INCEPTION REPORT

CONSERVATION AGRICULTURE FOR IRRIGATED AREAS IN AZERBAIJAN, KAZAKHSTAN, TURKMENISTAN AND UZBEKISTAN

Project Number: **GCP/RER/030/TUR**

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LIST OF ABREVIATIONS

ADB – Asian Development Bank

AZ – Azerbaijan

CA – Conservation Agriculture

CWANA – Central and West Asia and North Africa

FAO – Food and Agriculture Organization

FAO/SEC – FAO Sub regional Office for Central Asia

FTPP – FAO/Turkey Partnership Programme

GoT – Government of Turkey

ICARDA – International Center for Agricultural Research in the Dry Areas

ICARDA-CAC – International Center for Agricultural Research in the Dry Areas for Central Asia and the Caucasus

ICRISAT – International Crops Research Institute in the Semi-Arid Tropics

JIRCAS – Japanese International Research Center for Agricultural Science

KZ – Kazakhstan

MARA – Ministry of Agriculture and Rural Affairs

MoA – Ministry of Agriculture

NPC – National Project Coordinator

NRM – National Project Manager

PFA – Partnership Framework Agreement

PFU – Project Facilitation Unit

PRC – Project Regional Coordinator

SK – South Kazakhstan Province

UZ – Uzbekistan

ZEF – Center for Development Research

EXECUTIVE SUMMARY

The project "Conservation Agriculture in Irrigated Areas of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan" is funded by the FAO/Turkey Partnership Programme (FTPP) established over an initial period of five years (2007 – 2011) at the benefit of the countries assisted by the FAO Sub regional Office for Central Asia (FAO/SEC).

The expected long-term impact of the project is focused on the improved rural livelihoods and food security through increased productivity of irrigated farming systems in four Central Asian countries - Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan - using the principles and practices of CA to achieve sustainable land and water management.

Following the release of funds by FAO, an inception workshop was organized from January 31 - 1 February, 2011 in Tashkent for the preparation of a detailed work plan for each participating country and at subregional level. In the Inception Workshop experts from FAO, ICARDA, JIRCAS, ZEF-project, Vice rectors of Agricultural Universities of Uzbekistan and National project coordinators and consultants from Azerbaijan, Kazakhstan and Uzbekistan participated. A total number of 40 participants from 3 countries of Central Asia and including Azerbaijan participated to the workshop.

During the inception workshop it was decided to conduct national seminars to identify project demonstration farms and complete detailed project work plan, crop rotation in each respective country. The national seminars were conducted in all three countries.

Demonstration and research activities is carried out in at least one selected benchmark site of 25 ha size per country. The selection criteria were developed by project regional coordinator and national consultants of the project in each country taking into account local conditions in agriculture of the participating countries in the project during the national seminars which were held February through March 2011. These sites were selected at the beginning of project operations and they represented the most significant ecological zones in each country. Project regional coordinator and the project team and local counterparts agreed on project farms for each country. These demonstrations plots will be used to provide field and formal training courses and also field days for demonstration of conservation agriculture to the farmers and for training of farmers, extension specialists in crop management.

Recruitment of subject matter specialists on crop production, water management, farm mechanization and economics, in each country, is at the final stage. The national consultants required according to the crop season. The national consultant in crop management will work as national project manager (NPM).

Each concerned country already appointed a National Project Coordinator (NPC) to be located on-site and to provide full-time orientation, coordination and supervision during project implementation.

In the time of Soviet Union farms' area was planted to cotton in rotation with alfalfa in Azerbaijan and Uzbekistan while in South Kazakhstan, Kazakhstan wheat was rotated with vegetable crops. Cotton was occupying up to 80% of cropland in Ganja and Kashkadarya provinces of Azerbaijan and Uzbekistan respectively. The rest of cropland was dedicated to alfalfa and other forages. As cotton and wheat are main contracted crops by the Government of Uzbekistan, the farmers in this area switched to cotton monoculture

relying on supply of inputs through Governmental channels. Nowadays in Ganja, winter wheat, barley and cotton occupies 80% of the total arable area. In order to attain food security, wheat became the most important crop in the region.

Crop rotations for the selected farms were developed taking into account farmers' interest and also marketability of the selected agricultural crops of the project throughout the project countries. For crop diversification, farmers were advised to grow more legumes but they were not ready to accept at once this concept and they were not sure about the market. Seven crops were tested, out of which wheat occupied the largest area followed by maize and cotton.

Double cropping is good for farmers (more produce means more money) and good for the environment (producing more on a unit of land means less land will need to be devoted to farming). Double cropping has a great potential to increase agricultural production in the project countries. Many crops can be used as a double cropping after wheat harvest in the irrigated conditions of Central Asia and Azerbaijan. In this context maize, mungbean, pearl millet, kidney bean and sorghum are used as summer crop after wheat harvest in the project demonstration sites.

All on-farm field days carried out within the selected project farms during the project implementation period. Taking this into account first field day was organized on May 21st in Azerbaijan and second field day was organized on June 16 in Kazakhstan, the third field day was conducted on August 24, 2011 in Uzbekistan.

At the end of the project, it is expected that the water and soil conservation technologies will have been sufficiently validated by core farmers groups, and an expanded programme will have been prepared for farmers living in nearby districts, in view of improving farm-gate incomes, local livelihoods and employment opportunities for the rural poor and national partners' capacity in technology development, evaluation and dissemination.

Demonstration sites for proper conservation agricultural practices will be fully operational in all participating countries, and the up-scaling of successful technologies beyond the rural communities initially participating in the project will have been initiated. The scientific information will have been made available in forms of booklets, flyers and scientific publications.

Before project termination, a workshop will be organized for the main Government stakeholders and potential donors. The purpose of this workshop is to take stock of project achievements in the field of sustainable land, crop and water management measured against the project objectives. The main stakeholders will discuss both the principle benefits and also drawbacks of the tested new technologies. The results and conclusions of this project analysis will provide the basis for the preparation and drafting of an outline programme (i.e. main features) of follow-up interventions designed to be submitted to interested donors.

In all, in spite of delayed equipment delivery, the project team led by National Project Managers in each country under technical backstopping from ICARDA-CAC office was able to accomplish major outputs planed in the Project Document, and made good start for more successful implementation of the workplan in 2012, the second year of the Project.

PREFACE

The Government of Turkey, represented by the Ministry of Agriculture and Rural Affairs (MARA) and FAO concluded, in mid-2006, an Agreement whereby setting up an FAO/Turkey Partnership Programme (FTPP) with an annual trust fund contribution of USD 2 million by the Government of Turkey over an initial period of five years (2007–2011) at the benefit of the countries assisted by the FAO Sub regional Office for Central Asia (FAO/SEC).

The primary objectives of the FTPP, as described in the Partnership Framework Agreement (PFA) reported is to provide a substantive, financial and operational framework for active cooperation in the areas of food security and rural poverty reduction in the above beneficiary countries. The FTPP is demand-driven, as much as it responds to the priority problems identified by national and/or sub regional stakeholders and is expressed in the form of official requests. National ownership of all FTPP programmes and projects approved and implemented in each beneficiary country will be ensured by concerned governments driving the process of integration of the FTPP support within national development strategies and programmes.

In this respect, each beneficiary country will appoint a FTPP Focal Point at senior level, liaising and coordinating communications between the government and FAO. In addition, for each project, the concerned national or sub regional partner institution will appoint, on behalf of the government, a National Project Coordinator (NPC) as direct counterpart responsible for its implementation. The partner institution and the NPC will ensure appropriate follow.

The project “Conservation Agriculture in Irrigated Areas of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan” is funded by the FAO/Turkey Partnership Programme (FTPP) established over an initial period of five years (2007 – 2011) at the benefit of the countries assisted by the FAO Sub regional Office for Central Asia (FAO/SEC).

The initial outline of this project was submitted by FAO for consideration by the Steering Committee of the FTPP and was approved with an estimated budget of USD 600 000.

As a result, the present Project Document has been prepared in light of the above outline and, after signature of the relevant Arrangement by the Ministry of Agriculture and Rural Affairs (MARA) of Turkey and FAO. The project became operational when Kazakhstan and Uzbekistan are signed the project document.

ICARDA is providing technical backstopping to the project on conservation agriculture as per a Letter of Agreement between FAO and ICARDA. The inception report was prepared according to this LoA.

1. INTRODUCTION

Conservation Agriculture (CA) is defined as a concept for resource-saving agricultural crop production that strives to achieve acceptable profits, high and sustained production levels while concurrently conserving the environment. Conservation agriculture is based on enhancing natural biological processes both above and below the ground. Interventions such as mechanical soil tillage are reduced to an absolute minimum, and the use of external inputs such as agrochemicals, nutrients of mineral or organic origin are applied at an optimum level and in a way and quantity that does not interfere with or disrupt the biological processes.
Conservation agriculture rests on three major principles: minimal disturbance of the soil, the health and productivity of which is at the basis of every farming operation; permanent soil cover with plant residues or living crops in order to reduce water loss, erosion, and protect the soil from harsh climate extremes; and the diversity of crops in time (rotations) and space.
Crop rotation is an integral part of the crop production system. The greatest benefit to a good crop rotation is increased yields. A well-planned crop rotation will help in insect and disease control and will aid in maintaining or improving soil structure and organic matter levels. Using a variety of crops can reduce weed pressures, spread the workload, protect against soil erosion and reduce risk. Legume crops in the rotation have become more valuable with the increased cost of nitrogen. Research and experience have proved that a good crop rotation will provide more consistent yields, build soil structure and increase profit potential.

2. IMPACT AND OVERALL OUTPUTS

2.1. Impact

The expected long-term impact of the project is focused on the improved rural livelihoods and food security through increased productivity of irrigated farming systems in four Central Asian countries - Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan - using the principles and practices of CA to achieve sustainable land and water management.

2.2 Outcome and outputs

The project expected Outcome is as follows:
Outcome 1: Current cropping systems adjusted toward conservation agricultural practices promoting production intensification within irrigated farming systems. In this respect, alternative cereal crops, food and forage legumes suitable for irrigated cotton-wheat farming systems in Central Asia will have been identified and integrated so as to encourage cropping systems diversification and new CA technologies will have been disseminated.
To obtain the above Outcome a number of Outputs and Activities are expected to be implemented.
Output 1.1 Improved crop production and management within demonstration sites through accelerated adoption of conservation agricultural practices
Output 1.2 Raised-bed planter and land levelling technology adjusted and applied and lower and more efficient water utilization for the crop rotations introduced, as compared with traditional cropping systems;
Output 1.3 Crop rotations diversified with crops suitable for CA

Output 1.4 Confidence of farmers, extensionists and other stakeholders on practicing principles of CA increased
Output 1.5 Farmer-oriented brochures and guidelines on applying CA practices in irrigated and rainfed areas in the selected countries produced and printed.
Output 1.6 Capacity building activities in the area of CA designed and carried out at the benefit of farm households and national partners.

