

REVIEW AND SYNTHESIS OF THE BEST SLM TECHNOLOGIES AND APPROACHES IN UZBEKISTAN

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TASHKENT -2014**

TEAM OF THE COMPONENT 1

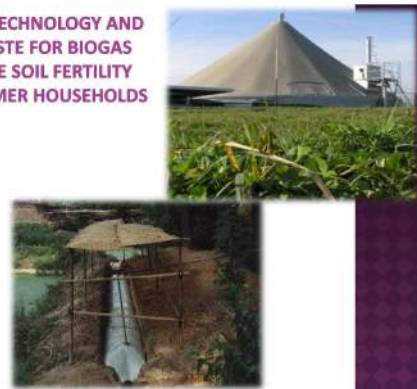
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SOURCES USED

- Proceedings and Collections: Research Institute for Soil Science and AgroChemistry;
- Annual catalogs of the Republican fair of innovative ideas, technologies and projects;
- www.wocat.net, www.undp.uz, www.sgp.uz
- Research Institute on Cotton Production, Research Institute of vegetables, melons and potatoes, Institute of Microbiology of the Academy of Sciences, National University of Uzbekistan named after Ulugbek, Tashkent State Agrarian University, Tashkent Institute of Irrigation and Melioration.

CONSERVATION-BIOGAS TECHNOLOGY AND THE USE OF ORGANIC WASTE FOR BIOGAS PRODUCTION TO IMPROVE SOIL FERTILITY AND CROP YIELDS IN FARMER HOUSEHOLDS

- Supplies readily available plant nutrients;
- Reduce the rate of fertilizer by 40-50% and increase soil fertility;
- This technology is conservation measure, which can improve social conditions of farmer households;
- It produces fuel energy materials and eco-friendly high quality, solid and liquid organic fertilizer



Agroecosystem: Irrigated and rainfed agriculture
Source: Catalogue of V Republican fair of innovative ideas, technologies and projects, Tashkent 2012. Author: M.M. Tashkuziev, RISSAC, maruf41@rambler.ru

AGROTECHNOLOGY TO IMPROVE SOIL FERTILITY, ENRICHING SOIL ORGANIC MATTER UNDER IRRIGATION BY CROP ROTATION "COTTON - WINTER WHEAT" WITH REPEATED AND INTERMEDIATE CROPS

- The chain of growing staple crops "cotton-winter wheat" includes their repeated alternation and intermediate sowing, hoeing at a shallow depth (minimal processing) with the obligatory introduction of high rates (20-30 t / ha or more) of organic, organic-mineral fertilizers and composts;
- For the short term (3-4 years) it significantly enriches the soil with organic matter, protects from erosion;
- Save on 30-40% or more mineral fertilizers;
- Increases on 15-20% yield of crops.



Agroecosystem: irrigated

Contact: Professor MM Tashkuziev RISSAC, maruf41@rambler.ru

TECHNOLOGY FOR PRODUCING OF ORGANO-MINERAL FERTILIZERS FROM POULTRY WASTE WITH THE ADDITION OF ORGANIC MATTER AND MINERALS BY AEROBIC BIOTHERMAL FERMENTATION

- Technology for producing organo- mineral fertilizers from poultry waste differs from conventional composting. In this method the biothermal fermentation of waste is done after adding organic material and minerals containing a number of trace elements needed by plants.
- This technology is ecology-friendly. It is used to improve the ecological state of natural objects in the zone of poultry farms;
- Soil enriched with organic matter and improves nutrient regime;
- Helps to ensure a high crop yields and improve the quality of plant products



Agroecosystem: irrigated

Source: Catalogue of the IV Republican fair of innovative ideas, technologies and projects, Tashkent 2011. Author: A.J. Bairov, RISSAC

AGROTECHNOLOGY TO OPTIMIZE THE LOW FERTILITY PROPERTIES OF SOILS AND PRODUCE ORGANIC FERTILIZERS BASED ON SECONDARY RESOURCES

- Produces new organic- based fertilizers and manure glauconitic and highly organic fertilizer - vermicompost supplemented with minerals.
- When they are used in all crops (cotton , maize, melons , etc.) due to their content of organic substance, additional nutrients, including microelements and physiologically active substances are improving all the basic properties and nutrient status of the soil;
- Contributes to the restoration, preservation and improvement of soil fertility, increases productivity of cultivated crops.



