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World is better with ЏŚ!

Dear friends

I would like to ask for your attention to the 2nd issue of the newsletter of the Global Environmental Facility's Small Grants Programme (GEF SGP) in Uzbekistan. It has been three years since the Programme was launched, and during these three years the Programme has achieved significant results.

The current issue of the newsletter is devoted to a few selected technologies: a) The reforestation of pistachio forest stands as the most profitable land use alternative in arid foothills in Uzbekistan; b) aquaculture development as an economic way of fighting fish biodiversity degradation, a very good income generation practice, and a way of improving the food security of Uzbekistan; c) laser leveling of farmers' fields and no tillage practice as ways to improve soil fertility and a water saving mechanism. This issue also introduces a few other practices implemented within the GEF SGP projects.

We hope that the provided information will be of interest to you, and that you will have a chance to appreciate benefits of these practices. We also hope that you will help us to disseminate the information as much as possible. This will help to protect environment of Uzbekistan as well as to help people improve their livelihoods. We especially anticipate that this information will be interesting for all partners.

Sincerely,
Anita Nirody
UNDP Resident Representative in Uzbekistan

THE GEF SGP'S FLAG IS ON LENIN PEAK – AT 7 134 METERS HEIGHT

Dmitrty Ruch, the member of Uzbekistan mountain climbing national team, hoisted our flag on the peak when climbing this seven thousand height summit. Once again we were up to the highest mark. This time literally. The ascend to the summit took place on July 25, 2011 at 1:40 p.m. local time.

For reference:

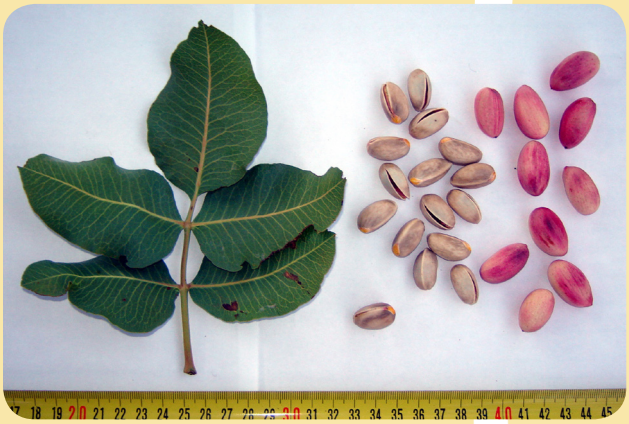
Lenin Peak is situated on the border of Kyrgyzstan and Tajikistan. It is one of the highest peaks in Central Asia within the Pamir's mountain range. The peak was first discovered and described in 1871 by the outstanding Russian geographer and traveler Aleksey Fedchenko. German mountain climbers were the first to climb the peak in 1928.

Uzbekistan sportsmen once again showed that they cared about the nature of their country, and they were ready to do a lot to popularize a caring attitude towards environment.

Our congratulations to the climber! Thanks a lot for great pictures.

PISTACHIO PLANTATIONS – THE MOST PROFITABLE LAND USE ALTERNATIVE IN ARID FOOTHILLS IN UZBEKISTAN

We can make this statement based on the results of our project implemented in Jizzak region (we wrote about it in the first issue of the Newsletter) and made a cost-benefit analysis. Cultivation of pistachio proved to be the most profitable alternative of land use in arid foothills in Uzbekistan. There are over 400,000 hectares of such lands in Uzbekistan. The lands can be found in Tashkent, Samarkand, Navoi, Jizzak, Kashkadarya, Surkhandarya regions, and along the Fergana valley. It is possible to turn these low productive lands into the most effectively used.



According to the economic analysis, made by NGO KRASS (Urgench) for our project, profitability of cultivating pistachio ranges between 379% and 446%, depending on a culture planted in row-spacing. Calculations were made taking into account long term return, since pistachio trees were first needed to be planted. We also have made comparison of profitability of pistachio cultivation against other kinds of land use in the given territory.

To compare the efficiency of pistachio plantations with the efficiency of other cultures the analysis was made taking into account cost of money (on the basis of a 20% informal inflation rate). Pistachio plantations need a 18 year period to grow and gain strength and thereafter they start giving good harvests. During the same period peas can generate profit of 10.4 million soum per hectare, melons and water melons – 31.6 million soum, and wheat, in the best case scenario, will give profit in the amount of 5,9 million soum. The profit gained from pistachio plantations within the considered period can reach 300 million soum depending on a combination of cultures grown up

Table 1. Efficiency of some agro cultures in the conditions of dry farming

per 1 hectare

	Productivity	Prices for production	Expenses	Income	Profit	Efficiency
Crops	Center per hectare	Soum/kg	Thousand soum	Thousand soum	Thousand soum	%
Pea	3	2000	400	600	200	50
Melons and water-melons	40	250	392	1000	608	155,1
Wheat	8	540	319	432	113	35,4
Livestock						24
Pistachio	Varies	16 000	Varies	Varies	Varies	379 and higher

**You may become familiar with calculations on pistachio depending on cultures planted in row-spacing on the site www.sgp.uz*

in a row-spacing that is 28 times more than the profit obtained from peas, 9 times higher than that of melons and water melons and 50 times higher than the profit obtained from wheat.

According to farmers and local population almost everywhere in Uzbekistan, and in our project area in particular, the live stock production is considered as the most profitable way of farming as compared to all other branches of agricultural production in the shortage of irrigation water and droughty climate. However, even live stock provides little chance for accumulation of capital means. Difficulties with live stock breeding occur because of shortage of forage and lack of pastures, and this problem is becoming more severe from year to year.
During the research the people were reluctant to reveal the incomes gained from live stock production. That is why to compare the efficiency of live stock breeding with growing pistachio, we used data from the report “Live stock production in Uzbekistan”, jointly prepared by UNDP, Ministry of agriculture and water resources of Uzbekistan and Israeli Agency on International cooperation for development MASHAV. According to this report, in 2006 the average efficiency rate of the farms with live stock was 24% (the highest indicator), and average annual profit per head of live stock was 125.6 thousand Uzb.soum. Taking into account future cost of money (20% inflation), the average profit per one head of live stock should make 226.1 thousand soum. During 18 years the profit from livestock will amount to 11.8 million soum making only 4.5% from profit on a pistachio plantation.

Using the method of calculation of the future cost and taking into account different interest rates, the profit on sheep breeding in the conditions of the Jizzak area has been calculated. The analysis shows that the profit on sheep breeding appeared to be the highest at an informal rate of inflation. Within 18 years the profit on breeding Karakul sheep can total to 8,461,000 soum and 15,832,000 soum when breeding Gissar sheep. The same indicator on pistachios (profit obtained within 18 years) can make 256,037,000 soum and more in case of planting additional agricultural crops in a row-spacing (table 1). Thus, it turns out that cultivation of pistachio plantations is 30 times more profitable than cultivation of Karakul sheep, and it is 16 times more profitable than cultivation of Gissar sheep.
Calculations on profitability have shown that profitability of cultivation of Karakul sheep is 55.5% (that is 7.7 times lower than profitability of pistachio) and that of Gissar sheep is 80.3 % (that is 5.3 times below the profitability of pistachio cultivation).

