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**The Use of Scarce Input Resources in the Zeravshan Valley's Agriculture:
A Case Study for Uzbekistan**

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I. Introduction

Agriculture is an important sector for the economy of Uzbekistan. The country has some distinctive economic features, such as about 17.0 million or 60 percent of the population of the country living in rural areas, with 34 percent of them involved in the agricultural production (MAWR, 2008; Spoor; 2006; Djalalov, 2006). Therefore, agriculture remains the principal income source for the rural people. Agricultural production in the country is increasingly becoming a field for concern, especially with regard to the efficient use of input resources, such as land, water, labor and capital. Due to economical and ecological unsustainable agricultural systems, water scarcity and land degradation, the cost of these resources in the past years have rapidly increased and are expected to additionally rise in the near future. These developments make it increasingly difficult for agricultural agents to produce according to the demand for food and other commodities, especially owing to a fast population growth. The present study aims at focussing on scarce resources use in the agricultural production of the Zeravshan valley. Additionally, issues related to the agricultural enterprises' profit maximisation shall be addressed. Secondary data is hardly available in the post-soviet countries. To this effect, the initial methodological approach was to collect primary data and employ it according to research tasks, for this purpose a questionnaire covering nearly all aspects of agricultural production has been developed. This study is the first part of an ongoing research carried out in the framework of the Climate Change Network for Central Asia (CliNCA).

II. Study Site- Primary Data Survey and Methods

The study aims at finding answers for the following questions: What is status quo in the agriculture of Zeravshan valley? How do agricultural enterprises perform in a situation of input resource shortages and price increases? The study evaluates the efficiency of recourse use in different organizational farm types; an economic assessment of yields from main agricultural crops on different land & farm types is carried out to develop a profit maximisation function. A cost-benefit approach is used to investigate trends in the agrarian sector, including the maximisation of economic value of agricultural production within the framework of scarce resources use.

The Zeravshan valley is one of the biggest intermountain areas of Central Asia and is situated between the mountain ridges of Turkistan and Zeravshan. Historically, irrigated agriculture has well developed nearby the Zeravshan River. Nowadays, Uzbekistan's part of the valley occupies mainly 3 regions Samarkand, Navoiy and Bukhara and partly the southern areas of Jizzakh and the northern areas of Kashkadarya, which are main agricultural producers of fruit, vegetables, cotton, grain and other agricultural commodities for the country. The valley occupies around 1/5 of the country's irrigated land and produces 1/3 of the total agricultural commodities of Uzbekistan.

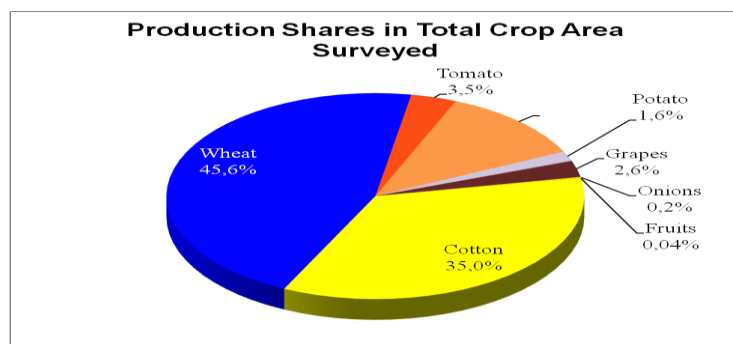
In early 2010 a survey was carried out among private (farmer) and household (dehqon) farms mainly of the Samarkand and partly of the Navoiy region's counties. The survey was conducted in the framework of the German foreign ministry funded project CliNCA (Climate Change Network for Central Asia) through the Giessen University (JLU) and the Samarkand

Agricultural Institute (SAI) in Uzbekistan. The survey covered 102 farms and households, random selection was insured. The main questions included the types and modes of input resources use, off-farm income sources, questions related to farm management and other socio-economic questions. The efficiency of resource use in different organizational farm types is evaluated and an economic assessment of yields from main agricultural crops on different land and farm types is conducted. The average farm size in the area surveyed amounted to 49 ha for the 76 private farms and on average 0.45 ha for the 26 household farms. The survey area can be divided into 4 zones, based on weather, water sufficiency and land use conditions. First zone includes 3 upstream counties (Urgut, Bulungur and Taylak), characterized by mountains and semi-mountains and having sufficient water and non-cotton cropped areas. The total respondent for this zone were 19 farmers, 2 of them being females, with an average farm size of 12.7 ha. The crop areas are smaller in comparison with other zones, but have the advantage of growing high value crops. The main crops of this zone are wheat, tomato, potato, tobacco and fruits. The second zone includes 3 counties (Akdarya, Jambay and Payarik) with good provision of surface and ground water, plain land areas, located north and north-east of Samarkand city. 22 farmers are surveyed from this zone, with an average farm size of 57.6 ha and the main crops cotton, wheat and tomato. The third zone is characterized by larger farm sizes and severe issues of land salinity resulting from dreadful drainage systems. The total farm respondents were 28 with an average farm size of 59.4 ha. The main focus in the third zone primarily lies on cotton and wheat cultivation. A lot of farmers are using pump irrigation systems, with maintenance of these pumps being a key concern. The fourth zone of the surveyed area is located in the Navoiy region (Karmana and Hatirchi), located downstream the Zeravshan river. The main crops grown are wheat and cotton, whereas in the upland areas of the Hatirchi County grapes and safflower also cultivated. 7 farms from this zone were surveyed, with an average farm size of 75.8 ha.

