nations in terms of quality and quantity.

The ICCAP Project among with other issues tries to answer the question of farmers' adaptability to climate change. This paper will help answer that question from a farmer's point of view. Present situation as well as future scenarios will be discussed.

2. Present Cultivated Crops

A variety of crops are grown in the region, from cereals, citrus to vegetables. The crop

pattern has changed radically from the early 60's and 70's (the years irrigation commenced) to present. These changes were simply due to market conditions, that is they were due to economic reasons not climatic.

The suitable climatic conditions and availability of irrigation water in Adana makes farmers to have two crops in one year in irrigated areas. Usually wheat as a first crop is followed by maize or soybeans. The other alternatives are onions or watermelon followed by either maize or soybeans.

2.1. Cotton

Cotton which once made up 90% of the crop pattern and called "white gold" due to its high income generating nature in the early periods is not cultivated widely due to its high production costs, high labor demand and low prices. However, the new policy nowadays is encouraging farmers to go back to cotton with price incentives (governmental subsidies). Recent availability of mechanized harvesting and higher yielding varieties are the other major incentives why the farmers are reconsidering this crop.

2.2. Wheat

Wheat is one of the major crops along with maize in terms of acreage and production. New variety wheat (Adana-99) with its ability to resist rust disease and high yields has made it one problem free crop. The only reason why a farmer would give up on wheat is the falling prices. Turkey's recent application to European Union and her agreements on World Tariffs are the two main reasons for this downward trend. However, farmers in Adana as well as all over Turkey are disappointed about this new development. For them world prices or "Chicago Stock Market" prices do not mean anything since they realize that these

prices are heavily subsidized. Turkish farmers' inputs are one of the most expensive inputs in the world, 1.8\$/L for diesel oil compared to 0.5\$/L for diesel oil for American farmers, for example. Same goes for the other major inputs such as fertilizers, other chemicals and seeds.

2.3. Maize

Maize either as a first crop or a second crop after wheat harvest has become one of the major crops due to its less labor requirement and good prices in the 90's. Price policies by the governmental agency for cereals and industrial (oily) crops were the major driving force behind this expansion. Government encouraged the farmers to expand their acreage by favorable prices since Turkey had a huge maize deficiency. In a period of few years Turkish farmers, mostly made of Adana farmers, closed this gap and Turkey became self sufficient in maize. However prices fell sharply and farmers were very disappointed and bewildered.

2.4. Soybeans

Similar story goes for the soybeans, only dates and periods are different. Turkey had and still has a deficit in oily crops. Soybeans were very much encouraged in the early 80's through similar policies to meet the demand. Soybeans are also excellent crops for crop rotation therefore they were heavily cultivated as second crop after wheat in the 80's. However, wrong agricultural policies forced farmers to abandon this valuable crop and switch to maize as first or second crop. Presently, with the encouragement of the government and industry soybeans are once again becoming an alternative to maize especially as a second crop.

2.5. Watermelons and Melons

Adana has an early market advantage in watermelons and melons. These crops are first harvested in Adana before anywhere else in Turkey. However, high demand for labor and capital has made watermelon and melons

very sensitive to market variations. Since these crops are almost all sprinkler irrigated labor costs for irrigation is high along with costs for green housing. The biggest problem with these high cash crops, however, is the misplanning of acreage. Farmers rush to plant large acreages the next year when prices are high for the present growing season. As expected markets crash when there is an overflow next year. Unfortunately the same goes for another cash crop-onions.

2.6. Citrus

Adana is the main growing region for citrus, a species that is native to the Mediterranean region. Most farmers have invested heavily on citrus as insurance to their wealth and well being in case their field crops fails. Citrus is a long term investment; it takes anywhere from 5 to 7 years for a citrus orchard to make itself feasible while a farmer still has to allocate resources to maintain it during this long time. Most citrus varieties are grown for export market; therefore farmers are adversely affected when the international markets are not favorable. The national market is not large enough to absorb this abundant supply of citrus when export markets fail. This adverse situation is more upon us than anytime in our history. Once again farmers have become victims of their own productivity and incorrect agricultural policies.

Adana farmers adjust quickly as any farmers do; they do and will shift crops when the conditions are not favorable. If there are agricultural incentives to deficient crops such as cotton, soybeans and sunflower then farmers will give up planting maize or wheat. It is interesting to see that this is already happening at a very quick pace. We see less and less new plantations of citrus as opposed to increasing plantations of olives, pomegranates and Japanese plums.

3. Water use

Most Adana farmers think that there is plenty of water; therefore they do not think that

they have to save water. They never think that water availability could ever be a limiting factor in their farming one day. Much water is wasted by inefficient irrigation network (leakage from channels) and irrigation methods. This especially true of farmers who use surface irrigation methods, mainly basin irrigation used on orchards and furrow irrigation used in cotton, maize, soybeans and sunflower. Wheat is seldom irrigated; it principally grows in winter and spring when there is plenty of rainfall. Most vegetables (tomatoes, peppers and eggplants in greenhouses) and fruits (watermelon and melon) are either drip or sprinkler irrigated. Many farmers who have orchards are switching to drip irrigation not for the sake of saving water but solely for the technological advantages it offers; less labor, fertigation, ease of use, higher yields, better quality, less weed problem, etc.