Agroecosystem: irrigated and rainfed

Contact person: Professor M.M. Tashkuziev
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NEW BIO-FERTILIZER TO IMPROVE SOIL FERTILITY AND CROP PRODUCTIVITY

- Application of the new bioagrotechnology in agriculture, based on the use of 2 or 3 types of biofertilizers (bacterial fertilizers Fosstim- 1 and Fosstim- 3 , and a biological product Serhosil and biocompost Biokom) increases the yield and quality / agricultural products: cotton - on 8-10 kg / ha, wheat - 7.5 kg / ha, vegetables (cucumbers - 4 t / ha and tomatoes - 12 t / ha), potatoes - by 5,2-5,9 t/ha . Also , increases profitability of agricultural production: cotton - 52% , wheat - 45% , vegetables and potatoes - by 44-90 %.

Restores and enhances the fertility of degraded soils, reduces the consumption of mineral fertilizers by 25-50%, consumption of organic fertilizers by 75% , consumption of irrigation water by 20-30 % , the content of toxic salts in saline soils for vegetation - 0.5-0.6 % , emissions of greenhouse gases (CO₂ , N₂O) - by 25-50% .



Agroecosystem: irrigated

Contact person: Dr. G.I. Dzhumaniyazova,
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CONSERVATION TECHNOLOGIES FOR IMPROVING THE FERTILITY OF DEGRADED SOILS

- This technology allows for a short time to effectively process poultry waste and municipal solid waste of the cities to the two ecologically clean products: vermicompost - effective fertilizer for agriculture and biomass of worms - a high-protein feed with poultry and pond fish (worms themselves can be effective in domestication and reclamation of degraded soils);
- Technology is a resource-saving , environmentally friendly, environment conservation, at the same time simple and affordable for farmers, gardeners , landscapers , and others;
- Using this technology reduces the volume of fertilizers and transport costs by 6-10 times.



Agroecosystem: irrigated and rainfed

Contact person: Professor L.A.Gafurova, TashSU,
named after Ulugbek

WATER-SAVING IRRIGATION TECHNOLOGY ON WATERING OF COTTON SCREENED FURROWS COVERED BY PERFORATED POLYETHYLENE FILM

- This technology saves irrigation water by 30-40% ; Eliminates irrigation erosion, improves water and soil physical properties (density, permeability);
- Increases crop yields by 10-20% revenue of farmers by 15-20%; reduces the demand for irrigation water - 30-40% , water expenditure - 10.5 % , reduces workload - 15-20%; maintains soil fertility - 10-15% , increases soil moisture - 10-15% , biomass - 15-20 % , the organic matter in the soil;
- Reduces the loss of soil carbon by 15-20%, reduces crusting / soil compaction - 50-70%.



Agroecosystem: irrigated

Contact person: Prof. Bezborodov G.A. Uz
RICP.

MULCHING THE SOIL WITH PLASTIC FILM

- This technology contributes to a more intense thermal heat of the soil, especially in the early periods of the growing season of cotton and prevents physical evaporation of moisture from the soil, almost completely eliminates the possibility of soil compaction and thereby creates optimal conditions for early emergence, rapid growth and development and more intensive biomass accumulation of cotton.
- During the growing season of cotton, inter-row cultivation, watering and fertilizing, mulching are carried out through the beds.
- Scope of work is reduced by about 50%. Also, when mulching and manual processing of weed drastically reduced, resulting in reduced costs by approximately 20-25 %.



Agroecosystem: irrigated

Contact person: Professor I. Turapov,
TashSAU.

TECHNOLOGY TO INCREASE THE FERTILITY OF ERODED IRRIGATED SOILS

- Protects the soil from irrigation erosion and increases the fertility of soils on the basis of anti-erosion preparation and mechanized method of fertilizers application with a special tools;
- The technology is applicable for cotton crops in irrigated conditions on eroded grey soils;
- Improves the water-soil physical properties (density, permeability), increases the productivity of agricultural row crops.