3. INCEPTION WORKSHOP AND NATIONAL SEMINARS

3.1. Inception workshop

A two day Inception Workshop was held from January 31 - 1 February, 2011 in Tashkent under the FAO/Turkey Partnership Programme (FTPP), in which ICARDA Regional Office in Tashkent is providing technical backstopping. The Inception Workshop was held at the premises of the La Grande Plaza hotel located Tashkent (Please see Annexes 1.1 and 1.2).
The following objectives were set: a) Discuss the detailed national and regional work plans of the project; b) Obtain valuable inputs and suggestions from the distinguished participants regarding for the conservation agriculture in the project countries; and c) Proposals and options for the none expendable equipment. In the Inception Workshop experts from FAO, ICARDA, JIRCAS, ZEF-project, Vice rectors of Agricultural Universities of Uzbekistan and National project coordinators and consultants from Azerbaijan, Kazakhstan and Uzbekistan participated. A total number of 40 participants from 3 countries of Central Asia and including Azerbaijan participated to the workshop (please see Annex 1.3).
The opening session was chaired by Prof. Shermat Nurmatov, Deputy Minister, Ministry of Agriculture and Water Resources of the Republic of Uzbekistan. Prof. Nurmatov, Dr. Friedrich Senior Officer, Plant Production and Protection Division, FAO, Rome, Italy and Dr. Turok, Head PFU and ICARDA-CAC Regional Coordinator, made welcome speeches in the opening session about importance of conservation agriculture Central Asian Countries and Azerbaijan; the project comes at a timely moment, as farmers in Central Asia are now becoming increasingly aware of conservation agriculture as a new, promising technology; and this project will help introducing the concept of conservation agriculture practices in the region.
Then key note speakers and resource persons made presentations during the second session of the Inception Workshop. The first presentation was delivered by Dr. Theodor Friedrich, Senior Officer, Plant Production and Protection Division, FAO, “Status, challenges and perspectives of conservation agriculture in Central Asian countries”. This was followed by the presentations on the topics – “ICARDA’s research strategy on sustainable intensification in the dry areas” by Dr. Rachid Serraj, Program Director, ICARDA, “Conservation Agriculture in Wheat-based systems in CWANA” by Ravi Gopal Singh, Agronomist (ICARDA), “ICARDA’s approach to implementing Conservation Agriculture in Central Asia” by Dr. Jozef Turok, Regional Coordinator ICARDA-CAC, and “No-till wheat yield as related to soil moisture content and manure application at different rates” by Dr. Aziz Nurbekov, Project Regional Coordinator (ICARDA-CAC). Three national project coordinators from Azerbaijan, Kazakhstan and Uzbekistan were made country presentations included suggested project sites. Dr. Hafiz Muminjanov, Plant Production and Protection Officer, FAO/SEC, Ankara, Turkey, made an introductory presentation to the project on the

topic “Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan”.
Dr. Aziz Nurbekov, made presentation on the proposed project work plan which was done according to the project document and to the presentations of national project coordinators. The floor was then opened for obtaining inputs and suggestions on the proposed work plan. Then the project work plan has been examined including issues relevant to improving crop production and management through conservation agriculture, cropping system diversification, economic analysis and capacity development. A majority of the participants representing various countries and agencies provided their valuable inputs in relation to the project regional and national work plan. The participants provided critical and valuable inputs for the national work plan of the project. It should be also mentioned here that the participants realized the need of the conservation agriculture practices in the region. This was well reflected during the discussion sessions after each presentation. The workshop accomplished the objectives as planned. The workshop was participated by diverse group of specialists from the region. The interaction during the discussion sessions was very lively. The participants appreciated FAO and ICARDA efforts in conservation agriculture in Central Asia and Azerbaijan.
Dr. Theodor Friedrich, Senior Officer, Plant Production and Protection Division, FAO, chaired the closing session. The course was closed by Dr. Zakir Khalikulov, Deputy Regional Coordinator, ICARDA-CAC, Dr. Hafiz Muminjanov, Plant Production and Protection officer, Sub-regional Coordinator for Central Asia, FAO, and Prof. Laziza Gafurova, Vice Rector, Tashkent State Agrarian University, Uzbekistan. They made closing remarks in the closing session and gave the vote of thanks to all the participants for coming to the inception workshop, for their active participation, for valuable inputs and suggestions.

3.2. National Seminars

During the inception workshop it was decided to conduct national seminars to identify project demonstration farms and complete detailed project work plan, crop rotation in each respective country. The national seminars were conducted successfully and summary of the national seminars is given in the paragraphs below.

Azerbaijan

A one day national seminar was conducted in Terter district on 27 February, 2011. Dr. Asad Musaev opened the national seminar with welcome speech. He dwelled on the agenda and objective of the seminar. Then project regional coordinator briefly introduced the project goals, objectives and expected outputs. Participants of the seminar showed great enthusiasms and interest in conservation agriculture practices in Ganja province. Detailed project workplan and crop rotation for each farm were developed and discussed. After the national seminar the pre-selected project farms were visited. The participants of the national seminar stated that they are glad to provide assistance to the project team and they showed their great willingness to participate in the project activities.

Kazakhstan

The national seminar was conducted according to recommendations of Regional Inception workshop held in Tashkent in the end of January and in the beginning of February. The national seminar was very productive in terms of discussions between national consultants of the project and participating farmers. The national seminar was opened by Prof. Dosymbek.

There were lively fruitful discussions, between stakeholders and project team, on benefits of the conservation agriculture in Kazakhstan and in the world. It should be mentioned here that conservation agriculture practices especially minimum tillage method occupied almost all spring wheat sowing areas of Northern Kazakhstan where the total area of minimum tillage technology accounted for more than 3 mln ha. Consultants stated that for the first time conservation agriculture practices will be tested in the irrigated areas of the South Kazakhstan province. All the farmers and project national consultants showed very high degree of enthusiasm about a need for conservation agriculture in the South Kazakhstan province. A clear work plan was agreed between all stakeholders and project national consultants.

Uzbekistan
National seminar was held in the premises of Kashkadarya Research Institute of Breeding and seed production of cereal crops. This National seminar brought together national consultants, different research institutes and private farms from the region. Dr. Zokhidjon Ziyadullaev has opened the national seminar with welcome address to the participants and chaired the opening session. The speaker briefly introduced the main objectives of the national seminar. He said that for the first time the Conservation Agriculture is practiced in the irrigated conditions of the Kashkadarya province. Dr. Zokhidjon Ziyadullaev said that the conservation agriculture is nowadays the need of the day and also of the farmers of Uzbekistan. During the national seminar invited researchers, project national consultants and farmers exchanged own experiences in the field of conservation agriculture practices, diversification of proposed crops in the project demonstration site, new farm machinery for zero tillage and other issues related to project implementation.

4. IMPLEMENTATION AND MANAGEMENT ARRANGEMENTS and WORK PLAN

4.1. Implementation and Management Arrangements

Recruitment of subject matter specialists on crop production, water management, farm mechanization and economics, in each country, is at the final stage. The national consultants required according to the crop season. The national consultant in crop management will work as national project manager (NPM).

Each concerned country already appointed a National Project Coordinator (NPC) to be located on-site and to provide full-time orientation, coordination and supervision during project implementation.

Following the release of funds by FAO, an inception workshop was organized for the preparation of a detailed work plan for each participating country and at subregional level.

The project focuses on both resource-poor and better-off farmers. Demonstration and research activities is carried out in at least one selected benchmark site of 25 ha size per country. These sites were selected at the beginning of project operations and they represented the most significant ecological zones in each country.

4.2. Project Duration

The project is planned over a period of 24 months and will be based on past research activities of main partners in Azerbaijan, Kazakhstan, Uzbekistan and Turkmenistan. The legal duration of the project is planned for twenty four months, starting 1st of January 2011 and finishing 31st December 2012. The project duration can be extended up to three month to cover full two cropping season in order to have real two cropping seasons in the project sites. The current overall work plan is based on the assumption that the project will last for 24 months, excluding the inception phase (January – April 2011).

4.3 Work plan

For more details please see annex 4.

4. ANALYSIS OF THE PROJECT SITES, SELECTION CRITERIA AND PROJECT DEMONSTRATION SITES

4.1 Analysis of the project sites

Azerbaijan

The Republic of Azerbaijan has diverse agro-ecologic and climatic conditions. Traditionally, agriculture of Azerbaijan is based on high water consuming crops and water shortage is recorded during summer in many regions including Ter-Ter district where the project demonstration field is established. One of the main constraints for further increase of agricultural production is limited irrigation water. Therefore adoption of improved irrigation technologies through conservation agriculture has become very important in the country.

The irrigation and drainage infrastructure is deteriorating since the country's independence in 1991. Before independence, the normal period for overall maintenance of the canals used to be around three years but since then maintenance has been very erratic and insufficient. Irrigation water flows constantly into most canals up to the tertiary level for most of the irrigation season as insufficient flow control infrastructure is in place. This of course leads to high water losses through the scheme. Water is provided to farmers for free and they do not participate in the management of the irrigation scheme.

Kazakhstan

Traditionally, agriculture in South Kazakhstan (SK) is dominated by mid-size and small farms. Agricultural production is based on irrigated farming. Most of the farmland is privatized comprising mostly agricultural enterprises/individual farms, several agricultural co-operatives, joint-stock companies, limited partnerships and a few state-owned enterprises.

The crop production sector is dominated by cereal crops, mostly wheat, which accounts for 66% of the total crop output. Other important crops are fodder crops, potatoes and vegetables. Agriculture continues to be a major source of export with agricultural products constituting about 10% of total export revenue. Major agricultural exports include grain (50%), meat and wool. In 2000 the country exported 5.5 MT of wheat, mostly to Russia, down from 12 MT in 1991. Most domestic food supply is met from domestic production.

Water deficiency has remained one of the most important issues in the irrigated crop sector of South Kazakhstan province. The province with its shallow groundwater level and saline soils needs water-saving technologies and efficient irrigation systems for diversified cropping systems. Currently, grain crops such as winter wheat are grown continuously after wheat or winter barley which is a good crop rotation system. In most cases, wheat and barley are irrigated by wild flooding resulting in crop kill due to rise of highly mineralized ground water and soil crusting. Effective alternative approaches can be improved irrigation practices such as bed-planting technology. There were some on-farm research in the country has shown that bed planted crops have yielded better and consumed less irrigation water (about 40%) with lower seed rate, soil tillage and fuel expenses than flood irrigated crops. The soil is improved, especially on the top of the beds. Bed planting combined with reduced/zero tillage technologies looks promising to improve farming profitability, introduce better diversified rotations, reduce the turn-around period between harvesting and planting of the following crop to a minimum with a goal to produce two and more crops per year. The project will therefore also target crop diversification and conduct on-farm trials and demonstrations using alternative crops such as:
Cereals: spring and winter wheat, winter rye, millet, barley, oat, maize, sorghum
Leguminous: Mungbean, kidney bean, field pea.

Uzbekistan
After achieving independence, Uzbekistan laid major emphasis on agricultural growth and efforts towards developing its own market economy. During this transition, large inefficient shirkat farms have been disintegrated and a number of small private farms have been established. Therefore, high input use technologies will not be suitable for these small farms. It is right time to look for an appropriate and realistic strategy by which the cropping intensity could be enhanced and diversification in agriculture could be achieved. For development of this new type of farms, there are constraints associated with limited potential and abilities in cropping, tillage methods, soil fertility improvement and on-farm water management. There is an urgent need to pilot changes in agricultural practices in the region in order to improve agricultural production in the irrigated areas of Uzbekistan.
Kashkadarya is located in southeast of the country, in the Kashkadarya River Basin and on the western edges of the Pamir-Alai Mountain Range. Main agricultural crops are cotton, winter wheat, vegetables and cocoon production. The agricultural input of the province makes slightly more than 10 percent of the Uzbekistan's total agricultural production. Livestock farming and sheep keeping are well developed in the mountainous areas.

5.2. Selection criteria and selection of project sites

The selection criteria were developed by project regional coordinator and national consultants of the project in each country taking into account local conditions in agriculture of the participating countries in the project during the national seminars which were held February through March 2011 (annexes 1, 2 and 3). During the national seminar the project was briefly introduced to the local stakeholders and followed by partly controversial but overall constructive discussions on project sites, selection criteria, crop rotations and equipments to be purchased. Project regional coordinator and the project team and local counterparts agreed on project farms for each country. Time frame, work plan and detailed crop rotation system were prepared in the presence of selected farmers.

Azerbaijan
Ibragimov Ahmad, Jumshudov Ehtibar and Babaev Mehmon were selected as project farms in Azerbaijan. A total area of about 24 ha, distributed over 3 farms were selected for the demonstration of permanent beds, diversified crop rotations and improved field irrigation (please see annex 2). Of the 3 selected project farmers one has an own tractor, the second owns some equipment, and a third one is renting a tractor.

Kazakhstan
Several individual farms were visited and then three individual farms (owned by Yusufjonov Gafurjon, Sattarkhonov Musakhon and Babakhodjaev Avazkhan) were selected according to selection criteria (please see annex 3) developed by project team taking into consideration local conditions in the South Kazakhstan province. All selected three farms are functioning under Production Cooperative Farm named after "Yassaviy".

Uzbekistan
Uzbekistan project team and project regional coordinator visited farms around Beshkent town which is not far from Karshi city to select project farms according to selection criteria (Please see annex 4). After partly controversial and lively discussions three farms were selected (namely "Ismatova Farangiz Azamatovna", "Kholov Sobir" and "Meyliev Sayli Yoldoshevich" (please see annex 3). Owner of a farm named after "Ismatova Farangiz Azamatovna" Ismatov Azamat showed a great enthusiasm and interest on conservation agriculture technologies.

5.3. Selected project demonstration sites

The site selection was jointly made by project team in each country and project regional coordinator. In each country demonstrations plots were established in order to test bed planting technologies on winter wheat cultivation and to plant different agricultural crops after winter wheat harvest. These demonstrations plots will be used to provide field and formal training courses and also field days for demonstration of conservation agriculture to the farmers and for training of farmers, extension specialists in crop management.

Azerbaijan
Ter-Ter site is located in Ter-ter district of Karabakh steppe in the southern subzone of the Ganja climatic region. Kura-Araks lowlands located between rivers Kura, Kar-Karchai and Minor Caucasus. Long term mean rainfall is ranged between 300-400 mm and is occurring mostly in November-December in winter and March-April in spring season. There is almost no rain from July through-out September. The climate is continental with an average annual temperature of 13.4^0C. Summer temperatures often surpass 35°C; winter temperatures average about -3°C in January. Climate is different within the district - mild and semi-desert climates are specific to different regions. A ground water table was 3-10 m deep and salinity of the ground water ranged from 1 to 10 g/l. Soil is greybrown, heavy loam with organic matter content from 2.69-3.09% in topsoil. The whole area is served by earth canals providing surface irrigation for the cultivated crops. The Project activities will be implemented in the three farms in the Ter-Ter and Barda district on Southern-Eastern part of the Azerbaijan. The effect of bed planting and no-till practices on productivity of cereals,

legumes and also integration of legumes and small cereals into cereal cropping systems will be studied in this site.