III. Efficient use of scarce resources-Results and Discussion

The analysis of farm performance is carried out using the net crop revenue as an indicator. The findings clearly indicate that input resources are not used efficiently, especially in the case of cotton growing farms, where the farm performance is clearly negative. The analysis as a novelty also addresses the use of voluntary assistance labor (hashar) based on a shadow-price framework and also incorporates household-or family labor. In terms of technology use, a trend towards demechanisation could be seen, which is found to be driven by unemployment outside the agricultural sector. Two crops, namely cotton and wheat are leading the agriculture of the country, the same being the case for the area at study. Wheat has the largest share in the cropped area, which mainly is grown under the food self sufficiency scheme of the country. Cotton is the main export crop, strengthening the state budget with foreign currency. Others commodities shares remain rather small in total, but are considerably higher in terms of yield (see Figure 2).

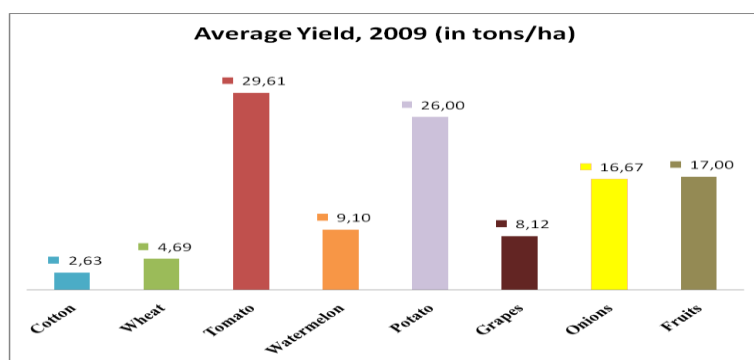
Figure 1: Production shares in total area surveyed, 2009



Source: own illustration, 2010

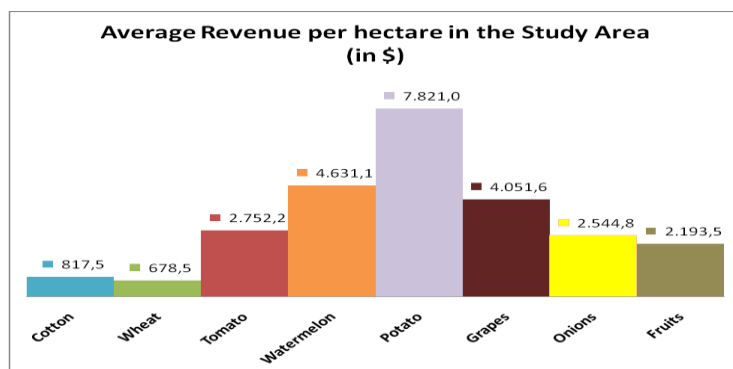
In terms of yield per hectare, tomato, potato, onion and fruits are the major cash crops to the rural dwellers.

Figure 2: Average yield of crops in selected survey area, 2009



Average revenue per hectare in the survey area is higher for potato, grapes and tomato, which makes them a first choice for farmers. In the surveyed area the average revenue of wheat is rather low, owing to the fact that farmers are getting high quality wheat seeds for high prices and that during the harvesting time they have to hire combines and machinery from MTP (Machinery Rental Stations), which is rather cost intensive. Therefore, although the wheat yields in the surveyed area high, wheat production remains a costly undergoing. Farmers with big and medium size farms mostly have their own tractor or farm machinery, nevertheless they have reported having hired additional machinery during the harvesting season. Machinery overuse in some cases has been observed, clearly indicating the inexperience of farmers in certain areas.

Figure 3: Average revenue of crops in selected survey area, 2009



Source: own illustration, 2010

High profit crops for the Zeravshan Valley are potato, watermelon and onion. However, the state order forces farmers to grow cotton and wheat, leaving them with no choice. This leads to huge losses for the farmers and for the government, as the losses of the farmers at times have to be compensated for by the state. Compensation is provided by the state in form subsidies. Subsidies can be indirect, i.e. tax reductions and credits at lower interest rates.

IV. Conclusions and Outlook

In the surveyed area, the input resources are not used efficiently. The inexperience of newcomers to the agricultural sector makes it an extremely challenging task to be efficient and use the agricultural input resources in a sustainable manner, in soviet times the “kolkhoz” (large state farms) used to take care of all matters related to the farm, thus making the farmer a mere executer of orders. Today the farmer has to manage his farm on his own, making it increasingly difficult for the farmer to be economically and ecologically efficient at the same time. Furthermore, the incentives for being efficient are not provided by the state, as control of land property remains in state hands. The analysis as a novelty also addressed the use of voluntary assistance labor (hashar) based on a shadow-price framework and also tried to incorporate household labor. The use of voluntary assistance for some crops is found to be not economically viable. In terms of technology use, a trend towards demechanisation could be seen, which is found to be driven by unemployment inside and outside of the agricultural sector. Climate change, which drives water scarcity, aggravates issues of land degradation will be another key aspect to deal with efficiency in the long run. In a next step the idea is to extend the survey to other parts of Uzbekistan and Central Asia to develop adaptive strategies for a new challenging era of farming in Uzbekistan.

V. References:

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