Agroecosystem: irrigated

Source: Catalogue of the III Republican fair of Innovative ideas, technologies and projects, Tashkent 2010. Author: O. Hakberdiev, RISSAC

A METHOD FOR IMPROVING THE QUALITY OF COTTON FURROW IRRIGATION ON LAND DAMAGED BY IRRIGATION EROSION

- To reduce Irrigation erosion, improve soil moisture uniformity along the length of furrows, the technology to apply winter wheat straw (0.1 kg per 1 m length) was developed. Applied straw serves as a brake on the flow of water that retains moisture after watering, reduces water discharge from the field and thus removal of nutrients, resulting in grooves formed along the length of the uniform soil moisture.
- Reduces irrigation erosion, soil moisture is uniform along the length of the furrows; Increased productivity if crops by 8-10% and reduction in the demand for irrigation water - 10-15% , increase in income of farmers on 10-15%, reduction in costs - 10-15%, reduction in runoff - 15-20% , increased soil moisture - 5.10 % , the improvement of the soil surface - 10.5 % , increase replenishing of nutrients - together with the straw are introduced N- 12 kg / ha , P- 14 kg / ha , K- 26 kg / ha , increasing soil organic matter - the annual plowing straw increases organic matter - 5-10% .

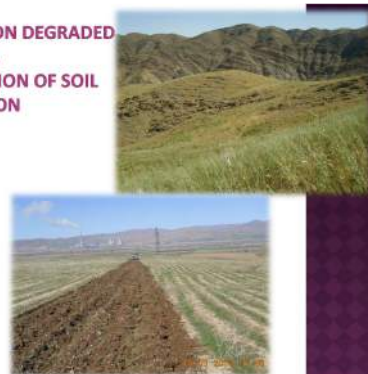


Agroecosystem: irrigated

Contact person: Prof. Bezborodov

ZERO AND MINIMUM TILLAGE ON DEGRADED RAINFED AND IRRIGATED SOILS, RESTORATION AND CONSERVATION OF SOIL FERTILITY FOR CROP PRODUCTION

- Increases the diversity of products - 20% (crop fodder, vegetables and melons);
- Increases biomass - 20% due to gain in crop cultivated with / crop and vegetative organs of plants;
- Improved properties of poor soils, increasing their fertility (increasing humus soil microorganisms, earthworms), reduced salinity, flow of nutrients (mineral and organic fertilizers, fuel and energy resources);
- High yields and quality.



Agroecosystem: rainfed agriculture

Source: Catalogu of the VI Republican fair of innovative ideas, technologies and projects, Tashkent 2013. Author: M.M. Tashkuzieva, RISSAC
maruf41@rambler.ru

DEVELOPING OF CARTOGRAMS WITH CONTENT OF MOBILE FORMS OF PHOSPHORUS AND POTASSIUM IN IRRIGATED SOILS

- Technology on developing of cartograms of content of mobile nutrients, based on large-scale mapping of soils, including the total agrochemical characteristics of soils.
- It is used in the development of system on fertilizers' use for the cultivation of crops in the irrigated and rainfed soils;
- Cartograms fully reflect the content of soil nutrients, allow optimal application rates of mineral and organic fertilizers and other events



Agroecosystem: irrigated and rainfed

Source: Catalogue of the III Republican fair of innovative ideas, technologies and projects, Tashkent 2010. Authors: A.A. Karimberdiyeva, M.M. Tashkuziev, RI

DEVELOPMENT OF "CARTOGRAMS ON SALINIZATION" OF IRRIGATED FARM LANDS

- By the use of cartograms on salinity it is possible to solve many issues on reclamation and desalinization of soil.
- By removing toxic salts from the soil through leaching it is possible to address the issues of land degradation.
- Cartograms will show diversity of salinity contours and the amount of soluble salts, which must be removed from the soil under leaching;
- It gives an idea of the overall assessment of soil-reclamation state farms



Agroecosystem: irrigated

Contact person: A.U. Akhmedov, Head of Department, RISSAC

AGROTECHNOLOGY TO PREVENT SECONDARY SALINIZATION ON RECLAIMED SLIGHTLY SALINE SOILS IN IRRIGATED AGRICULTURE

- For the slightly saline soils on light gray soils, a modified system of agricultural technologies was developed to improve soil fertility and yield of crops (cotton , grain) , aimed at enriching it with organic matter and prevent secondary salinity, improve its basic properties.
- Changed as follows: in autumn, before planting the main crops on slightly saline soil, soil should be leached;
- The remaining activities are the same as in the technology developed for non-saline soils on typical sierozem belt. In subsequent years, the soil is not leached at all.