Kazakhstan

South-Kazakhstan territory is equal to 116 400 square kilometers (4, 4% of total Kazakhstan land size). Agricultural production in the province occupies 10 269 300 ha, of which 786 300 ha is under cultivation. 50% of the cultivated land is irrigated. The climate is continental, with hot temperatures and low air humidity in summer time and cold and quiet unstable winter with low snow fall. Average frost-free period lasts for about 225 days. Average daily temperature is 16.9 C. Annual precipitation level is around 500 mm. However, rainfall varies strongly over the year. Precipitation starts to fall at the end of September and early October. The highest precipitation falls in winter and spring seasons (78%) followed by autumn (18%) and summer (4%). All selected three farms are functioning under Production Cooperative Farm named after "Yassaviy". The production cooperative farm is located in the Sayram district, in the South Kazakhstan province, at 15 km from the city of Chimkent, the main population center and market of the region. The Project activities will be implemented in the three farms in the Sayram district on Southern-Kazakhstan province of Kazakhstan. The effect of bed planting and no-till practices and crop rotations on productivity of cereals, legumes will be studied in this site.

Uzbekistan

After achieving independence, Uzbekistan laid major emphasis on agricultural growth and efforts towards developing its own market economy. During this transition, large inefficient shirkat farms have been disintegrated and a number of small private farms have been established. Therefore, high input use technologies will not be suitable for these small farms. It is right time to look for an appropriate and realistic strategy by which the cropping intensity could be enhanced and diversification in agriculture could be achieved. For development of this new type of farms, there are constraints associated with limited potential and abilities in cropping, tillage methods, soil fertility improvement and on-farm water management. There is an urgent need to pilot changes in agricultural practices in the region in order to improve agricultural production in the irrigated areas of Uzbekistan.

Kashkadarya is located in southeast of the country, in the Kashkadarya River Basin and on the western edges of the Pamir-Alai Mountain Range.

There are three types of climate such as continental, partly subtropical and dry. The mountain ranges that have semi-rounded the province from northwest, east and south prevent the penetration of cold weather and create a convenient atmosphere for the condensation of the western humidity. Winters are warm and summers are hot and long. Average long term precipitation widely ranges among foothill, mountain and desert zones between 100 and 450 mm. The main river is the Kashkadarya River with its numerous streams coming from the mountains.

Main agricultural crops are cotton, winter wheat, vegetables and cocoon production. The agricultural input of the province makes slightly more than 10 percent of the Uzbekistan's total agricultural production. Livestock farming and sheep keeping are well developed in the mountainous areas.

The Project activities will be implemented in the three farms in the Kasbi and Karshi districts on Kashkadarya province of Uzbekistan. The effect of bed planting and no-till practices on

productivity of cereals, legumes and also integration of legumes and small cereals into cereal cropping systems will be studied in this site.

6. FIELD ACTIVITIES

6.1. Crop rotation

In the time of Soviet Union farms' area was planted to cotton in rotation with alfalfa in Azerbaijan and Uzbekistan while in South Kazakhstan, Kazakhstan wheat was rotated with vegetable crops. Cotton was occupying up to 80% of cropland in Ganja and Kashkadarya provinces of Azerbaijan and Uzbekistan respectively. The rest of cropland was dedicated to alfalfa and other forages. As cotton and wheat are main contracted crops by the Government of Uzbekistan, the farmers in this area switched to cotton monoculture relying on supply of inputs through Governmental channels. Nowadays in Ganja, winter wheat, barley and cotton occupies 80% of the total arable area. In order to attain food security, wheat became the most important crop in the region.
Crop rotation is an integral part of the crop production system. The greatest benefit to a good crop rotation is increased yields. A well-planned crop rotation will help in insect and disease control and will aid in maintaining or improving soil structure and organic matter levels. Using a variety of crops can reduce weed pressures, spread the workload, protect against soil erosion and reduce risk. Legume crops in the rotation have become more valuable with the increased cost of nitrogen. Research and experience have proved that a good crop rotation will provide more consistent yields, build soil structure and increase profit potential. Crop rotations for the selected farms were developed taking into account farmers' interest and also marketability of the selected agricultural crops of the project throughout the project countries (Please see annexes 6, 7 and 8).

6.2. Spring crops

Azerbaijan

Bed planted wheat
Wheat *(Triticum aestivum)* was planted on two different planting methods on beds and broadcasting (Please see annex 9.1). Bed width was 90 cm and three rows of winter wheat were planted. The winter wheat variety, Azamatli-95, was sown at a rate of 130 kg ha-1 while the same variety was planted by using broadcasting method at a seeding rate of 200 kg ha -1. Grain yield significantly affected by planting method. The maximum grain yield of 5.51 t ha-1 was recorded in Ehtibar Jumshudov's farm in bed planted wheat while the minimum grain yield (2.51 t ha-1) was recorded in Mehmon Babave's field on broadcasted method (Table 1). According to the results obtained from the first project year, bed planting method improves yields, save seed, save on an average of 36 % water.

Sugar beet
Sugar beet was planted on 1 April, 2011, on 4 ha of Ehtibar Jumshudov's farm at a seeding rate of 8 kg ha -1, by using two different planting methods such as bed planting and mega (or broadcasting) planting. During the vegetation period sugar beet was irrigated twice and

fertilized once. Field performance of the crop in two different planting methods was good. There are some differences on sugar beet plant standing but it is too early to conclude at this stage. Field observations are continuing for further (Please see annex 9.2).

Table 1. Wheat Yield Response to planting method				
Planting method	Wheat grain yields (t/ha)[1]		Saved water, %	
	Ehtibar Jumshudov	Mehmon Babaev	Ehtibar Jumshudov	Mehmon Babaev
Bed planted	5.37	4.53	36 %	36%
Broadcasted	3.52	3.25		

Chickpea

It was recommended by the project to plant Chickpea (*Pisum sativum*). The crop was planted on beds on Ehtibar Jumshudov's farm at the seeding rate 4 kg ha $^{-1}$ to demonstrate benefit of raised beds on chickpea cultivation in the irrigated conditions of Ganja province. During vegetation period of the crop two irrigation was given on the rate of 550 m^3 ha $^{-1}$. Yield of bed planted chickpea was 1.7 t ha $^{-1}$.

Kazakhatan

Wheat

This year was the first year of the Project and start up of the Project in South Kazakhstan coincided with very unusual weather conditions for plant growth and development because there was continuous drought during the vegetation period of agricultural crops. As farmers increasingly adopt resource conserving farming practices, there is a need for wheat that better adapts to the new agronomic practices. Wheat was planted under irrigated conditions on two farmer fields on beds. Wheat was planted with locally made bed planter at a seeding rate 140 kg ha -1 while in the broadcasting method the seeding rate was 200 kg ha -1. The best sowing rate with regard to grain yield across planting methods was bed planting. The benefits of planting wheat on beds in irrigated systems in terms of yield and water savings from various farms of project demonstration site are given in Table 2. Water savings, as indicated are significant and range from 28-30%, which is an extremely crucial issue in the conditions of South Kazakhstan.

Table 2. Wheat Yield Response to planting method				
Farm	Wheat yield, t ha -1		Extra yield, t ha -1	Saved water, %
	Bed planted	Broadcasted		
Sattarkhonov Musakhon	4.32	3.74	0.58	28 %
Yusufjonov Gafurjon	3.87	3.34	0.53	30%

[1] All wheat treatments were fertilized with 90 kg/ha of N and 60 kg/ha P.

Spring barley

For the first time in the irrigated conditions of South Kazakhstan province spring barley was planted on beds. There was obtained quite low yield (1.7 t ha $^{-1}$) of spring barley the main reason was unusual weather conditions in spring where temperature was high up to $+35^0$ C during tillering stage while during the grain filling period the temperature was even higher and was 40^0 C and also water shortage restricted the growth of spring barley (Please see annex 9.3).

Uzbekistan

Cotton

We used a 90 cm row width with furrow irrigation for cotton, which forms a raised bed between the furrows (Please see annex 9.4). Effect of different bentonite rates and microzum-2 on the productivity of cotton is testing in this experiment. Field performance of cotton is good. There are clear difference on plant growth and development.

Soy bean

The soy bean crop was planted on eight different treatments. Plant height and growth, and grain yield will be observed during the vegetation period. Field performance of the crop was good. It was suggested to irrigating the crop once more before mid July in order to get higher yield. The crop looked quite good with some weed problems which were being controlled by hand weeding.

Maize

Maize *(Zea mays)* was planted at different seeding rate and was planted at 70 cm row width with furrow irrigation, which also forms a 70 cm raised beds with locally available furrow openers. Maize crop growth and standing is a good condition. Field performance of the maize is a good condition. Further field observations are continuing.

6.3. Summer crops

Double cropping is good for farmers (more produce means more money) and good for the environment (producing more on a unit of land means less land will need to be devoted to farming). Double cropping has a great potential to increase agricultural production in the project countries. Many crops can be used as a double cropping after wheat harvest in the irrigated conditions of Central Asia and Azerbaijan. In this context maize, mungbean, pearl millet, kidney bean and sorghum are used as summer crop after wheat harvest in the project demonstration sites.

Azerbaijan

Maize *(Zea mays)* was planted after winter wheat by using no-till planter at the seeding rate 30 kg ha -1 in Ehtibar Jumshodov's farm. Field observations will be carried out during the vegetations period of the planted crop.

Pearl millet **[***Pennisetum glaucum* **(L.) R.Br.]** seeds brought from ICRISAT. For the first time pearl millet was sown at Ahmad Ibragimov's farm after winter wheat harvest in the irrigated conditions of Azerbaijan.

Field emergency of both was good (Please see table 3 and pictures at annex 9.5).

Kazakhstan

Considering double cropping in summer 2011 after harvest of winter wheat, maize was planted on 22 July, 2011, at a seeding rate 30 kg ha -1, the spacing of the major furrows was at 70 cm. Field emergency was good.

It is well known that the mungbean *{Vigna radiata (L.) Wilczek}* crop will begin to flower in 50 to 60 days after field emergency, and then continue flowering for a few weeks. The crop is usually ready to be harvested in early to mid October in the conditions of South Kazakhstan. Taking this into account early maturing variety of mungbean was planted at Gafurjon Yusufjonov's farm on 27 July, 2011.

Table 3 Area of summer crops in Azerbaijan 2011

	Name of crops	Planting date	Seed rate kg/ha	Fertilizer kg/ha (P)	Area ha
1	Maize	17/07/11	30	60	1
2	Pearl millet	26/07/11	8	-	3.0

Uzbekistan

At the Sobir farm, 2 ha of mungbean *{Vigna radiata (L.) Wilczek}* and maize *(Zea mays)* were broadcasted by hand which is common practice these days on small farms, on 21th of July at seeding rate 20 kg/ha and 40 kg/ha respectively while the other 2 ha of mungbean and maize were planted on beds at 12 kg ha -1 and 30 kg ha -1. Mungbean and maize were sown after winter wheat harvest. The field performance of the crops is a good condition. Please see picture at annex 9.6. Topsoil samples were taken from all project area fields for chemical analysis by national consultant.

7. CAPACITY BUILDING PROGRAMME

7.1. Capacity Building

All on-farm field days carried out within the selected project farms during the project implementation period. Taking this into account first field day was organized on May 21st in Azerbaijan and second field day was organized on June 16 in Kazakhstan, the third field day was conducted on August 24, 2011 in Uzbekistan. ADB project's consultants involved to participate in this field to give a lecture for participants.

Throughout the project duration the local Conservation Agriculture consultants will accompany the pilot farmers in a joint learning process and develop and adopt the Conservation Agriculture technologies together with the farmers. There will regular on-farm training sessions and field demonstrations to which farmers, extension staff and MoA staff will be invited. Neighboring farming communities will be encouraged to participate in observing the field tests so as to initiate a farmers-to-farmer extension and exchange.