All calculations have been made for sale of a raw pistachio. If to add labor for sorting and salting

pistachio pickles, the average increase in profit will make an additional 8.8%.

When making calculations it was taken into account that pistachio starts to bring fruits only after six years, and that pistachio “has a rest” every three years. And all the same – the pistachio turns out the most favorable long-term investment in droughty conditions of foothills in Uzbekistan. The reason is in drought-resistant qualities of pistachio. It does not require irrigation. Small amount of watering is necessary only at the first stage after planting.

Within the project, the experts of the Republican Research Centre of Decorative Gardening and Forestry have developed a detailed instruction on how to correctly plant, look after, and inoculate pistachio. The instruction is distributed to all areas of Uzbekistan where there is a potential for pistachio cultivation. Those who have not received the instruction can get it at our office or download free of charge on our web site in the section «Publications of GEF SGP». All interested can receive and get familiarized with the economic analysis made within the project.

GEF SGP continues to expand the practice of restoration of pistachio plantings. The more trees in the country the better for all. But besides the spread of knowledge about this technology, it is important to have in mind some more conditions.

First, it is necessary to convince people to use the land for pistachio planting. For this purpose it is necessary, that they believe that culitivate pistachio plantations for them is more economically beneficial than to undertake other farming activities. I think the figures of our analysis can convince at least someone to start cultivating pistachio. Also, it is necessary that people are allowed to plant pistachio. This is the second.

Second, it is necessary that there is full support of local authorities and the central government institutions for using land for plantations. Therefore we disseminate the results of the analysis received within the project. After all, what is more logical, than the use of the land for planting the most profitable culture? The more income obtained by people living in these areas means improving life in the communities, stabilizing social welfare, improving the development of the region as a whole, creating additional jobs. There are many other benefits which could be listed here.

Thirdly, besides of land, planting stock and inoculative material is needed. Planting stock can be obtained in the Republican Research Center for Decorative Gardening and Forestry. The contacts are below:

Republican Research Center for Decorative Gardening and Forestry
Address: 114110, Tashkent region,
Tashkent district, p/d Darhan.

Tel/Fax **(99871) 225-72-32, 225-71-79**

1. **Galina Mikhailovna Chernova**
Leading researcher, Doctor of science (AGR)
tel. **+ 998 97 455 32 76**

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tel. **+998 90 372 51 14**

The Republican Research Center for Decorative Gardening and Forestry, with the support of the Dzhizak Regional Committee on Wildlife Management and its chairman Holmatov Erkin Ergashevich and local governments in Galla Aral area of the Jizzak region are currently working hard to create stool plantations which will be used for stocking inoculative material of a high-quality pistachio. In other words, interested farmers can obtain inoculative material from the plantation to make a high-quality pistachio plantations at their places. As a result of long-term work the research center has collected more than 20 varieties of pistachio.

It is not enough to have only one stool plantation. We refer to the authorities in other regions of the country saying that we will be happy to help in developing such plantations in your region. Just address to GEF SGP.

Fourthly, it is necessary to have the support of local government in creating access of farmers to financial resources. It is quite costly to create a plantation, though it pays off. But it takes time before it pays off. A strong farmer will create a plantation by himself. Others, probably, will need help. «Why to help them?» - you may wish to ask.

Some information about the attitude to pistachio worldwide.

Pistachio is an important agricultural crop in many countries of the world, and the production grows every year. Pistachio world production is estimated in 550 thousand tons a year. The largest producers are such countries as Iran (192.3 thousand tons), the USA (126.1 thousand tons), Turkey (120.1 thousand tons), Syria (52.6 thousand tons) and China (40 thousand tons) (Table 2). Iran's share makes 37% of total world area under pistachio and 47% of world production of this crop making this country the largest world producer and the exporters. Uzbekistan ranks 13 on the list of leading pistachio producers. The

Таблица 2. Ведущие страны мира по производству фисташки на 2008 г.

№	Country	Production, Thousand $ US	Output, tons
1	Islamic republic of Iran	635,477	192,269
2	Unites States of America	416,779	126,100
3	Turkey	396,991	120,113
4	Syria	173,850	52,600
5	China	132,206	40,000
6	Greece	26,771	8,100
7	Afghanistan	8,262	2,500
8	Tunisia	8,262	2,500
9	Italy	6,610	2,000
10	Kyrgyz Republic	2,644	800
11	Pakistan	2,544	773
12	Madagaskar	760	230
13	Uzbekistan	661	200
14	Ivory Coast	330	100
15	Morocco	165	50
16	Cyprus	79	24
17	Mexico	33	10
18	Mauritius	16	5
19	Azerbaijan	9	3

Source: FAOstat , 2008

current annual volume of output of pistachio in Uzbekistan makes only 200 tons.

Many countries, such as Turkey, Iran, and Syria continue to increase pistachio plantations and production of pistachios at the state level, developing and implementing large special projects. For example, the large Turkish organization TEMA, jointly with the Swiss corporation Nestle, have developed a 1.5 million Turkish lyres (1.0 mln. US dollars) project aimed at increasing the production of pistachios in southeast provinces of Turkey. The project envisages to plant 10 thousand new trees. If the project is successfully implemented, Turkey can increase pistachio production 4–5 times within 5 years. Having favorable conditions for cultivation of pistachio, Uzbekistan could join top ten pistachio producers within 5-10 years by implementing similar projects. So far, this kind of projects do not exist.

In the world market, because of high taste qualities, pistachio nuts are 3-4 times more expensive than that of walnut and almonds. Iran and Turkey are the main suppliers of pistachio on the world market. In these countries pistachio is called «green gold», in Iran pistachio export makes 10% of total exports. The figure is close to Uzbekistan's cotton export. Regretfully, being an ideal place for pistachio production and a home for many varieties, Uzbekistan, is the ***pistachio importer***.

Therefore, it makes sense to help both local governments and other donors. There is a potential for developing not only plantations, but also the whole sector, which would create value added in sorting, processing and packaging. This would increase money inflow from marketing pistachio in the internal market and exporting to international market.

GEF SGP continues to propagate the given practice all over the country in the regions where pistachio growth is possible. The project is being implemented in Kuruksay settlement of Chirokchi district, Kashkadarya region. Mixed planting of pistachio and almond is being tested there. The matter is as follows: the main resisting factor to start pistachio plantations is a long term before getting initial crop (5-7 years). Almond gives crop on the 3rd year. Planted in pistachio row-spacing, almond can generate quicker income to the farmer; by the time when pistachio starts giving crop in full volume (18-20 years), almond should be cut off so that to create optimal conditions for pistachio growth. We are going to calculate economic efficiency of this kind of mixed plantations and will share the results.

So, what are the conclusions?

We think that:

i. From economic point of view, **pistachio is the most promising culture for droughty foreland zones** in Uzbekistan;

ii. Pistachio cultivation is a much more comprehensive form of farming from the point of view of achieving healthy and stable ecosystems in droughty foothills of Uzbekistan, than live stock or wheat production in conditions dry farming;

iii. The greatest constraint is the fact that the farmer obtains the initial profit only 5-7 years after, but there are mitigation means to get income quicker by planting and growing different cultures in pistachio row-spacing.

iv. Investments made in pistachio plantation bring profit during the lifetime of a farmer and his descendants. The lifetime of a pistachio tree is over 1000 years.

v. Cultivation of pistachio plantations in different regions will serve as an additional factor for local development, taking into account the possibility of gaining additional income, creating additional jobs and other benefits for the region.