Agroecosystem: irrigated

Contact person: Professor M.M. Tashkuziev, RISSAC, maruf41@rambler.ru

NEW TECHNOLOGY OF MINIMUM TILLAGE FOR CROPS

- Minimum tillage based on the ridges with 90 cm in row spacing allows to create and maintain optimal soil conditions, the preservation of productive soil moisture, eliminates compaction and steadily increase crop yields.
- Application of this technology for the cultivation of cotton and wheat allows reducing the number of tillages, resulting in fuel and wages savings.



Agroecosystem: irrigated

Source: Catalogue of the III Republican fair of innovative ideas, technologies and projects, Tashkent 2010. Author: R.K. Kurvantayev, RISSAC.

TECHNOLOGY OF DIRECT SEEDING OF SOLANACEOUS CROPS

- This technology is unlike expensive and time-consuming methods is based on mulching of beds with plastic black film. Seeding is accomplished by making holes in film (tomatoes, peppers, eggplant, etc.);
- It reduces the construction and heating costs of greenhouses, manual labor cost, consumption of water for irrigation and the amount of agro-technology operations on cultivation of tomatoes on 34 operation units, labor mechanics for 9.2 people per day, and workers on 669.8 people per day. Cost of diesel fuel will be reduced by 51.3 l / ha.



Agroecosystem: irrigated
Source: Catalogue of the V Republican fair of innovative ideas, technologies and projects, Tashkent 2012. Research Institute of vegetable, melon crops and potatoes.

TECHNOLOGY FOR PRODUCING AND APPLICATION OF NON-TRADITIONAL FERTILIZERS

- With this technology, organo-mineral fertilizer obtained from waste messes, vegetables, production waste containing organics industry elements, macro- and micronutrients that promotes the recovery and restoration of the ecological balance of the area where unconventional fertilizer are produced.
- The resulting innovative fertilizer contains not only macronutrients, but a lot of different trace elements, and also organics which increases the yield of crops;
- Production of nontraditional fertilizers prevents environmental pollution by waste and residues. As a result of the application of innovative fertilizer there is increase in the soil humus and other nutrients content.



Agroecosystem: irrigated

Contact person: Prof. J.S. Sattar, RISSAC

FERTILIZER APPLICATION SYSTEM TO GET A 50-70 DT / HA GRAIN YIELD OF WINTER WHEAT

- This fertilizer system aims to correct use of soil nutrients;
- increase grain yield and improving its quality;
- increase the effect of fertilizers;
- Prevention of environment pollution by fertilizers.



Agroecosystem: irrigated

Contact person: Prof. J.S.Sattarov, RISSAC

TECHNOLOGY FOR DEVELOPMENT OF HIGH-QUALITY SOIL FOR VEGETABLE PRODUCTION IN GREENHOUSES

- The proposed technology is used in greenhouses, and can significantly reduce the financial costs to get stable high yields of good quality;
- It is developed based on the soil (preferably average loamy soils) + leaf litter + strains of actinomycetes +strains of soil invertebrates.
- Able to meet the needs of greenhouse crops in the nutrient demand, without further feeding;
- Provides environmentally friendly products. Disposal of leaf litter solves the problem of the protection of the environment.



Agroecosystem: irrigated

Contact person: Professor Riskieva H.T., RISSAC

Technologies from WOCAT

Pasture rotation in the desert areas of Uzbekistan (CACILM)

- improvement of a livestock grazing scheme
- ensuring the restoration of pasture vegetation
- appropriate pasture loading



Agro ecosystem: pasture

Source: WOCAT, Uzbekistan

Use of mineralized artesian water to organize irrigated crop farming in the Kyzylkum (CACILM)

- land improvement through retention of topsoil, rehabilitation of vegetation cover
- prevention of overgrazing through reducing livestock pressure by organizing irrigated forage production



Agro ecosystem: irrigated lands

Source: WOCAT, Uzbekistan

Improvement of land under arid conditions through the creation of pistachio plantations (CACILM)