7.2. Field days

Azerbaijan

A field day was organized at the farm of Ehtibar Jumshudov, a project farmer, Zumirjan village, Terter district, Ganja region, Azerbaijan, on 21 May, 2011. There were 33 participants including 17 farmers, 4 National Consultants, 2 agricultural consulting center staff, 1 seed specialist, 1 journalist and 8 scientists at the meeting (Please see annex 10). Winter wheat production technology, the main focus of the training programme, was explained to the participants by the experts of the project. During the discussions, it was highlighted that conservation agriculture is the need of the time in view of the declining water availability, labour shortages, emerging water erosion issues, increasing fuel and fertilizer prices, etc. For the benefit of the farmers, the results of the farmer participatory field trials on winter wheat planting on beds from previous projects in Azerbaijan were shared and discussed. It was quite interactive topic wherein each and every component technologies of conservation agriculture were discussed in length by the participants. National TV covered the Field Day and interviewed Aziz Nurbekov, Project Regional Coordinator and Imran Jumshudov, Agronomist, Azerbaijan Research Institute of Crop Husbandry. Main conclusion of the field is that farmers are keen to adopt bed planting technology because it reduces water consumption, production costs and increases yield.

Kazakhstan

The field day was organized on 16 June 2011, with the help of South-Western Research Institute of Livestock and Plant Industry under the FAO/GCP project on Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan. Altogether 35 participants (mostly farmers), including staff of Sayram district administration, mass-media and scientists of the research institute mentioned above have attended the event (Please see annex 11). The conservation agriculture field day highlighted bed planting technologies for agricultural crops to be widely distributed in the South-Kazakhstan Province. The field day included presentations by the project regional coordinator, as well as national consultants on bed planted winter wheat and spring barley, water saving technologies and socio-economic issues of the conservation agriculture. During the discussions the project regional coordinator informed about activities of ICARDA-CAC in the region with main emphasis on conservation agriculture issues while the national consultants answered participants' questions about conservation agriculture. The participants of the field day visited winter wheat and spring barley fields and discussed the current situation of wheat plant. According to the observation from field experiments conducted on the project's demonstration site, water shortage restricted the growth of winter wheat resulting in lower field performance of the crop. According to discussion of participants winter wheat was found more suitable crop to grow on beds. The participants of the field day were very happy to interact with the project national consultants during the field day. During the field day it was noted that conservation agriculture is a feasible for implementation in the irrigated areas of South Kazakhstan province.

Uzbekistan

A field day was conducted on August 24, 2011, in Kasbi district, under FAO GCP project on conservation agriculture. The field day focused on improving current conservation

agricultural practices in the project demonstration pilot site. The objective was to ensure that the farmer receives first hand information, from the national consultants, and participates actively. This field day brought together key public and private leaders and national consultants from Ministry of Agriculture and Water Management, Agricultural Department of Kashkadarya Province, different organizations and associations and Kashkadarya Research Institute of Plant Breeding and Seed Production of Cereal Crops and to share these ideas with participants. 40 participants attended the field day, and attendees included: key officials from Kasbi, Koson and Karshi districts; Researchers from different research institutes; National Project Consultants; project farm leaders and farmers; and ICARDA-CAC representative (Please see annex 12.1., 12.2 and 12.3 and picture 12.4.1).

The field day was opened by Dr. Zokhidjon Ziyadullaev, National Project Manager for Uzbekistan and Director General of Kashkadarya Research Institute of Breeding and Seed Production of Cereal Crops, with a welcome address to the participants. He informed participants that recently His Excellency President of the Republic of Uzbekistan visited the above mentioned Research Institute, and during the visit His Excellency recommended several options to the researchers on how to improve crop productivity by using innovative techniques on plant breeding, seed production and crop management. One of them is to develop resource saving technologies on wheat cultivation in the irrigated conditions of Uzbekistan. In this particular case, the project on conservation agriculture came to Kashkadarya in a right time, and it is incorporating with options mentioned above. He also said that leading specialists of the research institute are actively involved to the implementation of the project.

During the field day National Project Manager, National consultants and researchers delivered speeches on resource saving technologies in the irrigated areas. Most of them devoted to bed planting and double cropping after winter wheat harvest. There was an interactive lively sections during the field day where invited researchers, National Project Consultants and farmers exchanged their own experiences in the field of bed planting technologies, crop rotation in the project demonstration site and some other related issues on conservation agriculture (Please see annex 12.4).

CONCLUSIONS

- A two day Inception Workshop was held from January 31 - 1 February, 2011 in Tashkent under the FAO/Turkey Partnership Programme (FTPP) in which detailed national and regional work plans of the project and proposals and options for the none expendable equipment were discussed.
- The national seminars were conducted successfully in all project countries. Time frame, work plan and detailed crop rotation system were prepared in the presence of selected farmers.
- The selection criteria were developed by project regional coordinator and national consultants of the project in each country taking into account local conditions in agriculture of the participating countries in the project during the national seminars which were held February through March 2011.
- Project regional coordinator and the project team and local counterparts agreed on project farms for each country.

- The site selection was jointly made by project team in each country and project regional coordinator. In each country demonstrations plots were established in order to test bed planting technologies on winter wheat cultivation and to plant different agricultural crops after winter wheat harvest.
- Crop rotations for the selected farms were developed taking into account farmers' interest and also marketability of the selected agricultural crops of the project throughout the project countries.
- Wheat was planted on two different planting methods on beds and broadcasting in Azerbaijan and Kazakhstan. According to the initial results obtained from the first project year, bed planting method increases yields, save seed, save up to 36 % water.
- For the first time in the irrigated conditions of South Kazakhstan province of Kazakhstan spring barley was planted on beds.
- Cotton, Soy bean and Maize were planted as main crop in spring in Uzbekistan and field performance of the crops is good conditions. Further field observations are continuing.
- Many crops can be used as a double cropping or summer crops after wheat harvest in the irrigated conditions of Central Asia and Azerbaijan. Maize, mungbean, pearl millet, kidney bean and sorghum are used as summer crop after wheat harvest in the project demonstration sites.
- All on-farm field days will be carried out within the selected project farms during the project implementation period. The first field day was organized on May 21 in Azerbaijan and second field day was organized on June 16 in Kazakhstan. Local TVs covered the Field Days and interviewed Leading National Consultants.
- Another field day was conducted on August 24, 2011, in Kasbi district, under FAO GCP project on conservation agriculture. The field day focused on improving current conservation agricultural practices in the project demonstration pilot site.
- In all, in spite of delayed equipment delivery, the project team led by National Project Managers in each country under technical backstopping from ICARDA-CAC office was able to accomplish major outputs planed in the Project Document, and made good start for more successful implementation of the workplan in 2012, the second year of the Project.
- During the field visits and field works on project sites all works were done together with farmers and in general they are happy that they were selected. Some neighbour farmers while attending workshops and field days expressed their willingness to join the Project if possible.

LESSONS AND SUGGESTIONS

- The GCP has been implemented with difficulties associated with some natural constraints because of very difficult financial situation in farm sector. However, implementation of the project could have been more successful and there are several issues which might be improved for more successful work during second year.

- Most of equipment will be in place in September and this will give opportunity to do work without delays. However it is necessary to improve tender procedure of delivering equipments in time for implementation of Project activities. During the previous period the procedure was quite long lasting. As a result of this some important field works were done with considerable delay, which in agriculture may lead to complete failure.

Annex 1. Inception Workshop

Annex 1.1. Minutes

Minutes of
Inception Workshop for the Project on Conservation Agriculture in Irrigated Areas of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan, January 31 – 1 February, Tashkent, Uzbekistan.

Background
The project "Conservation Agriculture in Irrigated Areas of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan" is funded by the FAO/Turkey Partnership Programme (FTPP) established over an initial period of five years (2007 – 2011) at the benefit of the countries assisted by the FAO Sub regional Office for Central Asia (FAO/SEC). The expected long-term impact of the project is the improved rural livelihoods and food security through increased productivity of irrigated farming systems in three Central Asian countries - Kazakhstan, Turkmenistan and Uzbekistan and Azerbaijan - using the principles and practices of conservation agriculture (CA) to achieve sustainable land and water management. At the end of the project, it is expected that improved water and soil conservation techniques and measures will have been sufficiently validated by a core group of farmers and an expanded program will have been prepared for farmers of other districts.

Date
A two day Inception Workshop was held from January 31 - 1 February, 2011 in Tashkent under the FAO/Turkey Partnership Programme (FTPP), in which ICARDA Regional Office in Tashkent is providing technical backstopping. The Inception Workshop was held at the premises of the La Grande Plaza hotel located Tashkent.

Participants
In the Inception Workshop experts from FAO, ICARDA, JIRCAS, ZEF-project, Vice rectors of Agricultural Universities of Uzbekistan and National project coordinators and consultants from Azerbaijan, Kazakhstan and Uzbekistan participated. A total number of 40 participants from 3 countries of Central Asia and including Azerbaijan participated to the workshop. The participating institutions are the Ministries of Agriculture and the institutions under the Ministries of the all countries. The participants were nominated by Ministries of Agriculture of the respective countries in the project with high academic qualifications including PhD degree in agricultural sciences especially in crop production, mechanization, water management and economics subjects.

Objectives
The following objectives were set:
a) Discuss the detailed national and regional work plans of the project
b) Obtain valuable inputs and suggestions from the distinguished participants regarding for the conservation agriculture in the project countries
c) Proposals and options for the none expendable equipment.

Opening session

The opening session was chaired by Prof. Shermat Nurmatov, Deputy Minister, Ministry of Agriculture and Water Resources of the Republic of Uzbekistan. Prof. Nurmatov, Dr. Friedrich Senior Officer, Plant Production and Protection Division, FAO, Rome, Italy and Dr. Turok, Head PFU and ICARDA-CAC Regional Coordinator, made welcome speeches in the opening session about importance of conservation agriculture Central Asian Countries and Azerbaijan; the project comes at a timely moment, as farmers in Central Asia are now becoming increasingly aware of conservation agriculture as a new, promising technology; and this project will help introducing the concept of conservation agriculture practices in the region.

Presentations

Various resource persons made presentations during the second session of the Inception Workshop. The first presentation was delivered by Dr. Theodore Friedrich, Senior Officer, Plant Production and Protection Division, FAO, "Status, challenges and perspectives of conservation agriculture in Central Asian countries". This was followed by the presentations on the topics – "ICARDA's research strategy on sustainable intensification in the dry areas" by Dr. Rachid Serraj, Program Director, ICARDA, "Conservation Agriculture in Wheat-based systems in CWANA" by Ravi Gopal Singh, Agronomist (ICARDA), "ICARDA's approach to implementing Conservation Agriculture in Central Asia" by Dr. Jozef Turok, Regional Coordinator ICARDA-CAC, and "No-till wheat yield as related to soil moisture content and manure application at different rates" by Dr. Aziz Nurbekov, Project Regional Coordinator (ICARDA-CAC). Three national project coordinators from Azerbaijan, Kazakhstan and Uzbekistan were made country presentations included suggested project sites. Dr. Hafiz Muminjanov, Plant Production and Protection Officer, FAO/SEC, Ankara, Turkey, made an introductory presentation to the project on the topic "Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan".

Dr. Aziz Nurbekov, made presentation on the proposed project work plan which was done according to the project document and to the presentations of national project coordinators.

The floor was then opened for obtaining inputs and suggestions on the proposed work plan. Then the project work plan has been examined including issues relevant to improving crop production and management through conservation agriculture, cropping system diversification, economic analysis and capacity development.

Dr. Aziz Nurbekov made a presentation of tentative national and regional work plans. As the first component he mentioned improvement of crop production and management through conservation agriculture. In this component the following were proposed: permanent raised-bed planting system (laser leveling is a part of the system); design the beds to fit all crops in rotation; diversified close rotation; use crops establishment technologies with minimum soil disturbance and maintenance of mulch cover on the beds including weed management without soil engagement; make sure the traffic restricted to furrows.

As the second component he mentioned cropping system diversification. On the base of discussions the following crop rotations in respective countries were agreed to use:

As for Azerbaijan:

- Alfalfa – Cotton – Wheat – Maize
- Cotton – Field pea – Soybean – Wheat – Mung bean – Rye
- Wheat – Corn – Field pea – Cotton

As for Kazakhstan:

- Spring Barley – Millet – Winter wheat – Mung bean – Rape
- Wheat – Corn – Rape – Spring wheat – mung bean
- Alfalfa – wheat – vetch – maize

As for Uzbekistan:

- Cotton – Winter wheat – faba bean – Rape
- Soy bean – winter wheat – corn – field pea – Cotton - Rye
- Chickpea – maize – rape – cotton

An important component of the project is to estimate the financial benefits of the new technologies at the farmer-level. A comparison of input costs under conservation agriculture and traditional technologies will be undertaken in the selected project demonstration sites

- Farm surveys to determine the cost and profit of conventional operations
- Monitor all input cost (including machine cost/time) and labor as well as yields and income from the demonstrations pilots
- Compare budgets and profits between different soil treatments & rotations.