We express our special gratitude to Evgeniy Botman, author and project manager of all pistachio projects; to Galina Chernova, Ljutsian Nikolyai, Timur Tuljaganov, without their scientific knowledge and skills none of the above mentioned could not be realized; Bastamkul Saitkulov, Abdulla Karimov, Taras Zhukanin, Bahrom Karabaev and Turdykulov Zhumakul for implementation of the projects; and to all of them for enormous efforts in the advancement of this practice and work directed at increasing the land areas covered with pistachio trees in Uzbekistan.

Additional information can be found on GEF SGP web site.

HOW TO EFFICIENTLY USE WATER IN IRRIGATION NETWORKS WITHIN WATER USERS ASSOCIATIONS (WUA). CASE OF KHOREZM REGION

R.A.Eshchanov, Dr.of science (biology), H.Jabborov, associate professor, P.Saidov, associate professor Urgench State University

History of creating and constructing irrigation canals in Khorezm goes thousand years back. Old canals were used almost until the 1930s. They had dual importance: during vegetation period they provided irrigation water to agriculture, and during out of vegetation period they served as drains to drain the irrigated areas.

In the early 1930s, irrigated areas increased and the existing canals were not able to provide fields with irrigation water. Because of lack of water in the region, agricultural productivity, of cotton in particular, was very low and made 5.6-6.8 quintal per hectare.

To provide agriculture with sufficient amount of irrigation water, old canals were restored in 1939-1942, new canals constructed and later the canals were oriented for gravity irrigation.

The data collected show that having outfall water discharge of 0.4-0.8 м^3/sec, efficiency of these canals made 0.4-0.85. In the canals with outfall water discharge of 0.8-6.0 м^3/sec, efficiency equaled to 5-0.6. This type of canal is still functioning.

During 1971-1975 to irrigate crops on the area of 149.42 thousand hectares, the region spent 2,939.22 million м^3 of water or in average 19,671 м^3/per hectare. That amount of water was saficient to satisfy all irrigation needs of the region. In 1995-2000 to irrigate crops on the area of 236.2 thousand hectare, the region spent 4,599.17 million м^3 of water or in average 19,472 м^3/per hectare (Table 3).

However, even that amount of water was insufficient for meeting demands of agriculture. It is explained by the following:

First, from 1970 to 2002 irrigated area increased by 30.1% and made 57.3% of total area. Because of increased area, the length of inter and intra farm canals also increased. Alone between 1970-2005, total length on intra-farm canals increased by 1,529 kilometers.

Second, during the described period silt decreased in the river water while mineralization increased. At present, the silt indicator in inter and intra farm canals is very low. The lower the silt indicator is, the less insulated the canal bottom is, and hence water infiltration to soil increases.

Changes in the canals' efficiency due to low silt water have not been yet studied thoroughly, but an actual decrease of efficiency is obvious. More than 98% of canals in the region were constructed in the open ground and do not have anti-filter cover. This resulted in low efficiency of the canals and large losses of water during its transportation from the water source to the field. Because of losses, water does not reach the irrigated fields in sufficient amount, which results in lack of irrigation water for agriculture.

To test the way of solving this problem the staff of Urgench State University applied to GEF SGP. The idea was not brand new and had been applied earlier. It was necessary to see how in the local conditions the simplest anti-filter measures could increase the canals' efficiency. The idea was to insulate the bottom and the borders of the canal using polyethylene film in one selected Water Users Association (WUA).

For this work «Navrus yap» canal was selected. It is situated on the territory of Yangiaryk district of Khorezm region and its length is 2.6 км. The canal supplies water to 400 hectares of irrigated lands. 2,500 people live in this area and a number of

Table 3. Level of water consumption in Khorezm region

Years	Serviced area (in thousands of hectares)	Total amount of water consumed (in millions м^3)	Average consumption of water per 1 hectare (in м^3)
1971-1975	149.4	2,939.22	19,671
1995-2000	236.2	4,599.17	19,472

Table 4. Existing infiltration losses and efficiency of «Navrus yap» canal						
Water spending м³/sec	March	April	May	June	July	August
Water spending at the beginning м³/sec	1.5	1.3	1.4	1.8	1.9	1.4
Water spending at the end of the plot м³/sec	0.79	0.67	0.75	0.79	0.83	0.73
Infiltration losses м³/sec	0.71	0.63	0.65	1.01	1.07	0.67
Efficiency	**0.52**	**0.51**	**0.53**	**0.43**	**0.43**	**0.52**

farms are operating there. The canal is controlled and services by a separate WUA. The canal's throughput is 1.5 - 2 м³/sec, but because of infiltration, water never reached the irrigation fields in sufficient amount which resulted in constant lack of irrigation water.

To determine the existing efficiency of the “Navruz-Yap” canal the level of water in the canal was studied and infiltration losses and efficiency were defined.

The Table shows that the “Navruz-Yap” canal’s efficiency used to change on monthly basis ranging between 0.43 to 0.52, and during the vegetation period made in average 0.49. This means that 51% of irrigation water was lost for infiltration and nourished ground water.

Within the project, cleaning and filling works (picture 1) were implemented by excavator on the “Navruz-Yap” canal. Also, manual preparation of the bottom and borders of the canal was made. After that, a 10-15 cm. sand layer was laid for further placing of 100 micron thick polyethylene film (picture 2,3). After placing the polyethylene film (picture 4), the bottom and the borders were covered by a 10-15 cm. sand layer so that to avoid the damage of the film. Then, 0.8-1.0 м soil was laid over the sand layer on the bottom of the canal and a 0,5-0,6 м layer on the borders.

Before placing the film, the bottom and the slopes of the “Navruz-Yap” canal were prepared to provide water self-flow to irrigated fields.

After half of the work was done, infiltration losses were measured. After the film was placed, the canal’s efficiency was determined.
Data obtained are presented in Table 5.

The data obtained show that on the “Navruz-Yap” canal, on the section insulated by polyethylene film, the average efficiency was 0.89, while on the

Picture 1. Cleaning of the canal


Picture 3. Placing film


Picture 2. Placing film


Picture 4. Laying ground

Table 5. Changes in infiltration losses and in "Navruz-Yap" canal efficiency by applying antifilter measure

Canal sections		March	April	May	June	July	August	Average
Canal section isolated by film	Water spent at the beginning м³/sec	1.50	1.70	1.60	1.80	1.90	1.60	1.68
	Water spent at the end of the section м³/sec	1.28	1.55	1.42	1.64	1.65	1.44	1.50
	Infiltration losses м³/sec	0.38	0.46	0.45	0.54	0.67	0.51	0.50
	Efficiency	**0.85**	**0.91**	**0.89**	**0.91**	**0.87**	**0.90**	**0.89**
Check (not isolated) section of the canal	Water spent at the beginning м³/sec	1.28	1.55	1.42	1.64	1.65	1.44	1.50
	Water spent at the end of the section м³/sec	0.69	0.74	0.72	0.77	0.74	0.75	0.75
	Infiltration losses м³/sec	0.59	0.81	0.70	0.87	0.91	0.69	0.75
	Efficiency	**0.54**	**0.48**	**0.51**	**0.47**	**0.45**	**0.52**	**0.5**

checked section, not insulated by film, efficiency was only 0.5. The work implemented on the "Navruz-Yap" canal resulted in saving 10,450,944 м³ of water in 6 months. The water saved is sufficient for irrigating additional 522.5 hectares. In other words, implementing very simple anti filter measures along only one "Navruz-Yap" canal shows that water saved due to decreasing losses would allow agriculture to develop on twice as large territory with the same amount of water. Besides the standard 400 hectares of irrigated lands serviced by the canal, the available water would be sufficient for additional 522 hectares of irrigated lands.