- This technology is aimed at the creation of pistachio plantations on gentle slopes to improve the land's productivity and to rehabilitate the arid land in the hill zone
- restoration of landscapes in the foothill and arid hill zone, adaptation to climate change and an increase in agricultural productivity and income

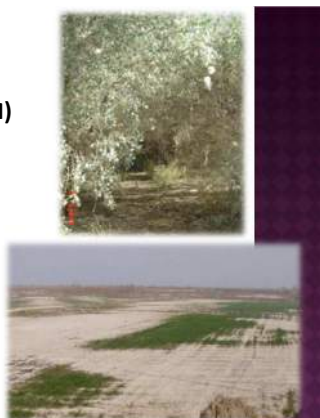


Agro ecosystem: pasture

Source: WOCAT, Uzbekistan

Afforestation for rehabilitation of degraded irrigated croplands (CACILM)

- increase the productivity of agricultural lands, rehabilitate agroecosystems and improve rural livelihoods through introduction of tree plantations on agricultural land
- increase of biomass, decrease of water supply, prevent soil salinity



Agro ecosystem: irrigated lands

Source: WOCAT, Uzbekistan

Creation of a perennial grass seed area (CACILM)

- Improvement of pastures through planting perennial legumes, cereals and grasses and creating seed banks
- To utilize the technology the following initial activities should be conducted: purchase of materials (poles, wire), soil processing (leasing of tractors and seeders), purchase of seeds for sowing, leasing of machinery for mowing and taking away the hay
- Since the grasses are perennial, there is no need for further activities, only nitric fertilizers should be applied from time to time



Agro ecosystem: pasture

Source: WOCAT, Kazakhstan

Off-season irrigation of fields and pastures as a mechanism for pasture improvement under climate change conditions in Southern Kazakhstan (CACILM)

- The purpose of this technology is the reduction of land degradation and desertification through the accumulation of moisture storage in the root zone of the soil during spring and autumn
- Establishment activities include:
 - 1) Reconstruction of the 12km canal, 5 floodgates and the furrowing in the fields
 - 2) Creation of sown pastures through sowing of forage crops: preparation of soil and Lucerne seeding, definition of irrigation norms
 - 3) Field training for rural inhabitants in the technology



Agro ecosystem: pasture

Source: WOCAT, Kazakhstan

Monitoring the condition of pastures (CACILM)

- Annual monitoring of pastures will make it possible to follow the dynamics of pasture condition and productivity and will allow to plan their use
- This approach enables a timely detection of changes in the condition and productivity of pastures under the influence of both anthropogenic and climatic factors



Agro ecosystem: Pasture

Source: WOCAT, Kyrgyzstan

Growing Arundo reeds (Arundo donax L.) to create buffer zones around households (CACILM)

- The purpose of this technology is to protect farmers' households from hot, dry winds and dust and to improve environmental conditions and economic livelihood of villagers
- One-off costs for planting Arundo will bring benefits to a farmer for at least 60 years without any additional costs



Agro ecosystem: irrigated lands

Source: WOCAT, Turkmenistan

Cultivation of sainfoin on high mountain pastures – Suusamyr Valley (in the frame of CACILM)

- Sainfoin improves the soil fertility. The cultivation of sainfoin should be rotated in all available fields
- Soil fertility conservation through crop rotation of barley with the perennial grass sainfoin
- This Technology also protects the soil surface from the erosion in the result of strong density of plants



Agro ecosystem: mountain

Source: WOCAT, Kyrgyzstan

Growing cereals by using minimum tillage(CACILM)

- A minimum tillage depth of 10-12 cm by a tractor with a ploughshare creates a friable soil layer, facilitates preservation of productive moisture until the agricultural crops' sowing
- reduce evaporation of moisture and CO₂ from soil
- eliminates the extreme soil compaction owing to the operation of heavy machinery and tractors
- create optimal conditions for soil micro fauna increase yield



Agro ecosystem: irrigated lands

Source: WOCAT, Kyrgyzstan

Production and application of biohumus

- Biohumus is produced by letting Californian red worms processing fresh manure filled into a trench
- As a result of the regular application of biohumus soil fertility has significantly improved
- Increase crop yield and improve soil fertility by application of organic fertilizer (biohumus)



Agro ecosystem: irrigated lands

Source: WOCAT, Kyrgyzstan

Planting forest on mountain slopes using moisture accumulating trenches (CACILM)