Dr. Nurbekov pointed out the capacity development:

- Strengthening the capability and skills of farmers and local experts in developing new technologies proposed by the project.
- Farmers themselves will evaluate the interest and practicability of new technologies on their farms jointly with local research experts.
- The direct involvement of agricultural scientists in the evaluation and adaptation of the new technologies at farm-level will be promoted.
- Involve students of the Universities to carry out their research in the project demonstration sites. (*This point was suggested by Dr. Laziza Gofurova, Vice Rector of Tashkent State Agrarian University)*.
- All the field days, field and formal trainings should involve all stakeholders be organized together with farmers organizations and involve mass media (*This point was suggested by Dr. Ram Sharma, Breeder, ICARDA-CAC).*

During the discussion of cropping system diversification, **Dr. Friedrich** informed all participants that final crop rotation should be designed also with farmers in respective countries. He also mentioned that it is very important to keep certain agronomic principles in designing crop rotations. Because there is only limited flexibility, such as rotating between legumes and non-legumes crops, not having too many crops of the same species followed up.
Due to the fact that the duration of the project is 2 years, **Dr. Rachid Serraj**, Director DSIPS, ICARDA advised to avoid introducing to many rotations, because the focus is on conservation agriculture, which only works with the farmers. The farmers should be introduced with some technologies in order to compare with what they have been doing before and at the end they can make some conclusion to see whether or not this is improvement.

Dr Zakir Khaliluov, suggested to include Bersim crop (*Trifolium alexandrinum*) into crop rotation instead of alfalfa.
Dr. Dosimbek Siddiq, I should say that alfalfa is my favourite forage crop so that why I suggest including alfalfa into proposed crop rotation system in the project demonstration site.
Dr. Nurbekov asked national partners to propose their crop rotations.
Dr. Fawzi Taher advised to start with the main crop and then to follow up with others.

After the offered proposals and discussions the following crop rotation in respective countries were confirmed:

As for Azerbaijan (suggested crop rotation by Dr. Asad Musaev):
- Wheat – Alfalfa – Cotton - vetch
- Cotton – Field pea – Maize – Wheat – Mung bean – Rye
- Wheat – Corn – Field pea – Cotton

As for Kazakhstan (according to discussions with Prof. Dosimbek Siddiq):
- Spring Barley – Millet – Winter wheat – Mung bean – Rape
- Wheat – Corn – Field pea – Spring wheat – vegetables
- Alfalfa – wheat – vetch – maize

As for Uzbekistan (according to discussions with Dr. Zokhidjon Ziyadullaev):
- Cotton – Winter wheat – Bersim – Rape
- Soy bean – winter wheat – corn – field pea – Cotton - Rye
- Chickpea – maize – rape – cotton

And also clear time frame for the proposed work plan were discussed and approved by the participants. Based on the detailed description of demonstration sites and crop rotation will be completed during national seminars of the project and reports will be produced in March end when they will be shared with FAO experts for discussion before finalization.
Furthermore, the participants have been analyzed specifications and cost of the equipments to be procured and have made final list of equipments.

Dr. Ravi Gopal Singh, Agronomist, ICARDA, noticed that farmers, in Central Asia, are using wide tires for establishing crops in bed planting. So it is better to use narrow tires while planting any crop in the conservation agriculture.
Dr. Zakir Khalikulov asked whether some equipment will be purchased within frame of the project in order to improve the mechanization.
Dr. Hafiz Muminjanov, Crop Production Officer, FAO/SEC, offered after the inception workshop to hold national seminars in each country and invite farmers in order to understand whether they would like to try new developments and whether the new scheme of crop rotation is acceptable for them.
Dr. Friedrich reminded to all participants that this project is not a research project to invent new things. The project should find ways to overcome hurdles to spread CA into irrigated areas in a wide way.
Dr. Friedrich noticed that CA is a permanent no disturbance of the soil: no tilling, no plowing and no disking. It needs to be taken in to account while designing the crop rotation.

A majority of the participants representing various countries and agencies provided their valuable inputs in relation to the project regional and national work plan.

Closing session
Dr. Theodore Friedrich, Senior Officer, Plant Production and Protection Division, FAO, chaired the closing session. The course was closed by Dr. Zakir Khalikulov, Deputy Regional Coordinator, ICARDA-CAC, Dr. Hafiz Muminjanov, Plant Production and Protection officer, Sub-regional Coordinator for Central Asia, FAO, and Prof. Laziza Gafurova, Vice

Rector, Tashkent State Agrarian University, Uzbekistan. They made closing remarks in the closing session and gave the vote of thanks to all the participants for coming to the inception workshop, for their active participation, for valuable inputs and suggestions.

Outcomes
The workshop was successful in the sense that regional and national work plan of the project successfully introduced and examined during the discussions. The participants provided critical and valuable inputs for the national work plan of the project. It should be also mentioned here that the participants realized the need of the conservation agriculture practices in the region. This was well reflected during the discussion sessions after each presentation. The workshop accomplished the objectives as planned.

Observations
The workshop was participated by diverse group of specialists from the region. The interaction during the discussion sessions was very lively. The participants appreciated FAO and ICARDA efforts in conservation agriculture in Central Asia and Azerbaijan. The conducive atmosphere of the inception workshop helped participants to take active part. However, absence of participants particularly the Members of Farmers' Association from the respective countries was greatly felt during the workshop.

Annex 1.2. Inception Workshop Program

Monday January 31

08:30 – 09:00	Registration

OPENING CEREMONY

Chairperson:	**Prof. Shermat Nurmatov, Deputy Minister, MAWR**
09:00	Welcome and opening address of MAWR of the Republic of Uzbekistan - Prof. Shermat Nurmatov, Deputy Minister, MAWR
09:10	Welcome by ICARDA - Dr. Jozef Turok, Regional Coordinator of ICARDA-CAC, Head of PFU
09:20	Welcome by FAO - Dr. Theodor Friedrich, Senior Officer, Crop Production Systems Intensification, FAO Plant Production and Protection Division (AGP)

Presentations

Chairperson:	**Dr. Jozef Turok, Regional coordinator ICARDA-CAC**
09:30 – 10:00	Status, challenges and perspectives of conservation agriculture in Central Asian countries - Dr. Theodor Friedrich, Senior Officer, FAO AGP

10:00 – 10:15	ICARDA's research strategy on sustainable intensification in the dry areas – Dr Rachid Serraj, Director DSIPS Program, ICARDA
10:15 – 10:45	Conservation Agriculture in Wheat-based systems in CWANA - Dr Ravi Gopal Singh, ICARDA
10:45 – 11:15	**Coffee break and Group Photo**
Chairperson:	**Dr. Theodor Friedrich, FAO**
11:15 – 11:30	ICARDA's approach to implementing Conservation Agriculture in Central Asia – Dr. Jozef Turok, Regional coordinator ICARDA-CAC
11:30 – 12:00	No-till wheat yield as related to soil moisture content and manure application at different rates – Dr. Aziz Nurbekov, ICARDA-CAC
12:00 – 12:30	Discussions
12:30 – 13:30	**Lunch break**
Chairperson:	**Dr. Fawzi Taher, FAO/SEC**
13:30 – 14:00	Country presentation – National Project Coordinator, Azerbaijan
14:00 – 14:30	Country presentation – National Project Coordinator, Kazakhstan
14:30 – 15:00	Country presentation – National Project Coordinator, Uzbekistan
15:00 – 15:30	Discussions
15:30 – 16:00	**Coffee break**
Chairperson:	**Dr Rachid Serraj, ICARDA**
16:00 – 16:30	Conservation agriculture for irrigated areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan - GCP/RER/030/TUR Dr. Hafiz Muminjanov, FAO/SEC
16:30 – 17:30	Discussions
19:00	Official Dinner

Tuesday, February 1

Chairperson:	**Dr. Hafiz Muminjanov, FAO/SEC**

09:00 – 09:30 Presentation of project work plan – Dr. Aziz Nurbekov, Regional Project Coordinator

09:30 – 10:00 Discussion and agreement on the work plan

10:00 – 10:30 Coffee break

10:30-12:30 Discussion and agreement on the work plan

12:30 – 13:30 Lunch

Chairperson: Dr. Theodor Friedrich, FAO

13:30 – 15:30 Proposals and options for the none expendable equipment

CLOSING SESSIONS

Chairperson: Prof. Shermat Nurmatov, Deputy Minister, MAWR

15:30 – 16:00 FAO Remarks - Dr. Theodor Friedrich & Dr.Hafiz Muminjanov

ICARDA Special Statement

Closing remarks by the MAWR of the Republic of Uzbekistan

Annex 1.3 List of Participants of the Inception Workshop

	Name/Surname	Position	Organization	Tel/Fax/Email
Ministries in Uzbekistan				
1	Prof. Shermat Nurmatov	Deputy Minister	MAWR	
2	Dr.Bakhtioyr Kamilov	Department of Coordination and Planing of Research	USPCA	
3	Mr. Rustam Ibragimov	Head Foreign Department	MAWR	
4	Mr. Nodir Abdullaev	Head UN Department	MoFA	
ICARDA				
5	Dr.Zakir Khalikulov	Deputy Head, PFU and Regional Coordinator, ICARDA-CAC	ICARDA-CAC	Tel: +998 71 1372130/1372169 Fax: +9871 1207125 E-mail: Z.Khalikulov@cgiar.org
6	Dr. Aziz Nurbekov	Project Regional Coordinator	ICARDA-CAC	Tel: +998 71 1372130/1372169 Fax: +9871 1207125 E-mail: A.Nurbekov@cgiar.org
7	Dr. Rachid Serraj	Director	DSIPS, ICARDA	E-mail: R.Serraj@cgiar.org

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20	Dr. Ajar Karabalaeva	Water management	Research Institute of Livestock and Plant Industry	E-mail: nii-tassai@rambler.ru
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Uzbekistan				

22	Dr. Ravshan Boyirov	Specialist	TIIM	
23	Dr. Yormamad Kholiyorov	Senior Officer	SAIME	
24	Dr. Abdumalik Namozov	Head department of Investment	MAWR	
25	Dr. Zokhidjon Ziyadullaev	Director General	Kashkadarya RIBSPCC	
Representatives of international organizations in Tashkent				
26	Mr. Alexey Volkov	National Coordinator	GEF Small Grants Programme	
27	Dr. Yukio OKUDA	Project Leader	JIRCAS Tashkent	
28	GTZ-project			
29	Prof. Nazir Ibragimov	Agronomist	ZEF-Project	
30	Dr. Oybek Egamberdiev	Agronomist	ZEF-Project	
Invited participants from Uzbekistan				
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Annex 2 Selection of project demonstration sites for the project, Azerbaijan

	Name of villages and farmers	Area, no less than 30 ha		Knowledge of farmers about conservation agriculture,	Interest of farmers, P/N	Machinery supply, yes/no	Irrigation infrastructure status, good/fair	Reasonable proximity to Tarter town and readily accessible by road		Access to market, Yes/no	Private ownership of the land, yes/no	Structure of sown area		Positive signs	Negative signs
		Area, ha	Yes/no	Yes/no				Distance, km	Reasonable, Yes/no			Rotation	Suitable, yes/no		
	Varda														
1	Ibragimov Ahmad	35	Yes	yes	Positive	no	good	2 km	yes	yes	yes	Cereal production	yes	8	1
2	Agalarov Vidodi	15	no	yes	Negative	no	good	10 km	yes	yes	yes	Cereal production	yes	6	3
3	Aliev Suzayot	5.5	no	no	Positive	no	good	12 km	yes	yes	yes	Cereal production	yes	6	3
	Ter-ter														
1	Djumshudov Ehtibor	30	yes	yes	Positive	no	good	14 km	yes	yes	yes	Alfalfa	yes	8	1
2	Abbasov Mahammad	13	no	no	Negative	no	good	16 km	yes	no	yes	Cereal production	yes	5	4
3	Ordjov Veysal	4	no	yes	Negative	no	good	12 km	yes	no	yes	Vegetable	no	6	3
	Experimental station														
1	Babaev Mehmon	50	Yes	yes	Positive	yes	good	11 km	yes	yes	no	Cereal production	yes	8	1
2	Mamedov Mahammad	4	no	no	Negative	no	good	15 km	yes	no	yes	Cereal production	yes	4	5
3	Khasanov Rasim	2	no	yes	Positive	no	fair	12 km	yes	yes	yes	Vegetable	no	5	4
4	Khusenov Khatom	22	no	yes	Negative	no	good	18 km	yes	no	yes	Cereal production	yes	5	4
5	Bakhshaliev Mohir	3	no	yes	Negative	no	good	12 km	yes	no	yes	Cereal production	yes	5	4