What conclusions can be made? On the one hand, it is quite cheap way of water saving which could be used for additional farming. Besides, canal water is self-flowing, which makes possible to refuse a great number of pumps using large amount of energy. Economic efficiency calculations of the technique are currently underway.

On the other hand, through polling of the citizens and farmers using the canal, the following was revealed:

When asked whether they will continue the work initiated when they had seen the water saving, the people answered negatively. Why? The upstream farmers have water in any case, whether there is much water or no. They are the first in the line. There is no sense for them to take part in any refitting works. They do not want to pay for that. The farmers of the middle section of the canal have more or less similar attitude – they also have sufficient water. The downstream farmers are in the most difficult situation. They are not able to make everything by themselves from the very start of the canal, and they do not have tools to make the upstream farmers participate. Hence, evidence shows a very efficient water saving technique while in practice it is difficult to expand it without additional methods of water regulation. Water Users Associations are currently too weak institutions to regulate this.

Authorities at the level of ministries, regional and local khokimiyats should think of this.

GEF SGP expresses sincere gratitude to the article contributors and project implementers. Special acknowledgment is given to Ruzimbay Abdullaevich, rector of the Urgench State University for his constant aspiration to innovations and improvement of existing methods of management.

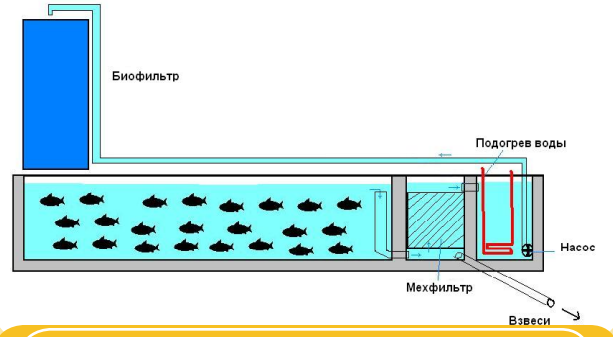
AQUACULTURE IN CLOSED WATER SUPPLY SYSTEM

B.G.Kamilov, candidate of science (biology), senior researcher, Institute of Zoology of the Republic of Uzbekistan, GEF SGP project manager

Fish is in deficiency in Uzbekistan: Production makes about 10,000 tons per year, consumption is less than 0.5 kg per capita per annum. This is much lower than the recommended medical norm of consumption necessary for providing full-fledged nutrition equaling 16 kg/per person/ per annum. To reach this norm it is necessary to produce over 400,000 tons annually.

Fishery is catching wild population of fish: it does not increase the amount of fish delivered for the population's consumption. The reason is that all the rivers in the country are regulated for irrigation, and the irrigation regime conflicts with biological cycle of the fish and does not allow for normal reproduction of marketable fish. Such a situation makes fishery a risky and unattractive activity for attracting capital.

Only ***intensive aquaculture*** is able to significantly increase fish production. Today, the country uses only extensive pond fish breeding of carp fish (*Cyprinus*). There are over 10,000 hectares of ponds in the country. Advantage of a pond system is the use of solar energy for natural production providing profitability of fish breeding. Ponds' disadvantages are high demand for land and water (per a 1 hectare of pond 15,000 м^3 of water is needed for filling and 7,000 м^3 for compensating evaporation; spring water is withdrawn from the water flow for the whole vegetation season) and the costs are high for creating new ponds and melioration of those available. In fact, ponds compete with irrigation farming for resources. There are no land and water resources in the country to create new ponds. Without introducing new technologies, pond fish breeding can be developed only in the existing ponds and cannot significantly increase fish production (not more than 15,000 tons per annum).



Picture 5. The scheme of constructing the closed water supply system (CWSS)

The main direction to develop can only be intensive aquaculture when fish never use natural food reserve, and growth takes place only at the expense of balanced fodder. Minimal fish productivity of such systems is 40 kg/м^3. For comparison: The best fish industry entity now in Uzbekistan produces today 1.5 tons of fish (this is 0.12 kg/м^3). Thereby, to produce 400,000 tons of fish using Closed Water Supply System (CWSS) it is necessary to have only 1,000 hectares of ponds, and there is no need to withdraw water from the flow, it can be used by all other water users. Water just flows through the fish breeding pond in less than one hour.

It is promising that: (a) *Fish breeding nurse-ponds* – can be placed on existing ponds of 2 meters deep and having the size of over 0.5 hectares, (b) *flowing pools* – can be placed near by the rivers, canals, and other ponds on the sloped land plot provide water flow because of gravitation, (c) *closed water supply systems* – can be placed in any place, despite the availability of ponds, it is necessary to have guaranteed electricity supply. Currently in Uzbekistan GEF SGP projects are being implemented to promote all these technologies for intensive aquaculture.

Initially it is needed to describe technology and what has been done. Within the GEF SGP project, theoretical basis and technology description were created, 3 operating closed water supply systems were constructed (each having 14 м^3 water volume of fish breeding pond), in which productivity reached 40 kg/м^3 of fish. African catfish was selected as the object of production, though there is a possibility to produce other varieties of fish. When constructing the closed water supply systems, the project focused on construction materials available on the local market.

CWSS (picture 5) has been constructed in the roofed premises with water heating. Water from fish breeding rectangular pools flows to the section with mechanical filter through narrow chink on the pool's bottom. Filled plastic substance (mechanical filter) slows down the water flow speed and serves as a filter for suspensions. Clarified water then flows to the pool with a pump, and a heat exchanger for heating water is installed inside the closed water supply system. The heat exchanger is a part of central heating system in which the water is heated by a gas boiler. Water is pumped from the pool to the top of a drip bio-filter on the upper point of the CWSS. Drip bio-filter is filled with a substance with large voids. Going through the whole chain, water is purified of

ammonium and nitrites, degased of excess carbon dioxide (CO_2) and saturated with air oxygen. CWSS works constantly.

Fish grows very fast because of optimal temperature regime and provided for proper and good nutrition. From spawn to marketable fish (1.2 kg) African catfish grows within 6 months. The same term is for carp, tilapia and other fish. It is possible to get two yields annually in one fish breeding pool. In case of 4 pools being available it is possible to deliver marketable fish all year round.

CWSS allows for the formula: Prime cost of fish equals to the cost of fodder plus 1 conventional unit (equal to USD 1 at commercial rate). The indicated conventional unit includes all costs: Salaries (high), spending for electricity and heating and other expenses.