- This technology can be used to restore the forest or to create a garden on non-irrigated lands (bogara) with a high risk for farming
- In dry years the survival rate of plants, The productivity of pasture vegetation has been increased by 3 times from 4 centner/ha to 11.8 centner/ha. This technology does not require watering the planted forest for the first year after planting
- The depth of moisture near the root system is 1.8 times greater than in virgin soil due to the collection of rainwater in the trenches



Agro ecosystem: pasture and mountain

Source: WOCAT, Turkmenistan

Perennial Herbaceous Fodder Plants for Intact Canopy Cover

- increasing farm production of good quality fodder
- reducing soil erosion since their cultivation leads to a more intact ground cover throughout the year
- can be used to improve canopy cover on uncultivated (abandoned) cropland



Agro ecosystem: mountain

Source: WOCAT, Tajikistan

Drainage Ditches in Steep Sloping Cropland

- Drainage ditches are dug in steep cropland areas to reduce soil erosion by diverting excess rain water away
- At the top of the field a 50x50cm cut-off drain prevents run-on onto the field
- Construction of the technology is not time consuming or costly, however, drainage ditches and cut-off drains are completely ineffective if not maintained on a regular basis



Agro ecosystem: mountain

Source: WOCAT, Tajikistan

Rehabilitation of poor soils through agroforestry

- An agroforestry system used to improve soil fertility and increase crop yield: plum, peach, sweet cherry and persimmon tree seedlings were planted in lines with intercropping of potatoes, watermelon, beans and wheat inbetween on a plot of land, with poor soil quality
- Greatly increased income opportunity in an arid environment



Agro ecosystem: irrigated lands

Source: WOCAT, Tajikistan

Drip irrigation using polyethylene sheeting and intermittent cloth strips

- The technology is used to grow vegetables and tree plants;
- This technology requires polyethylene sheeting, and cloth strips for drip irrigation;
- The technology is beneficial for the environment as it prevents soil degradation;
- By reducing the amount of water used for irrigation the technology helps to save water;
- Can be used in greenhouses and under extreme climatic conditions.



Agro ecosystem: irrigated lands

Source: WOCAT, Tajikistan

Orchard-based agroforestry

- An agroforestry system where legumes and cereals are planted in fruit orchards, giving simultaneous production and conservation benefits
- Improvement of soil fertility and soil organic matter content (crop residue and leaves of trees as cover)
- Considerable reduction of soil erosion

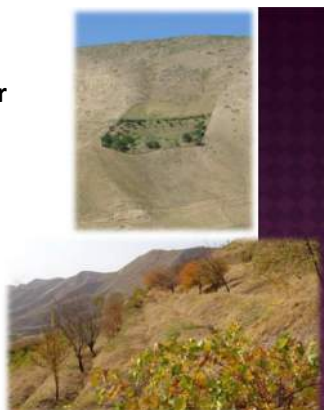


Agro ecosystem: irrigated lands

Source: WOCAT, Tajikistan

Conversion of grazing land to fruit and fodder plots

- Application of this technology is highly recommended for overgrazed pasture, which cause decreasing of vegetation cover, soil compaction and soil erosion
- Rehabilitation of degraded areas: reduced soil erosion;
- Production increase: good fruit yields;
- Diversification: different kinds of fruit trees growing on the plot



Agro ecosystem: pasture

Source: WOCAT, Tajikistan

Orchard-based agroforestry (intercropping)

- The technology involves intercropping wheat in an existing apricot orchard;
- Harvesting two crops at a time increases overall farm production and improves food security since harvests of intercropped food crops are found to be more reliable than those on exposed annual cropland;
- two harvests at a time, increase in farm production;
- improvement of soil cover by mulching, preventing soil erosion



Agro ecosystem: irrigated lands

Source: WOCAT, Tajikistan

Mulching in rainfed vineyards on terraces in the loess hill zone

- Mulching treatment increases soil moisture in the soil, improves soil quality such as soil organic matter and other elements and protects soil from erosion by water and wind
- Improves soil organic carbon, increases soil fertility
- provides shade to plant roots, and most importantly keeps soil moisture moderately in hot summer months