Annex 3 Selection of project demonstration sites for the project, Kazakhstan

		Area, no less than 5 ha		Interest of farmers, P/N	Knowledge of farmers about CA, Yes/no	Structure of sown area		Machinery supply, yes/no	Typical farm	Irrigation infrastructure status, good/fair	Reasonable proximity to Chimkent city and readily accessible by road		Access to market, Yes/no	Private ownership of the land, yes/no	Positive signs	Negative signs
		Area, ha	Yes/no			Rotation	Suitable, yes/no				Distance, km	Reasonable, Yes/no				
1	Abduraimov Bahrom	2	no	yes	no	vegetable	no	no	yes	good	15	yes	yes	no	5	5
2	Babakhodjaev Avazkhan	12	yes	yes	yes	vegetable	yes	no	yes	good	15	yes	yes	yes	9	1
3	Ashurmetov Gayratjon	7	yes	yes	no	cereal	no	no	no	fair	15	yes	yes	no	5	5
4	Eraliev Atakhon	3	no	no	no	cereal	no	no	no	fair	15	yes	yes	no	2	8
5	Eshmetov Hakimshik	4	no	no	yes	cereal	no	no	no	good	15	yes	yes	yes	5	5
6	Jannatkhojaev Shodmonkho'ja	2	no	no	no	vegetable	no	no	no	good	15	yes	yes	no	3	7
7	Kholmurodov Qabuljon	1	no	yes	no	cereal	no	no	yes	fair	15	yes	yes	yes	5	5
8	Mirkhaldarov Mirkomil	2	no	no	no	cereal	no	no	yes	fair	15	yes	yes	no	3	7
9	Niyazaliev Mahammat	3	no	no	no	cereal	no	no	yes	good	15	yes	yes	no	4	6
10	Sattarkhonov Musakhon	5	yes	yes	yes	cereal	yes	no	yes	fair	15	yes	yes	yes	8	2
11	Sharakhmetov Shoabbas	2	no	yes	yes	vegetable	no	no	no	fair	15	yes	yes	no	4	6
12	Shodimetov Sultaniyoz	3	no	no	no	vegetable	no	no	no	fair	15	yes	yes	no	2	8
13	Yusufjonov Gafurjon	5	yes	yes	yes	vegetable	yes	no	yes	good	15	yes	yes	yes	9	1
14	Yusupov Ikrom	4	no	no	no	vegetable	no	no	no	good	15	yes	yes	no	2	7

Annex 4 Selection of project demonstration sites for the project, Uzbekistan

		Area, no less than 70 ha		Interest of farmers, P/N	Knowledge of farmers about CA, yes/no	Structure of sown area		Machinery supply, yes/no	Typical farm	Irrigation infrastructure status, good/fair	Reasonable proximity to Karshi city and readily accessible by road		Access to market, Yes/no	Private ownership of the land, yes/no	Positive signs	Negative signs
		Area, ha	Yes/no			Rotation	Suitable, yes/no				Distance, km	Reasonable, Yes/no				
1	Hamroev Buri	105	yes	yes	no	cereal and cotton	yes	mtz	no	good	25	yes	yes	yes	8	2
2	Xoliyorov To'ra	103	yes	no	no	cereal and cotton	yes	mtz and ttz	no	fair	24	yes	yes	yes	6	1
3	Bozorov Umidjon	80	yes	yes	no	cereal and cotton	no	T-28	no	fair	24	yes	yes	yes	6	4
4	Khudaynazarov Qilich	90	yes	yes	yes	cereal and cotton	no	no	no	fair	24	yes	yes	no	6	4
5	Amirqulov Bahrom	75	yes	no	no	cereal and cotton	no	TTZ-80	no	fair	23	yes	yes	yes	5	5
6	Sayviev Ulugbek	70	yes	no	no	cereal and cotton	no	Mtz	no	fair	15	yes	yes	no	4	6
7	Meyliev Sayli	107	yes	yes	yes	cereal and cotton	yes	TTZ-80	yes	fair	23	yes	yes	yes	9	1
8	Qoyliboev Abror	110	yes	no	no	cereal and cotton	no	MTZ, T-28	yes	good	25	yes	yes	no	5	5
9	Haqberdiev Nizomjon	91	yes	yes	no	cereal and cotton	no	Mtz	yes	good	15	yes	yes	no	6	4
10	Azimov Dilshod	115	yes	yes	no	cereal and cotton	no	TTZ-80, combine	yes	fair	70	no	yes	yes	5	5
11	Abdullaev Otamurod	80	yes	yes	yes	cereal and cotton	yes	Mtz-80, TTZ, combine	yes	good	10	yes	yes	no	9	1
12	Ismatova Farangiz	75	yes	yes	yes	cereal and cotton	yes	Mtz-80	yes	good	25	yes	yes	yes	10	0
13	Kholov Sobir	70	yes	yes	yes	cereal and cotton	yes	Mtz-80	yes	good	25	yes	yes	yes	10	0

Annex 5 **Work plan and time frame of the activities**

Outputs/Activities	**2011**												**2012**												**2013**		
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**
Output 1.1. . Improved crop production and management through accelerated adoption of conservation agricultural practices																										
Activity 1.1.1: Award contracts to ICARDA and local consultants and establish project office at ICARDA, Tashkent office																										
Activity 1.1.2: Engage local scientists for monitoring agricultural and economic parameters of the demonstrations																										
Activity 1.1.3: Organize an inception workshop to discuss the detailed national and regional work plans																										
Activity 1.1.4: Select the demonstration sites in each country and identify in a participatory manner the participating farmers																										
Activity 1.1.5: Order required equipment, spare parts, seeds, herbicides and fertilizers																										
Activity 1.1.6: Modify existing machinery/equipment for the use under CA system																										
Output 1.2. Raised-bed planter and land levelling technology adjusted and applied and lower and more efficient water utilization for the crop rotations introduced, as compared to traditional cropping systems																										
Activity 1.2.1 Carry out soil analysis in the selected farms																										
Activity 1.2.2: Survey the selected farms																										
Activity 1.2.3: supervise improved land preparation and direct seeding																										
Activity 1.2.4: Training workshops on improved water, land and crop management																										
Output 1.3: **Crop rotations diversified with crops suitable for CA**																										

Activity 1.3.1. Carry out monthly on-farm training on water and crop management																										
Activity 1.3.2. Carry out bimonthly field days during each cropping season in each country																										
Output 1.4 Confidence of farmers, extensionists and other stakeholders on practicing principles of CA increased.																										
Activity 1.4.1: Monitor growing conditions of crops on selected farms (demonstration and control plots)																										
Activity 1.4.2: Economic analysis of production cost of introduced CA technology.																										
Output 1.5 Farmer-oriented brochures and guidelines on applying CA practices in irrigated and rainfed areas in the selected countries produced and printed.																										
Activity 1.5.1: Preparation of draft guidelines on improved land, water and crop management through CA technology.																										
Output 1.6 Capacity building activities in the area of CA designed and carried out at the benefit of farm households and national partners																										
Activity 1.6.1 Organize at least one quarterly field day during the cropping season on each demonstration field in each country.																										
Activity 1.6.2: Organize one final assessment workshop in each country to disseminate project's results with participation of all stakeholders and related civil societies.																										
Inception report																										
Final evaluation																										
Final workshop																										
Prepare publications																										
Final report																										

Annex 6. Crop rotation in the project demo sites in Azerbaijan

	Ehtibar Djumshudov																							
	2011											2012												
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct		Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	Winter wheat 4 ha				Maize				Field pea					Sunflower								Winter wheat		
	Ahmad Ibragimov																							
	2011											2012												
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct		Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Winter wheat 8 ha				Pearl millet					Winter barley								Maize for grain				Winter wheat		
	Mehmon Babaev																							
	2011											2012												
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct		Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Cotton 4 ha									winter wheat									Maize for silage			Winter wheat		
2	Winter wheat 4 ha				Soy bean				Winter wheat										Maize for grain			winter wheat		

Annex 7. Crop rotation in the project demo sites in Kazakhstan

	Babakhojaev Avazkhon																							
	2011										2012													
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Winter wheat 4 ha				Kidney bean 4 ha				winter wheat									Mung bean				Winter wheat		
	Yusufjonov Gafurjon																							
	2011										2012													
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct		Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Winter wheat + alfalfa 2 ha				1 year alfalfa							2 year alfalfa												
2	winter barley 3 ha				maize				winter rye+field pea							maize						winter wheat		
	Sattorkhonov Musakhon																							
	2011										2012													
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct		Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	Winter wheat 5 ha				Mung bean				Winter wheat													winter wheat		

Annex 8. Crop rotation in the project demo sites in Uzbekistan

	Meyliev Sayli																							
	2011										2012													
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	Corn, 6 ha							Winter wheat										Mung bean				Rape		
	Kholov Sobir																							
	2011										2012													
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	Soy bean, 4 ra							winter wheat										corn				field pea		
	Farm Ismatova Farangiz Azamatovna																							
	2011										2012													
	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Mai		Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	Cotton, 5 ha							Winter wheat										Bersim (*Trifolium*)				Winter wheat		
	Winter wheat, 5 ha				Mungbean/corn			Winter wheat																

Annex 9. Field activity photos

9.1. Bed planted wheat in Azerbaijan

9.2. Bed planted sugar beet in Ahmad Ibragimov's farm in Azerbaijan

9.3. Bed planted spring barley in Kazakhstan

9.4. Bed planted cotton in Uzbekistan

9.5. Notill maize in Azerbaijan

9.6. Bed planted mungbean in Uzbekistan

9.7 Soy bean field

9.8 Cotton field applied bentonite clay

Annex 10. Field day in Azerbaijan

Annex 10.1. Minutes

Field day of TCP FAO project **"Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan",** May 21, 2011.

A field day was organized at the farm of Ehtibar Jumshudov, a project farmer Zumirjan, Terter district, Ganja, on 21 May, 2011. There were 33 participants including 17 farmers, 4 National Consultants, 2 agricultural consulting center staff, 1 seed specialist, 1 journalist and 8 scientists at the meeting (Please see annex 2).

The field day was inaugurated by Dr. Maharram Aliev, Director, Terter Regional agrarian scientific center. In his welcome speech, Dr. Aliev emphasized that the conservation agriculture is a new direction on agriculture development and is widely adopted in Brazil. Through adoption of this technology farmers can improve their livelihood. He introduced to the participants agenda and objectives of the field day and mentioned that the field day was organized to discuss bed planting practices, water saving technologies and new machines of conservation agriculture used in the project demonstration pilot site. There are four main parts and are as follows: a) Winter wheat cultivation on bed; b) Water saving technologies; c) Mechanization and d) Socioeconomics.

Dr. Aziz Nurbekov, Project Regional Coordinator, highlighted that conservation agriculture practices are widely used all over the world. Conservation agriculture includes any practice which reduces, changes or eliminates soil tillage and avoids residues burning to maintain enough surface residue throughout the year. Conservation agriculture was practiced on 72 million hectares in 1999 mostly in Brazil, USA, Canada, Argentina, Mexico, Paraguay, Australia, etc, but nowadays it has spread to over 110 million hectares in 50 countries including China, South East Asia and Kazakhstan. Benefits of conservation tillage include topsoil conservation, reduced soil erosion, reduced labor, less wear and tear on equipment and fuel savings.

Dr. Imran Jumshudov, Agronomist, Azerbaijan Research Institute of Crop Husbandry, explained in detail about the conservation agriculture started at the demonstration site and wheat cultivation for having good yield. He told about the new varieties of wheat Azamatli-95, Tale-38, Ekinchi-84 and etc. to be planted to replace old winter wheat varieties. He also supported the adoption of conservation agriculture technologies in the region because field performance of winter wheat planted on beds in this particular farm is excellent and yield potential of this field can reached 7 tons per ha. He also said that new crop rotation system will be used to increase agricultural production in the farm. Different crops such as soy bean, sugar beat, mung bean, chickpea and corn will be planted in the project demonstration site during the implementation of the project.

Dr. Seymur Safarli, national project consultant in irrigation and director Azerbaijan Research Institute of Irrigation and Soil Erosion, told about water saving technologies developed in his institutes. In his talk, he also emphasized the main disadvantages of the float irrigation on winter wheat field because many farmers of the region use this irrigation method. The main disadvantages of the float irrigation are providing on hand method and too much water loss during the irrigation season, and, consequently,

coefficient of water use is very low. He also said that, additional to what Dr. Imran said, by using bed planting you can save water up to 30%. This is very important for the farmers who pay for water.

Dr. Kamil Fataliev, national consultant on mechanization, delivered his expert talk on new machinery for conservation agriculture. He briefly introduced the technical characteristics of the bed planter (produced in Turkey) used to plant winter wheat in latter autumn. On the request of farmers Dr. Imran Jumshudov assured them help for availability of conservation agriculture and field trainings on bed planting of winter wheat in Ganja region of Azerbaijan.

Dr. Akif made a talk about marketability of agricultural crops to be planted in the project demo site. He also made an introductory statement about farm survey which will be held during June.