Two workers can operate CWSS (provided for they do not perform the responsibility of guards as well). Marketable fish is hauled by landing net.

In order to have guaranteeing return of all investments (for capital construction and current assets) during at least three years, an aquaculture farm should have minimal production capacity of 8 tons of fish annually (i.e. 150 м^3 of total fish breeding pools).

Regretfully, in intensive aquaculture prices for raw materials and product – marketable fish –have not been defined because of a number of problems. Mainly cost of fish is determined by the cost of fodder. Experience of works implemented in 2011 shows that production of granulated fodder makes 3,500 soum per kg. Main expenses to produce 8 tons of fish are presented in Table 6.

Approximately, minimal price for the cheapest fish in CWSS (catfish) is 12,000 soum per kg. Then, income is 96-100 ml. soum. Total profit is 36 mln. soum.

Economic parametres are specified for one cycle – 8 tons. In CWSS it is possible to have two cycles of fish cultivation for a year. Hence, a qualified fish breeder will make more than 60 million soum total profits. Such farm can return 150 million soum of expenses for capital construction in three years. It means that it is necessary to try to create the closed water supply system for the sum not exceeding the specified amount and to keep the profitability of one cycle of fish cultivation at the level of 55%.

Development of CWSS technology will allow supplying fish to the market all year round without seasonal prevalence restriction. It will make real contribution to improvement of health of the population by improving a variety of a foodstuff. Besides, the more technology is being implemented, the cheaper fish will become for the final buyer, because the technology is really hundreds of times more effective than pond fish breeding and fishery which are currently the main sources of fish delivery. What is most important: Distribution of the given technology will make a

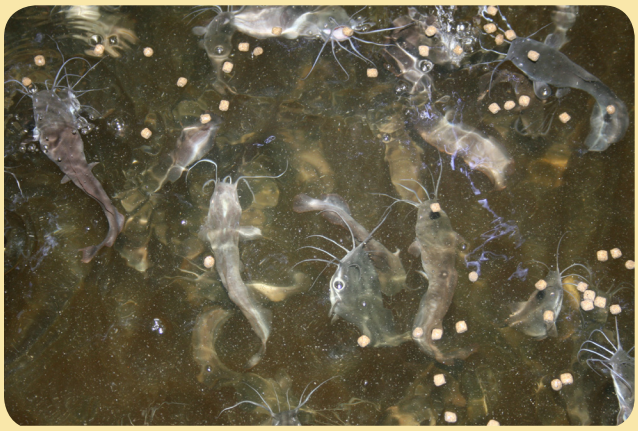


Table 6. Production cost of 8 tons of fish in CWSS

	Expenses	Expenses to produce 8 tons of fish
1.	Seeding material (10,000 units.)	12 mln.soum
2.	Fodder (12,000 kg, fodder co-efficient 1.5)	40 mln.soum
3.	Energy supply expenses	3 mln.soum
4.	Miscellaneous	5 mln.soum
	TOTAL cost	**60 mln.soum**

direct competition to fishery, which is frequently illegal, and will allow to considerably lower the pressure on natural water ecosystems.

Though, there are some restrictions for spreading intensive aquaculture in the country (CWSS, Fish wells, pools):

- Lack of real theoretical knowledge and experience, absence of research, and lack of professional staff having university degrees;
- customs duties to import mixed fodder for intensive fish breeding (60 % of customs duty, 70 % excise duty, 20 % VAT) are very high on the one hand, and there is a lack of theory for producing balanced fodder, fodder producers (fodder containing 35 % of protein is needed) on the other;
- lack of services (fodder suppliers, tiny fishes and equipment).

In conditions of fully privatized fish sector theoretically it is possible to create a private aquaculture farm only provided that fodder and bay fishes are imported for some periods of time. In case there are a number of such farms and provided for their cooperation, private hatcheries, suppliers, fodder producers and factories for fish processing will appear.

GEF SGP is currently dealing with this issue. A hatchery is being created in Tashkent region, and fodder producing plans are being established in Tashkent and Jizzak regions. A project on grazing and to nurse pond fish breeding has been started in Jizzak region on the Aydar-Arnasay system of lakes. We hope that this will allow restoring the degraded fish biodiversity in this eco system.

We are ready to work further and to disseminate the CWSS technology and other intensive aquaculture technologies all over Uzbekistan. For more information apply to GEF SGP.

ECONOMIC EFFECTIVENESS OF LASER LEVELING IN AGRICULTURE

K.Nurmetov, I.Rudenko, OEgamberdiev
ZEF/UNESCO project, KRASS NGO, Urgench

Agriculture plays an important role in the economy of Uzbekistan, and the share of the sector in country gross national product is 19% (the State Committee on Statistics, 2008). More than 90% of agricultural production in the country is dome by irrigated agriculture. Therefore water resources in agriculture play a huge role, and in particular in droughty years (like for example in 2000-2001 and 2008). Water resources shortage influences negatively not only agricultural production but also economic development as a whole. Besides the climatic reasons (drought), low efficiency of use of irrigating water is the reason for shortage of water resources.

Today, there is a need to use new effective and accessible water saving technologies. Application of a laser leveling methods is one of such technologies. Laser leveling is a method of land leveling with the help of a laser device using special equipment, when the difference of the field's roughness makes ±3 см. Laser leveling technology is widely used in the developed countries when building dwellings and main lines, and also when leveling farmlands, digging irrigation canals, drainage systems and collectors. The advantages of laser leveling technology are: Convenience of application; up to 25% of irrigating water saving; effective and even distribution of irrigating water on the field surface; and increase in productivity and improvement of a meliorative condition of land.

Economic efficiency of the project is the most important thing for any enterprise. When implementing a project or introducing a new technology, the attention is, first of all, paid to gaining profit and returns. Therefore for successful introduction of laser leveling technology, in addition to socially-ecological advantages, economic efficiency is also required. In 2009-2010 the researchers of the Khorezm Agro-advisory Center KRASS, within the joint GER SGP project, made an economic analysis of applying laser leveling technology.

Economic efficiency of laser leveling on a raw cotton and wheat fields

The economic analysis of applying laser leveling technology was made using the example of raw cotton and wheat grown on the field of "A.Temur" farm in Urgench district of Khorezm region. Base indicators of economic efficiency are presented in Table 7.