Agro ecosystem: pasture

Source: WOCAT, Tajikistan

Stabilization and afforestation of sand dunes around settlements in the Karakum Desert (CACILM)

- 2x2m mechanical sand dune fixation devices are used when winds of different directions dominate;
- improve environmental conditions and the sustainability of farms in the village in general
- vegetation on degraded pastures near the village is restored and infrastructure is protected against the advance of the desert
- application this technology assure sand dune stabilization for 2 years



Agro ecosystem: irrigated lands

Source: WOCAT, Turkmenistan

Approaches from WOCAT

Farmer Field Schools for improved agricultural practices in the irrigation zones of Uzbekistan

- training of farmers in sustainable agronomic and irrigation practices aimed at improving and increasing the productivity of soil by trained specialists (local)
- The subject area of the training must be aimed at resolving the issues of irrigated land farming specific to the training location
- FFS provides an opportunity for the training of farmers at the production site, within a suitable timeframe
- During the training in FFS, there is an opportunity to exchange experience and discuss peer-to-peer the issues and how to address them



Agro ecosystem: irrigated lands

Source: WOCAT, Uzbekistan

Joint pasture use planning

- The joint pasture use planning is the involvement of all stakeholders in the process of a balanced distribution of livestock, according to pasture capacities and seasonality of their use;
- The aim of this approach is the reduction/prevention of pasture degradation by joint pasture use planning;
- Participation of the local community in pasture use planning, which increases their responsibilities for pastures;
- Reduction and prevention of pasture degradation, preservation and rehabilitation of pasture ecosystems;
- Earning a stable income from livestock breeding.



Agro ecosystem: pasture

Source: WOCAT, Kyrgyzstan

Community-based forestry in Karakalpakstan

- Community-based forestry is aimed at preserving and restoring woodlands and reducing the threat of a loss of biodiversity through improving the forest resources management system by involving local residents in the forest restoration activities;
- Formation of personal and social responsibility for the condition of the forests among local residents.



Agro ecosystem: forest

Source: WOCAT, Uzbekistan

Joint pasture management

- joint management of pastures by considering opinions of pasture users with the view of prevention and mitigation of pasture degradation and an improvement in the living conditions of local communities
- Involvement of the local community in the management of natural resources, which can enhance their responsibilities for these resources
- Reduction and prevention of pasture degradation, preservation and rehabilitation of pasture ecosystem
- Capability of the local population to plan pasture management



Agro ecosystem: pasture

Source: WOCAT, Kyrgyzstan

СОЗДАНИЕ ШКОЛЬНЫХ ЛЕСНИЧЕСТВ ДЛЯ ВОВЛЕЧЕНИЯ МОЛОДЕЖИ В ПРИРОДООХРАННУЮ ДЕЯТЕЛЬНОСТЬ - ИСЦАУЗР

- Создание и деятельность школьных лесничеств на базе лесхозов и общеобразовательных школ для вовлечения молодежи в природоохранную деятельность.
- Экологическое воспитание, вовлечение подрастающего поколения в дело сохранения, восстановления и изучения уникальных лесов, начальная подготовка специалистов лесного хозяйства.



Агроэкосистема: орошаемое

Источник: ВОКАТ, Киргизстан

Rangeland management through the restoration of distant stock-breeding systems and the drastic improvement of rangelands

- The restoration of degraded rangelands and the improvement of their productivity through the rganization of distant stock-breeding and the introduction of pasture rotation;
- Restoration of the degraded pastures and increase of their efficiency by renewal of a traditional way of agriculture (seasonal pasture using) and pasture rotation



Agro ecosystem: pasture

Source: WOCAT, Kazakhstan

Farmer field schools

- Farmer Field Schools (FFS) are held to fill farmer's gaps in knowledge on the use of sustainable agricultural technologies, efficient irrigation water use and prevention of land degradation using trials tailored to local conditions;
- FFS were established with the aim to address the dissemination of sustainable agricultural technologies, and the introduction of new crops.



Agro ecosystem: irrigated lands

Source: WOCAT, Tajikistan

Mapping as a tool for the development of pasture use plans

- Mapping (development of pasture area maps) for the use of pastures with the participation of all stakeholders, as a basis for a balanced distribution of cattle depending on the capacity and seasonality of the pastures;
- Reduction / prevention of pasture degradation by mapping pasture areas, followed by the development of pasture use plans based on the elaborated maps.