Dr. Imran talked about the results of the farmer participatory field trials on winter wheat planting on beds from previous research investigations and projects in Azerbaijan were shared and discussed.

National TV covered the Field Day and interviewed Aziz Nurbekov, Project Regional Coordinator and Imran Jumshudov, Agronomist, Azerbaijan Research Institute of Crop Husbandry. Main conclusion of the field is that farmers are keen to adopt bed planting technology because it reduces water consumption, production costs and increases yield.

LIST OF PARTICIPANTS OF THE FIELD DAY

#	Name	Job title	Organization	Phone number
1	Maharram Aliyev	Director	Terter Regional agrarian scientific center	+994 50 6329070
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17	Abdullayev Ayyub	Farmer	Barda district	
18	Abbasov Mubariz	Farmer	Barda district	
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28	Shokhbozov Bakhtiyar	Farmer	Terter district	
29	Azizov Alekper	Farmer	Terter district	
30	Ibragimov Musa	Farmer	Terter district	
31	Javanshirov	Farmer	Terter district	

	Mehmet			
32	Atabekov Shukur	Journalist	Regional TV studio	
33	Nurbekov Aziz	Project regional Coordinator	ICARDA-CAC	+998-90-3485425

Annex 10.3

Pictures of the field day

Picture 1 participants of the field day

Picture 2 National TV covered the field day

Picture 3 Winter wheat planted on beds

Annex 11. Field day in Kazakhstan

Annex 11.1. Minutes

A field day of GCP/RER/030/TUR project **"Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan",** 16 June, 2011, Chimkent, Kazakhstan.

For the occasion, the field day was organized on June 16, 2011, with the help of South-Western Research Institute of Livestock and Plant Industry under the FAO TCP project on Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan. A total 35 participants/farmers including staff of Sayram district administration, mass-media and scientists of the research institute mentioned above (List of participants annexed at end) attended. The conservation agriculture field day highlighting bed planting technologies for agricultural crops widely distributed in the South-Kazakhstan Province. The field day included speeches by the project regional coordinator, national consultants on bed planted winter wheat and spring barley, water saving technologies and socio-economic issues of the conservation agriculture. During the discussions the project regional coordinator informed about activities of ICARDA-CAC in the region with main emphasis on conservation agriculture issues while the national consultants answered participants' questions about conservation agriculture (please see annex -2).

Dr. Aziz Nurbekov (Project Regional Coordinator, ICARDA-CAC) started and explained about the Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan project as a whole as well as ICARDA-CAC's programme and activities being undertaken for rolling out Conservation Agriculture based activities in Central Asian and the Caucasus Countries. He described in brief about the project target activities in Sayram site, Chimkent, Kazakhstan site. It was emphasized that the major focus will be on accelerating adoption of double cropped summer crops after winter wheat and spring barley harvest, no-till alfalfa in august seeding, bed planted mung bean and water saving technologies. Then, Dr. Aziz delivered some information on conservation agriculture. Conservation agriculture (commonly known as CA) is a concept for resource-saving agricultural crop production that strives to achieve acceptable profits together with high and sustained production levels while concurrently conserving the environment" (FAO, 2007). CA offers an alternative to expensive fertilizer and input based agriculture, which is much welcomed in the current economic environment. In CA, it takes times for benefits to be seen. The maximum benefits are seen in rainfed areas in a shorter time while benefits in irrigated areas takes much longer (more than 5-6 years) and much more efforts. Dr. Aziz told new prototype of direct seeding machines will be brought from Brazil to Kazakhstan and will be used in your fields to plant different agricultural crops. He said that generally the machines being tested in Uzbekistan and can be used all around the year successfully.

This speech was followed by a field presentation by the Prof. Dosymbek Siddiq, Agronomist, Project National Coordinator for Kazakhstan on no-till wheat cultivation in the Northern part of Kazakhstan where area of no-till wheat increased up 1 mln hectare in 2010 and the area under no-till wheat increasing from year to year. He also highlighted that bed planted winter wheat and spring barley is the need of the time in view of the declining water availability in the irrigated conditions of Southern Kazakhstan. So this field day is not just learning on bed planting practices, but it is also to build confidence among the farmers with a strong knowledge base. The main problem is the adoption of conservation agriculture in the irrigated areas of South Kazakhstan. We need to change mind of governor official to conservation agriculture with this way adoption of

conservation in South Kazakhstan will be accelerated like in North Kazakhstan. Prof. Dosymbek Siddiq also answered to the queries made by the farmers about conservation agriculture and bed planting practices on winter wheat barley cultivation. He mentioned that adoption of conservation agriculture is a big problem in the irrigated areas of Southern Kazakhstan. There is no success unless farmers are involved in technology development and refinement process. Farmers have to participate in research and not just in testing products on the field. Only interactive training such as field days can be expedite the process of adoption of conservation agriculture in the irrigated areas of South-Kazakhstan province.

Dr. Ajar Karabalaeva, National Consultant on irrigation, made a speech on water saving technologies on conservation agriculture. She briefed about the water saving technologies in the province and explained the need of conservation agriculture to the participants. She highlighted the problems with water shortage in the region as an example this year you are facing with the problem in the field because water shortage is significantly caused crop production. She said I would like draw your attention to this particular winter wheat field where the plant suffered from water shortage and consequently yield will be lower compare latter year. But it should be mentioned here that if you apply conservation agriculture practices in your field you can get same yield by saving considerable water, fuel, labour and other resources. She highlighted that many improved water saving technologies will be tested to improve water management in the demonstration site. Improved water management methods require proper land leveling that is why the project is going to purchase laser leveling equipment. In our next field days we can be able to show you cross and alternative furrow irrigation methods.

Dr. Avazkhan aka, briefed about his PhD thesis which was done four years ago in Sayram district on study bed planting practices on winter wheat growing in the South Kazakhstan province. For the first time bed planting technologies were tested in the irrigation conditions of our province. He said that by cultivating winter wheat on beds you can decrease seed rate by two times while increasing yield potential of the crop. We used to plant winter wheat the modified Soviet type of the seeder into bed planting machine. The seeds sowing depth is very important, once it is one of the factors that interfere in the plants emergency and germination. The modified seeder is having some problems with the seed sowing depth so that is why the modified seeder should be replaced by Brazilian bed planter. The Brazilian bed planter will brought to plant winter crops end of September.

Dr. Natalya Gritsenko, national consultant on socio-economics. She said that before coming to this field she went through some articles and books on socio-economic analysis of conservation agriculture. It is well known that conservation agriculture reduces the energy consumption of farming operations and increases energy productivity -this is the yield output per energy input- in the range of 15%-50% and 25%-100%, respectively. Direct drilling/ no-tillage requires as little as one pass for planting compared to two or more tillage operations plus planting for conventional tillage. Fewer passes save an estimated 97 EUR per hectare on machinery depreciation and maintenance costs. That is, about 1950 EUR savings on a 200 hectares farm. Direct sowing/ no-tillage also permits a fuel saving of an average of 31.5 litres per hectare annually compared to conventional tillage systems. These savings normally compensate for or exceed the extra costs of conservation tillage (application of herbicides and direct sowing machinery).

The group visited winter wheat and spring barley fields and discussed the current situation of wheat plant. In the project site, water shortage restricted the growth of wheat

altogether. According to discussion of participants wheat was found more suitable crop to plant in the salted soils of project demonstration pilot farms field. The participants of the field day were very happy to interact with the project national consultants during the field days. During the field day it is felt that conservation agriculture is a feasible in the irrigated conditions of South Kazakhstan province.

Annex 11.2.

List of Participants of the field day

	Name/Surname	Position	Organization	Tel/Fax/Email
ICARDA-CAC				
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3	Dr. Natalya.Gritsenko	Socio economist		
4	Dr. Ajar Karabalaeva	Water management	Research Institute of Livestock and Plant Industry	8-10-7-701-9121460 – (725)- 2-55-40-13; E-mail: nii-tassai@rambler.ru
Sayram district				
5	Mr. S.S.Eraliev	Chairman	Cooperative farm named after Yassau	8701-3371733
6	Mr. Kh.Akhmadkhanov	Akim	Sayram ocrug	8701-3670075
7	Dr. A.Babakhodjaev	Chief Agronomist	Cooperative farm named after Yassau	8702-6279284
8	Mr. Khalmuratov	Agronomist	Cooperative farm named after Yassau	8702-1021117
9	Mr. O.Kholvashaqov	Chief water specialist	Cooperative farm named after Yassau	8702-236-1161
10	Mr. Kh.Niyazmetov	Chief Agronomist	Sayram District	8701-352-5810
11	Mr. S.Iristoev	Foreman	Cooperative farm named after Yassau	8775-3896646
12	Ms. Husniddinova	farmer	Cooperative farm named after Yassau	
13	Ms. Hudaybergenova	farmer	Cooperative farm named after Yassau	
14	Ms. G.Tursuntayeva	farmer	Cooperative farm named after Yassau	
15	Mr. G.Yusufjanov	Foreman	Cooperative farm named after Yassau	87017463705
16	Mr.Sattarkhonov Musakhon	Foreman	Cooperative farm named after Yassau	87016235525
17	Mr. B.Abduraimov	farmer	Cooperative farm named after Yassau	
18	Mr. A.Kurbantaev	farmer	Cooperative farm named after Yassau	
19	Mr. B.Egamtoev	farmer	Cooperative farm named after Yassau	
20	Ms. M.Khudaynazarova	farmer	Cooperative farm named after Yassau	

21	Mr. M.Saytamova	farmer	Cooperative farm named after Yassau	
22	Mr. B.Akhmadaliev	Foreman	Cooperative farm named after Yassau	
23	Mr. X.Eshmetov	farmer	Cooperative farm named after Yassau	
24	Mr. G.Ashurmetov	Foreman	Cooperative farm named after Yassau	8701-4919673
25	Mr. A.Yuldashev	farmer	Cooperative farm named after Yassau	
26	Ms. M.Tursametova	farmer	Cooperative farm named after Yassau	
27	Ms. D.Ergeshova	farmer	Cooperative farm named after Yassau	
28	Ms. T.Sultanboeva	farmer	Cooperative farm named after Yassau	
29	Ms. G.Madumarova	farmer	Cooperative farm named after Yassau	
30	Ms. M.Nazmetova	farmer	Cooperative farm named after Yassau	
31	Mr. X. Sattarkhanov	farmer	Cooperative farm named after Yassau	
32	Galim Anarbaev	driver	Cooperative farm named after Yassau	
33	Rustam Tuychiev	driver	Cooperative farm named after Yassau	
34	Abdulmurat Elmuratov	driver	Cooperative farm named after Yassau	
Sayram TV				
35	Sagindik Abdirahmanov	Reporter	Sayram TV	

Annex 11.3. Questions and Answers

Question 1: Area of conservation agriculture in the world?

AN: It is about 117 mln ha.

Question 2: What are the main advantages of the conservation agriculture?

AN: The main advantages of the conservation agriculture are the soil fertility can be improved after long term use; yield of agricultural crops will be stable across the years; conservation agriculture can be a buffer in climate change and etc.

Question 3: Do placement of fertilizers and seed together in same slit adversely affect germination of crop planted no- till-ferti seed drill if we use Brazilian cum seed drill? (General)

AN: Yes, there are positive effects on winter wheat yield when we used cum seed drill in our experiment in Karakaplakistan. Seed germination percentage was higher and cosequnetly yield potential also was higher.

Question 4: Does no-till system change the weed composition in the field?

AN: Yes, continuous no-till enhances the population of perennial and broadleaf weeds. The maximum benefits are seen in rainfed areas in a shorter time while benefits in

irrigated areas takes much longer (more than 5-6 years) and much more efforts. Then number weeds will be reduced.

Question 5: What are the harmful effects of burning residue?

DS: Burning of crop residue causes air pollution and waste precious nutrients. Burning of residues also adversely affect the beneficial soil micro-flora and fauna.

Question 6: Soil density is very high in this case no-till technology can not be adopted in Southern Kazakhstan. What do you think?

DS: Some years ago, I also thought like this, but now I can say that there will not be any problem with adoption of conservation agriculture in the region.

Question 7: How do you irrigate no-till wheat?

AK: For the first time conservation agriculture will be tested in the irrigated conditions of Kazakhstan. But our neighbor country Uzbekistan has some experience on this particular question and we can use their experience in our experiments.

Annex 11.4.

Field day pictures

National Coordinator interviewed by the local TV

Participants of the field day

Participants of the field day

Annex 12. Field Day in Uzbekistan

Annex 12.1. Minutes

A field day was conducted on August 24, 2011, in Kasbi district, under FAO GCP project on conservation agriculture. The field day focused on improving current conservation agricultural practices in the project demonstration pilot site. The objective was to ensure that the farmer receives first hand information, from the national consultants, and participates actively. This field day brought together key public and private leaders and national consultants from Ministry of Agriculture and Water Management, Agricultural Department of Kashkadarya Province, different organizations and associations and Kashkadarya Research Institute of Plant Breeding and Seed Production of Cereal Crops and to share these ideas with participants. 40 participants attended the field day, and attendees included: key officials from Kasbi, Koson and Karshi districts; Researchers from different research institutes; National Project Consultants; project farm leaders and farmers; and ICARDA-CAC representative (Please see annex 10.2 and picture 10.5.1).