Most farmers who use groundwater are farmers that have orchards and use drip irrigation. Since groundwater has higher quality than surface water for drip irrigation farmers that have drip systems prefer groundwater for its higher quality and lower price. Water charges paid to the water user associations (WUA) are lower when groundwater is used. Most WUAs also charge 50% of regular water fees when a farmer has drip irrigation independent of water source, be it surface or groundwater. However, it is getting harder and harder to get permission to bore a well since groundwater levels are falling.

Labor cost for irrigation does not constitute significant part of production costs when surface irrigation is used. However, when sprinkler irrigation is used on crops, mainly on watermelon, melon, onions and peanuts labor costs are more significant mainly for two reasons: 1. Labor costs for sprinkler irrigation is almost twice as surface irrigation (basin or furrow). In surface irrigation labor is charged by hectare whereas it is charged per day in sprinkler methods. 2. Sprinkler irrigation is applied more often than surface irrigation (usually every 10-11 days versus 15 days for surface).

One major problem that is mostly overlooked by the farmers is drainage. In the early 60's General Directorate of Village Affairs or Topraksu (Soil and Water) as it was called then installed subsurface clay tiles with wide spacings (100-110 m) in irrigated areas hoping farmers would install the additional piping. As expected, most did not. Surface ditches are poorly maintained by WUAs which complicate things further. Farmers believe that drainage network should be better taken care by the WUAs. Any price increases by the WUAs to meet this urgent need along with others are not welcome by the farmers.

WUAs are new comers to the farming world since the mid 90's. Farmers who were used to being served by State Hydraulic Works (DSI) and General Directorate of Village Affairs all of a sudden found themselves to be in charge of their own water affairs. The executive committee is elected by farmers that belong to a certain WUA which then later elects its president. All WUAs has to employ an agricultural engineer as general secretary who takes care of technical issues. Many farmers think that WUAs are overly politicized and have high water charges and poor service. These negative feelings are mainly due to the fact that WUAs are more successful in collecting water charges than the previous state agency - State Hydraulic Works (90% versus 10% collection rate).

4. Land Ownership

As it is the case in all farming communities land ownership is one of the prominent issues among Adana farmers. Lands are getting smaller and smaller by day as lands pass from generation to generation. Adana region has one of the largest average farm sizes in Turkey. There are no laws in Turkey as you would find in parts of Europe to prevent this diminishing trend in size. Downward trend in land size obviously causes problems in efficiency and productivity. Heritage laws does not favor men over women, everyone has equal rights when parents pass

away. However it is no secret that large farms have huge advantage over small farms when it comes to capital and technological investment. Agricultural policy makers, therefore, are working on laws to integrate small plots into larger units; i.e. preparing land use plans for higher efficiency and productivity. They have become successful in exemplary areas in other parts of the country where land sizes are small compared to that in Adana.

Another issue that is picking up momentum is what Turkish agriculture will be like if she ever joins European Union (EU). Most farmers strongly believe that they would be worse off than today. Many already laments the agreements signed to join EU are the principal reasons for today's problems. Farmers worry that they can never compete against EU farmers in terms of land size, capital, technology, subsidies, input prices, crop prices, etc. Only few believe, mostly educated growers that they have advantages which their European counterparts do not have; suitable climate, unspoiled land, cheaper labor, right conditions for organic agriculture, etc.

5. Future and Conclusion

Farmers' immediate adaptation to new conditions shows their capacity for renewal. The best example to prove this is the case of a major rust disease in 1997 of wheat crop. Farmers met this disease for the first time when the rainfall that year was extremely high. Almost all had very low yields since they had no chemicals or know-how to combat it. However in the next year the chemical (anti-fungus) was imported. Farmers were not satisfied however; they also changed to a resistant variety (Adana-99) from the previous variety. The new variety was even higher yielding. This incident clearly shows that crop varieties as well as crop patterns will change depending on technical and economical conditions. We might see more of olives, pomegranates, Japanese plums, or who knows what? If the labor costs increase drastically then farmers will and have to invest more in

the technology, use more drip irrigation instead of surface irrigation, for instance. If water sources become less available then more growers will have to change to drip irrigation, or perhaps to subsurface drip irrigation.

Most growers are not aware or simply do not consider environment as an issue. They think it is simply another constraint. Farmers as well as others also have to understand that their livelihood depends on the respect they have for the environment and the lands. Laws are getting stricter in that sense. For example it is now forbidden to build industries on 1st and 2nd class lands. They have to be concentrated on organized zones which are of 4th class.