When applying laser leveling technology on wheat fields mechanization cost increases by 12.3%. On the other hand, because of the leveled surface of the field by means of a laser leveling, labor force cost (for the subsequent agrotechnical measures) decreases by 23.2% and irrigation water cost decreases by 30% Thus, productivity of wheat grain per one hectare raises on average

Table 7. Indicators of economic efficiency of applying laser leveling technology (per 1 hectare)

Indicators	Traditional method	Laser leveling method	Changes	
			Quantity	%*
Wheat				
Mechanization cost, thousand soum	453.1	508.9	55.8	12.3
Labor force cost, thousand soum	63.9	49.1	-14.8	(23.2)
Irrigation cost, thousand soum	72.8	53.1	-19.7	(27.1)
Other costs, thousand soum	500.5	520.2	19.7	3.9
Total cost, thousand soum	1,090.3	1,131.3	41	3.7
Water spent, м3	**5,725**	**4,011**	**-1,714**	**(30)**
Productivity, center per hectare	40.0	44.0	4	10
Income, thousand soum	**1,260**	**1,386**	**126**	**10**
Profict, thousand soum	169.7	254.7	85	50.1
Efficiency, %	**15.5**	**22.5**	**7**	
Cotton				
Mechanization cost, thousand soum	595.2	649.7	54.5	9.2
Labor force cost, thousand soum	113.2	100.4	-12.8	(11.3)
Irrigation cost, thousand soum	90.8	71.9	-18.9	(20.8)
Other costs, thousand soum	572.1	621.1	49	8.6
Total cost, thousand soum	1,371.3	1,443.1	71.8	5.2
Water spent, м3	**10,000**	**8,000**	**-2,000**	**(20)**
Productivity, center per hectare	25	27.5	2.5	10
Income, thousand soum	**1,508.5**	**1,659.3**	**150.8**	**10**
Profict, thousand soum	137.2	216.2	79	57.6
Efficiency, %	**10**	**15**	**38.2**	

**Note: in brackets decrease rate is indicated in %*

on 4 centners (10%), and the profit increases by 50.1%. As a whole, profitability of wheat cultivation on the laser leveled fields can grow from 15.5 to 22.5%.

Calculations on cotton fields have also shown economic efficiency when applying the laser leveling technology. Labor cost decreases by 11.3%, irrigation cost by 20.8%, and the amount of water used for irrigation decreases by 20%. Thus productivity raises on average by 2.5 centners per hectare, and the profit grows by 57.6%. As a whole, profitability of cultivation of cotton on laser leveled fields can grow from 10% to 15%. Such effect has been reached because of refusing actions for making of furrows and reducing irrigation cost (for pumping and labor force).

Covering the laser equipment cost

The cost for covering the equipment depends first of all on a financing source. The sources can be own means of farms, credits of commercial banks, and the means of the leasing companies. The total cost of the laser equipment directly obtained in Tashkent (at Leica Geosystems company representation) makes 11,501 US dollars or 18,634 thousand soum. (1 US dollars – 1,620.20 soum on a Central Bank rate for 28.09.2010). Expenses on customs registration of the equipment (0.2%) to be added to this amount. Table 8 shows the recoupment options of the laser equipment on wheat and cotton fields taking into account different sources of financing within 1 to 3 years.

According to calculations, the equipment cost will be fully covered by any source of financing, but for that different sizes of land plots are needed. To cover the equipment cost for three years the farmer will need 38 to 56 hectares in case of wheat and 39 to 58 hectares in case of cotton. Besides, it is noteworthy that the equipment obtained from the company Leica Geosystems is some of the most reliable, though expensive.

Table 8. Recoupment of laser leveling equipment within 1 and 3 years					
Sources of financing	**Equipment cost (with interest) thousand soum**	**Additional profit from 1 hectare for 1 year, thousand soum**	**Necessary land area for 1 year, hectare**	**Additional profit from 1 hectare for 3 years, thousand soum**	**Necessary land area for 3 years, hectare**
Wheat					
Own means of farms	18,633.9	85.0	219	490.3	38
Leasing, 14%	26,460.1	85.0	250	490.3	54
Credits of commercial banks, 16%	27,578.2	85,0	254	490.3	56
Cotton					
Own means of farms	18,633.9	79.0	236	472.3	39
Leasing, 14%	26,4601	79.0	335	472.3	56
Credits of commercial banks, 16%	27,578.2	79.0	349	472.3	58

There are a lot of other suppliers of similar equipment, for which the price starts at USD 4,000 without the cost of a scraper which can be manufactured locally for 5-6 million soum. Hence the recoupment of the laser equipment will be quicker and more simple.

The effect of applying laser leveling technology: case of a selected region

After determining the positive economic effect of applying laser leveling technology at the level of a farm, the total effect at the level of Khorezm region was calculated. One laser planner can level 3-4 hectares a day in case the soil is well prepared and tractors and scrapers have sufficient power. This makes 300 hectares per year (within 3 months of intensive field work when the land is not occupied by crops). To determine efficiency at the level of the entire Khorezm region, calculations were made for average annual production areas covered by case of cotton and wheat, which made 48,500 hectares for wheat and 105,000 hectares for cotton. Total amount made 153,500 hectares. For stage by stage (within 3 years) leveling of cotton and wheat fields it is necessary to have 171 sets of laser equipment (153,500 hectares / 300 hectares = 512 sets. / 3 years = 171 sets). With the price for one set of laser equipment equaling to 18 634 thousand soum, total investment should make over 3 billion soum or about 2 million US Dollars (Table 9).

Table 9. Additional profit from applying laser leveling technology at the level of Khorezm region			
	1 year	2 year	3 year
Investment in laser equipment, thousand soum	3,178,115		
Investment in laser equipment, US Dollars	1,961,557		
Wheat			
Area of leveled lands, hectares	16,167	32,333	48,500
Additional profit per 1 hectare, thousand soum	85	203	203
Total additional profit, thousand soum	1,374, 768	6,552,486	9,828,729
Cotton			
Area of leveled lands, hectares	35,000	70,000	105,000
Additional profit per 1 hectare, thousand soum	79	197	197
Total additional profit, thousand soum	2,766,306	13,765,801	20,648,702
Total additional profit on cotton and wheat, thousand soum	4,141,074	20,318,287	30,477,430
Total additional profit on cotton and wheat, US Dollar	2,555,903	12,540,604	18,810,906
Net additional profit after covering investment, thousand soum	962,958	20,318,287	30,477,430
Net additional profit after covering investment, US Dollar	**594,345**	**12,540,604**	**18,810,906**
Gross Regional Product's share, %	**0.1**	**1.3**	**2.0**

Increase in productivity by 2.5 centners in case of cotton and by 4 centners on wheat per 1 hectare (Table 6) due to laser leveling will allow obtaining additional profit both at the level of a farm and at the level of the region. During the first year, the profit will make over USD 2.6 million not taking into account investment and about USD 0.6 million after investment has been covered. During the third year of laser leveling in the Khorezm region, the effect of the additional profit will make USD 18.8 million, which is 2% of Gross Regional Product. Hence, investment in laser equipment will be repaid during the first year of applying the laser leveling technology, and additional profit will be increasing year to year.

Based on the results obtained, index of return (Cost-Benefit Ratio - CBR) was 1.22. Investment could be considered as effective when CBR>1, it is supposed that investment in laser equipment for land leveling in Khorezm regain will be fully justifies from economic point of view.

Besides the economic efficiency, applying laser leveling will allow to save large amount of water in the region. The necessary amount of irrigation water for growing wheat by traditional methods is 277.7 mln. м^3 (48,500 hectares * 5,725 м^3), and 1,050 mln. м^3 (105,000 hectares * 10,000 м^3) for growing cotton. The amount of water needed for irrigation when growing wheat by applying laser leveling makes only 194.5 mln. м^3 and 840 mln. м3 for growing cotton. Hence, total savings of irrigation water in the region can make 293.2 mln. м3 or 7.3% of total annual water consumption in Khorezm region (4,025 mln. м^3).