The field day was opened by Dr. Zokhidjon Ziyadullaev, National Project Manager for Uzbekistan and Director General of Kashkadarya Research Institute of Breeding and Seed Production of Cereal Crops, with a welcome address to the participants. He informed participants that recently His Excellency President of the Republic of Uzbekistan visited the above mentioned Research Institute, and during the visit His Excellency recommended several options to the researchers on how to improve crop productivity by using innovative techniques on plant breeding, seed production and crop management. One of them is to develop resource saving technologies on wheat cultivation in the irrigated conditions of Uzbekistan. In this particular case, the project on conservation agriculture came to Kashkadarya in a right time, and it is incorporating with options mentioned above. He also said that leading specialists of the research institute are actively involved to the implementation of the project.

During the field day National Project Manager, National consultants and researchers delivered speeches on resource saving technologies in the irrigated areas. Most of them devoted to bed planting and double cropping after winter wheat harvest. There was an interactive lively sections during the field day where invited researchers, National Project Consultants and farmers exchanged their own experiences in the field of bed planting technologies, crop rotation in the project demonstration site and some other related issues on conservation agriculture (Please see annex10.3).

Field visits

Fields are prepared which were visited throughout the field day, where participants were able to see experiments on Conservation Agriculture planting of summer crops as succeeding crop, cotton growing with application of Bentonite clay and cotton seed treated with Mycroum-2. These fields were set up in different parts of the project demonstration pilot farm across the Kasbi district. The objective of the field visits is to analyze in each of them concrete aspects of the different systems of Conservation Agriculture.

Field 1: The system of bed planting

Subject: System of bed planting, benefits of the system and its environmental impact, criteria on production strategies for different agricultural systems were discussed during the field day.

Consultant: Dr. Ravshan Boyriov (pioneering water irrigation specialist on permanent bed planting in Kashkadarya). Irrigation technology is recently more relevant issue in agriculture sector of Uzbekistan. The main methods of irrigation are namely aerosol wetting, local irrigation (inside soil and dropping), sprinkling with fertilizing and applying pesticides, surface irrigation (floating and furrow), subirrigation (irrigation with underground water). It should be mentioned here that bed planting technology is promising furrow irrigation technology in the irrigated areas of Uzbekistan where water

shortage is limiting factor to plant growth and development during the vegetation period as a result crop production will be decreased. Water use efficiency is important issue not only in Kashkadarya but in whole Uzbekistan as well. As farmers increasingly adopt water saving technologies, there is a need to plant on beds summer crops such as mung bean and maize that better adapts to the new agronomic practices. Taking this into account we have planted mungbean and maize on beds in mid July as the succeeding crops. Initial observations on irrigation rate shows that bed planting practices can save on an average of 50% water (Please see picture 10.5.2 and 10.5.3). Pease note that this is not final conclusion the final conclude will done after harvest. We will inform you with the end results of this experiment in our next field days and, formal and field training courses.

Field 2: The system of crop rotation.

Subject: Crop rotation and soil productivity improvement in conservation agriculture.

Dr. Zokhidjon Ziyadullaev briefly informed about crop rotation in the project demo sites and the work done on initial soil analysis to monitor soil fertility under different crops. The main principle of the crop rotation is that a crop should not follow itself across the years. Disease and insect problem can occur with monocropping as a result yield potential of the crop will be decreased. Everybody knows that in the past cotton rotated with alfalfa which was good crop system to keep soil fertility but nowadays this rotation system has been changed to cotton-wheat rotation system which is very common practice. In fact, the structure of soils in cotton-wheat rotations is actually poorer than that of soils that were previously in cotton-alfalfa crop rotations. The benefits of crop rotation can be varied at the many aspects of farming system. I have seen some articles on conservation agriculture. The articles say long-term soil productivity is the biggest attribute of no-till to current land situation. Taking this into account we have conducted an experiment on crop rotation system to identify yield potential of soy bean, maize and cotton on influencing soil fertility. Some initial soil analysis was done and we will continue our soil sampling after harvest.

I will finalize my speech by this: if you adopt good crop rotation system in your farm you will have four main benefits. Conservation-wise, there is less soil erosion. Agriculturally, water infiltration and soil holding capacity increase so plants are less affected by dry spells. Ecologically, soil quality and soil life improve. Economically, fewer trips over the field save fuel and time. Field performance of soy bean is good. If you are truly interested in adopting conservation agriculture, please plan crop rotation carefully and seek information from project team.

Field 3: Succeeding crops (multi-cropping)

Subject: Multi-cropping can provide additional production in the same year

Dr. Aziz Nurbekov, Project Regional Coordinator, ICARDA-CAC, made a speech on succeeding crops. Multi-cropping system within one year offers much opportunity to provide additional production from present land resources. The clear definition for this system is two or more crops can be grown in one growing season. Climatic conditions of the Kashkadarya region can lead to grow two or more crops if you choose right crops to be grown. The multi-cropping potential may be the most important issue of today's modern agricultural developments of the region. The big issue in multi-cropping system is timing of seeding sometimes the second crop becomes limited along with pressures of harvesting the mature crop. In this case the no-tillage system, by eliminating ploughing and preparation, reduces the time element while retaining soil moisture present, and reducing runoff, soil erosion and evaporation. These items are essential given the intensive cultivation characteristics of a multi-cropping system. Long-term advantages include improving or at least maintaining soil structure under the stress of planting and harvesting two crops every year. Besides, double-cropping plays important role in conservation agriculture as it allows covering land surface with crop. You can see bed planted and broadcasted mungbean fields of the project demo site. In the irrigated

conditions of the province for the first time the mungbean crop was planted on beds. Field performance of the crop is good. And there is clear difference between two planting methods. Bed planted mungbean has higher plants than broadcasted mungbean and also number of tillers of bed planted mungbean is higher compare to the second planting method. The same can be said on bed planted and broadcasted maize. This is just initial field observations of plant growth and development of both crops while the final saying will be concluded after mungbean and maize harvest.

Field 3: The importance of cotton growing.

Subject: Successful cotton production depends on an integrated management strategy

Dr. Zokhidjon Ziyadullaev presented a speech on cotton growth and development in the project demo sites. He said that efficient use of water is a crucial in the irrigated conditions of Uzbekistan. Traditional irrigation method used in this experiment. We studied effect of bentonite clay on cotton productivity with the main emphasis on water saving during plant vegetation period. We used a 90 cm row width with furrow irrigation for cotton, which forms a raised bed between the furrows. Field observations showed that there are differences across the treatments where bentonite clay applied. Field observations are continuing. Dr. Ziyadullaev continued his speech on the second experiment where cotton seed were treated with Microzum-2. Successful cotton production depends on an integrated management strategy that recognizes and adapts to the unique characteristics of the crop by using bio-stimulators such as Microzum-2. The objective of this experiment is to study effect of Mycrozum-2 (bio-stimulator) on cotton productivity in the irrigated conditions of Kashkadarya region. Visual observations show that Microzum-2 positively affects the development of vegetative growth and fruiting forms of cotton. We are further continuing our field records on cotton growth and development of these two experiments. We will continue the experiment in the second project year.

Socioeconomics

Dr. Aziz Nurbekov informed the participants on socioeconomics of conservation agriculture which were done in the other project of conservation agriculture in the region. He started with phrase of “money talks”. Money talks, so we’ll start talk on economic benefits of conservation agriculture. The results of those projects show that a no-till system is more profitable than other kinds of tillage systems. The major difference is with a no-till system, you do a burn down spray to prepare for planting; while with a tillage system, you do your tillage to prepare for planting. All other costs are similar. So, the cost differences are fuel, additional equipment, maintenance of that equipment and the time spent to do the tillage operations versus one extra spray, the fuel and the time it takes. Yet yields are statistically the same in trials. So, you can save some money. During the project implementation economic impact of the traditional and conservation agriculture technologies will be assessed. He also said that if you establish a no-till system, your fields will have increased water infiltration and a higher water-holding capacity than with tillage systems. This is due to better soil health and improved soil quality. Soil health is a gauge of the stability of the organisms in the soil ecosystem which is a crucial problem in Kashkadarya province. At the end of field day the floor was given to Mr. Choriev Mardon, Chairman Kasbi district farmers association. Mr. Choriev Mardon said thanks for all speakers and participants who are presented their knowledge in the field of world conservation agriculture practices, crop rotation, agricultural machinery for conservation agriculture, and etc. and also thanks for organizers behalf of all participated farmers in the field day for interesting speeches, given recommendations on bed planting technologies, improved water saving technologies, crop rotation and etc. which are more important issue to get high and stable yield of crops and get benefits from their cultivation by using resource saving technologies. He thinks it will improve farm enterprises development in market transition period.

Annex 12.2

List of Participants of the field day

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19	Ismatov Azamat	Chairman	Azamat qizi Farangiz	+998-75-525-0016
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Kashkadarya Research Institute of Plant Breeding and Seed production of Cereal Crops (KRIPBSPCC)				
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28	Meyliev Akmal	Scientific worker	KRIPBSPCC	+998-97-795-7784
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34	Abdullayev Otamurod	Deputy Director	KRIPBSPCC	+998-75-312-2644
35	Qosimov Ro'ziboy	Scientific worker	KRIPBSPCC	
36	Shomurod	Driver	KRIPBSPCC	
37	Sherali	Driver	KRIPBSPCC	
38	Samatov Sanjar	Staff	KRIPBSPCC	
39	Narimonov Anvar	Staff	KRIPBSPCC	
40	Kuvvatov Komronbek	Staff	KRIPBSPCC	

Annex 12.3

Questions and Answers

Question 1: Can farmers use all the modern crop varieties for planting on bed planting and no-till method?

Answer: Some of the modern varieties do better than others in bed planting systems. Therefore, genotype x tillage interactions can play an important role new crop establishment methods such no-till and bed planting system. Modern varieties that are more vigorous in early growth stages cover the soil more effectively such as to compete better with weeds. All such varieties generally should be the preferred choice of the farmers if the prevailing marketing and pricing policies also permit such cultivar choices.

Question 2: What are the other crops that can be planted with direct seeders?

Answer: Zero-till drills of different makes are usually fitted with various seeding devices such as fluted rollers, cupping systems and inclined rotating discs. Drills with fluted rollers can easily handle large sized seeds but have difficulty in planting crops having small and light weight seed such as Indian mustard or seeds of rice having a long awn and hairs on the seed cover. For seeding small grains, farmers generally mix sand/ ash with the seed to increase the volume of seeding material for uniform distribution. The multi-crop planter-cum-zero-till machines are now available in the market which can sow almost all the cereal and pulse crops.

Question 3: Is it true that zero-till/raised bed planted crop lodges less than the one planted using conventional tillage practices?

Answer: It is observed that crop lodging is generally less in zero-till planted crop. In zero-till system, plants seem to receive good mechanical support from undisturbed soil in close vicinity of narrow slit. Also higher root biomass provides better anchorage to the plants against lodging.

Question 4: Are farmers accepting the zero tillage in Uzbekistan?

Answer: Not yet, there is a need strong support from Government of Uzbekistan and also there is a need for changing the attitude of the farmers before they adopt zero-tillage and start getting the benefits from it.

Question 5: Can you give us information about Microzum-2?

Answer: We distributed booklet on Microzum-2 you can read the booklet. If you do need more information I will provide you.

Question 6: Is there any possibility to use the Brazilian planter by neighbor farms?

Answer: Yes, there is possibility to use the planter by neighbor farms. I hope we can have the planter in mid of September before winter wheat planting season.

Question 7: Does tractor speed during planting affect seed rate?

Answer: Theoretically, speed of the tractor does not affect the number of revolutions of fluted roller that delivers seed to the tubes. However in practice, tractor speed more than 4-5 km/hr increases slippage of drive wheel on uneven surfaces. Increased slippage lead to uneven crop stands resulting in reduced yields. In order to have good crop stand and reduce labor in filling the gaps it is advisable to run the tractor at speed close to 4-5 km/hr.

Question 8: Does seed enrichment with Microzum-2 improve the seed germination?

Answer: Enrichment of seed with Microzum-2 ensures healthy seedlings and betters the initial crop growth. Enriched seed improves germination and early growth.

Annex 12.4. Pictures of the Field Day

Annex 12.4.1 National Project Manager delivering speech

Pictures 12.4.2 and 12.4.3 participants in the bed planted and broadcasted mungbean field