On the basis of the work implemented in Khorezm region, GEF SGP has approved a similar project for the Namangan region. The projects for the Surkhandarya region and the Republic of Karakalpakstan are being developed to be submitted to GEF SGP soon. We expect other regions to join and adapt this technology for applying in their respective regions.

GEF SGP expresses gratitude to the staff of KRASS NGO for developing and implementing the project.

NECESSITY AND OPPORRTUNITIES OF USING ZERO TILLAGE IN RISKY FARMING ZONES OF KARAKALPAKSTAN

B.Aybergenov

Soil fertility in Karakalpakstan has steadily been decreasing because of repeated soil processing, consolidation of soil layers, reduction of organic substance, insiccation and salinization of soils. In order to obtain good crops despite the loss of soils efficiency, the farmers apply repeated processing, plentiful watering and chemicalization, often forgetting about the reproduction of soil fertility. From year to year the soil is exhausted, having lost its natural allies – other plants, micro-flora and invertebrates.

A UNDP-GEF project on tugai forests protection came up with an idea to introduce a new farming technology directed at restoration of soil fertility by activating natural processes going on in the soil. This is a technology of zero tillage. In the first issue of our newsletter we have already written that the project had been started with the support of GEF SGP. This time we would like to share initial results.

The project is being implemented in Kanlikol district of the Republic of Karakalpakstan. From the very beginning the project purchased special machinery - seeding machine SA 11,500 «Vence TUDO» produced in Brazil and designed for seeding on fallow soil, and also a laser planner. After that the project started to demonstrate the technology which consists of the following:

Preparation of the field starts with leveling. To provide event and flat surface of the field it is necessary carefully make field leveling by laser planner. Such leveling provides even germination of crops and saves water resources, the access to which is decreasing from year to year. See information of GEF SGP project and KRASS NGO in Khorezm region.

After leveling, it is necessary to make deep tillage to the depth of 35-70см. After that a culture producing a large amount of plant biomass should be seeded and left in the field after the crops have been gathered. The biomass is processed in mulch distributed on the surface of the soil. This

Table 10. Additional profit obtained from applying laser leveling in Khorezm region

Dates of observation	Depth of horizon (см)	Soil moisture on the uncovered field, %	Soil moisture on the field covered with wheat straw, %	Soil moisture preserved at the expense of covering the field by straw, %
31.08.2011г.	0 -5	2.90	9.49	6.59
	5 -10	6.65	8.34	1.74
10.09.2011г.	0 -5	2.21	9.30	7.09
	5 -10	5.30	8.10	2.80
Intensiveness of evaporation for 10 days in the horizon	0 -5	0.69	0.19	
	5-10	1.35	0.24	

mulch layer will avert soil dehydration keeping moisture in it.

Winter wheat is widely used culture good for mulching in our conditions. Other cultures can also be used such as triticale, barley, oats, corn, sorghum, millet and others. After harvest of the grain (main product), the rest of the plant biomass is chopped and left on the field to provide full coverage of the soil. Later, when the soil is covered with plant remaining, the next culture (any) is seeded with the help of a seeding machine.

Why is there a need for zero tillage? First, in conditions of growing dryness of a climate it is important to keep scarce soil moisture and, thereby, to reduce the amount of water for irrigation. It is very important nowadays, especially in droughty years. Secondly, current methods of land processing (uncovering soil surfaces) lead to erosion of soils, micro fauna and fertility losses. The lost soil fertility is restored by receiving of organic mass in the form of the plant rests, preserving moisture for its decomposition, and, consequently, increasing in soil biodiversity. Thirdly, presence of the plant rests helps to reduce salinization in the layer of earth where the plant's root is placed, by reducing evaporation of ground waters. Fourthly, probably, the most important thing for farmers, application of this technology allows to considerably cut down expenses on soil processing, save labor and material resources on cultivation of plants thus allowing to lower the cost of agricultural production and to increase profit.

Keeping the plant rests on the field is the integral and a must part of zero tillage. They protect the soil from wind and water erosion, decrease evaporation of moisture and decrease seasonal accumulation of salts in the layer of earth where the plant's root is placed. They also supplement the stocks of organic substance in the soil, serving the source of energy for vital functions of soil organisms. The results of researches within the project show that keeping wheat straw and stubble remains on the soil surface decreases seasonal accumulation of salts by **1.6-4** times as compared to the land plots where the plant remnants were not kept.

Biological activity of the soil is one of the most important indicators of soil fertility. The study of biological activity of the soil showed that in the soil where the straw was kept on the surface, activity was higher as compared with the field with no straw kept.

Project observations also revealed that the soil covered by wheat straw decreases moisture evaporation and keeps moisture of the upper 0 -5 см layer **3.2-4.2 times higher** than in the uncovered plots (Table 10).

Economy of applying the technology is also interesting. Monitoring of costs for tilling winter wheat by zero tillage and by traditional repeated tillage showed that when using zero tillage the cost for winter wheat tillage decreased by 179 thousand soum because of refuse of ploughing and harrowing (Table 11).

Productivity of winter wheat when applying zero tillage was 18.9 centners per hectare and when applying traditional repeated tillage 23.3 centners per 1 hectare.

It is difficult to name the reason for lower productivity on the fields with zero tillage. The matter is, that the field with zero tillage was not irrigated during the whole vegetation period, while the field where traditional repeated tillage was applied, was irrigated twice during vegetation. The farmer's perception of the zero tillage field was that it was an experiment, and he watered firstly the fields with traditional tillage. When the turn came to irrigate zero tillage fields, water supply

Table 11. Actual cost of winter wheat tillage per 1 hectare in Kanlykol district of the Republic of Karakalpakstan

Activity	Fuel cost litre / soum		Seed cost kg/soum		Fertilizer cost kg/soum		Labor cost, soum		Total cost, soum		Differ-ence (TT- ZT), soum
	TT	ZT	TT	ZT	TT	ZT	TT	ZT	TT	ZT	
Ploughing	30/ 45,000	0					80,000	0	125,000	0	125,000
Harrowing	15/ 24,000	0					15,000	0	39,000	0	39,000
Seeding and fertilizing	8/ 12,800		250/ 212,500		100/ 33,300		10,000		268,600		0
Irrigation							15,000			0	0
Harvesting by combine	20/32,000					85,000	117,000		0		0
Total									**564,600**	**385,600**	**179,000**

** In the Table «TT» means Traditional Tillage, and «ZT» - Zero Tillage*

was out. Most probably the yield would have been much higher if at least one watering had been done.

These harvests were obtained on the zero tillage fields even with no watering. It became possible because of full coverage of the field with straw (mulch). This preliminary result is very important in conditions of repeated draughty years. Continue research is needed of this aspect for further scientific justification of the methodology.

Despite the low productivity of winter wheat (18.9 centner/hectare) while applying zero tillage, profitability level was much higher (43.1%) than while applying traditional tillage[2] (23,3 centner/ hectare), where the profitability level was only 29.5% (Table 12).

Total cost of Brazilian manufactured seeing machine Vence TUDO SA 11500, designed for direct seeding without any tillage, purchased in and delivered by the company was USD 22,106 or 38.354 million soum (1 USD – 1,735 soum according to the Central bank's exchange rate for 09.09.2011). The seeding machine can daily seed 15-25 hectares depending on the tractor's speed. Table 13 shows options of the seeding machine recoupment when seeding wheat and taking into account different sources of financing

Table 12. Economic efficiency of tilling 1 hectare of winter wheat in Kanlykol district of the Republic of Karakalpakstan

Indicators	Traditional tillage	Zero tillage
Productivity, centner/hectare	23.3	18.9
Gross income, soum	2330 x 292=680360	1890 x 292=551880
Costs, soum	564600	385600
Prime cost 1 kg of grain, soum	242.3	204.0
Net income, soum	680360 - 564600=115760	551880 - 385600=166280
Profitability,%	20.5%	43.1%

[2]If to take into account, that when carrying out irrigation during the zero tillage the labor cost on irrigation will be added, but productivity will also increase, we can conclude, that during the zero tillage profitability will remain higher as to compare to traditional tillage

Table 13. recoupment of zero seeding machine during 1,3 and 5 years							
Type of financing	**Equipment cost, (with interest rate) thousand soum**	**Additional profit per 1 hectare for 1 year, thousand soum**	**Land area needed for 1 year, hectare**	**Additional profit per 1 hectare for 3 years, thousand soum**	**Land area needed for 3 years, hectare**	**Additional profit per 1 hectare for 5 years thousand soum**	**Land area needed for 5 years, hectare**
Self financing	38,354	50.5	759.5	151.5	253.2	252.5	151.9
Leasing, 14%	43,723.5	50.5	865.8	151.5	288.6	252.5	173.2
Credit of commercial banks, 16%	44,490.6	50.5	881	151.5	293.6	252.5	176.2

during the 1 year, 3 years and 5 years indicating necessary land area for farming. It is noteworthy that besides the wheat, the seeding machine is able to seed wide-row cultures (like cotton, corn, sorghum, soya beans, mung bean, sunflower, sesame and many others). Though, economic analysis of cultivating cotton and other cultures has not yet been done. That is why decrease in the recoupment parameters is expected.

Experience and practice from other countries where the application of zero tillage is growing fast shows that the efficiency of zero tillage starts when soil restores its fertility by increasing soil organisms and strengthening their vital activity. Many scholars and practitioners note that the efficiency of zero tillage reaches stable and high level only after 5 years of its permanent application.

Initial results obtained by the project are promising. In view of all advantages of the technology, they indicate at the possibility to apply zero tillage in soil and climatic conditions of Karakalpakstan.

Along with advantages of zero tillage there some disadvantages which should be taken into account. One of the most referred complains stated by farmers is as follows: With no ploughing in the conditions of Karakalpakstan there is a possibility to contaminate the fields by perennial weeds (rush, licorice, camel's-thorn, etc.) and bushes (tamarisk). The contamination of crops by perennial weeds is a serious problem and requires effective measures to struggle against weeds. Many countries while applying zero tillage also use highly effective herbicides. However, we are very well aware that by applying herbicides, we destroy not only weeds but also soil organisms and pollute air and water reservoirs. Besides, herbicides are expensive and this finally affects the cost of agricultural production. Therefore, manual weeding is the most acceptable and beneficial option both for the farmer and for the nature. The cost of manual weeding of 1 hectare of cotton has, for example, this year made approximately 15 thousand soum. The cover of soil by straw (mulch) suppresses the growth and development of many weeds, therefore it is not so difficult to clean manually sporadically appeared weeds and bushes.

There are also biological methods of weeds extermination. They are based on antagonism between the plants. Crop rotation also influences the changes in the variety composition of the weeds.

Another factor is distrust in new methods and the necessity to purchase new equipment for soil cultivating – zero tillage seeding machines. As it was already mentioned, the equipment cost requires quite solid initial investment.

However, despite all these deterrents, in the course of the days spent in the field, we managed to reveal and make the farmers interested in approbation of zero tillage technology. They could understand an idea of technology and evaluate its advantages. With their help, and also with the government support, we hope that zero tillage technology will be extended in the difficult farming zone of Karakalpakstan for restoration of the lost fertility of soils, restoration of a soil biodiversity, and savings of scarce water resources.

For additional information apply to GEF SGP. We express our gratitude to Mr. T.T.Ibragimov, khokim of Kanlykol district, for his complete support in project implementation. We also appreciate the work done by UNDP-GEF project on preserving tugai forests in Karakalpakstan, namely by H.S.Sherimbetov and E.A.Chernogaev.

BRIEFLY ABOUT OTHER GEF SGP INITIATIVES

Drip irrigation

GEF SGP has supported the project in the Namangan region aimed at manufacturing drip irrigation systems. A farmer Abdulvohid Boltabaev initiated the project, while the Association of Water users of «Movaraunnahr-Guliston» was the applicant. It is planned that the project will result in establishing an enterprise for manufacturing drip irrigation systems in Namangan region. The enterprise will supply the systems to the farmers in Fergana valley. We will keep you informed on the project developments.

Greenhouse in Samarkand

At the biological faculty of Samarkand state university re-equipping of a botanical greenhouse is underway. It is planned that the project will reconstruct existing heating and lighting systems of the greenhouse. The insulation system of the greenhouse is being modernized; a new boiler-house with the modern energy efficient equipment is being constructed; the heating and ventilation systems are improved. Besides, the project plans a number of measures to improve scientific potential of the greenhouse. The greenhouse is expected to perform educational and propagation measures to raise awareness on biodiversity and energy efficiency.

Symposium on adapting to climate change by local communities of Uzbekistan

On June 3, 2011, the National symposium devoted to aspects of adaptation of local communities of Uzbekistan to changing climate conditions took place. Over 80 representatives from various parts of the country took part in the symposium.

The symposium considered a number of issues:

I. Energy – How the forecasted climate change can affect generation and use of energy; how it is going to affect ordinary people; how it could affect infrastructure.

II. Land – How more draughty climate and deficit of water can affect land use in rural areas; what are possible consequences; and what people and authorities should do to re-arrange economy in new climate conditions.

III. Biological diversity – What the changing climate brings to our natural ecological systems; what the authorities and local citizens should do to preserve stability of ecological systems and their functions.

A publication, reflecting opinions of different experts on the problems mentioned, is underway. The publication will be available on the GEF SGP web site and will be circulated among our partners.

The idea to convene such kind of a meeting on the issues of adapting to climate change, belongs to UNDP-GEF project «Adaptation to climate change at the community level», implemented by GEF SGP in 10 countries of the world.

World is a better place with Us!

GEF SGP launched a project to protect wild nature of Uzbekistan. Within the project, sports and show business stars will be covered by a body art make-up (painter Ekaterina Kovshova) representing one of the disappearing animals of Uzbekistan. After that the photos will be taken by a professional photographer (Svetlana Kanaki) and will be presented accompanied by relevant slogans aimed at protecting wild world. A calendar with the pictures will be issued and circulated all over the country.

This way we hope to attract public attention to the existing problems of wild nature protection. We have also announced a contest for the best title of the project. The contest winner is Elena, whose slogan you see in the title of this article.

You can find detailed information on the GEF SGP web site – www.sgp.uz.

We will be happy to have you joining our community on Facebook.com:
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