Agro ecosystem: pasture

Source: WOCAT, Kyrgyzstan

Village-level participatory planning for sustainable agriculture and land management

- Design and implementation of participatory planning for village-level sustainable agriculture and land management investments through small grants for groups of upland farmers



Agro ecosystem: mountain

Source: WOCAT, Tajikistan

Sub-district (Jamoat) level support for sustainable land management

- Provision of technical and financial management assistance through Jamoat ("Sub-District") level organizations to farmers in a large small grants programme
- The approach aimed to use a sub-district level organization to provide more efficient, transparent and accountable services to farmers



Agro ecosystem: irrigated lands

Source: WOCAT, Tajikistan

Voluntary Labour Assistance

- Voluntary labour assistance for labour intensive activities whereby community members help each other in contributing labour on the basis of mutual understanding;
- Members of the labour exchange group (often relatives and neighbours) can ask for assistance when labour intensive farm activities need to be performed;
- Eases the labour problem with very little costs
- Eases labour shortages and stronger social relationships among community members.

Agro ecosystem: irrigated lands, mountain

Source: WOCAT, Tajikistan

Joint Land User Initiative

- Joint initiative neighboring land users to prevent soil erosion in steep sloping cropland
- Joint initiative helps to avoid possible disputes between neighbouring land users
- Approach helps reduce conflicts between land users
- The land occupied by the SWC technology is shared between land users
- Strong ownership of the approach

Agro system: mountain

Source: WOCAT, Tajikistan

Selection of SLM Technologies for Natural Disaster Risk Mitigation

- Community Based Natural Disaster Risk Management Workshops for identification of locations for the implementation of SLM technology to reduce the risk to the village from natural disasters;
- The approach helped link the prevention of natural disaster with SLM practices;
- The approach included a community training element that benefited a broader range than just the land users;
- The approach involved mobilisation of local government and community participation;
- The approach involved a range of stakeholders and experts who were all able to actively contribute. This could be enhanced by continued collaboration between all parties.

Agro ecosystem: irrigated lands, pasture, mountain

Source: WOCAT, Tajikistan

Village school participation and involvement

- A competitive tendering process for project grant money to implement identified SLM practices within a community, and on completion of the implementation activities the village school will be assigned ownership and responsibility for the maintenance and sustainability
- The objective of the approach is to find a mechanism by which you can involve large sections of the community, allocate land for the communities benefit, provide a mechanism for long term maintenance, and establish a demonstration area for cross site visits and educational training.



Agro ecosystem: irrigated lands, pasture, mountain

Source: WOCAT, Tajikistan

GENERALIZATION OF TECHNOLOGIES

	Collected	WOCAT	Totally
Technologies	19	21	40
Approaches	-	14	14
Totally	19	35	54



A photograph showing a group of people seated around a long table in a meeting room. The room has a white wall and a patterned curtain. The people are mostly men, some wearing suits, and they appear to be engaged in a discussion or meeting. There are water bottles and papers on the table.

№	Organization	№	Organization
1	Goskomzemgeodezskadastr	9	Uzbek Research Institutes of vegetables, melons and potatoes
2	ICARDA-CAC	10	Institute of Microbiology of the Academy of Sciences
3	Uzbek Scientific Production Center for Agriculture	11	National University of Uzbekistan named after Ulugbek
4	Council of Farmers of Uzbekistan	12	Tashkent State Agrarian University
5	Hydrometeorological Center of Uzbekistan	13	Tashkent Institute of Irrigation and Melioration
6	Uzgiiprovodhoz	14	Media
7	Research Institute for Soil Science and Agricultural Chemistry		
8	Research Institute on cotton production		

No	Name	Organization	Position
1	Akramhanov Akmal Farhadovich	ICARDA-CAC	Project coordinator
2	Nishanov Narimon	ICARDA-CAC	Component II leader
3	Kuziev Ramazon Kuzievich	SRISSAC	Director
4	Turdiev Sadikjon Turdievich	Council of Farmers of Uzbekistan	Chairman
5	Alimov Avazbek Halilovic	Goskommzemgodezskadastr	Head
6	Salih Khamzin	Uzgirovodhoz	
7	Abdullayev Alo Kayumhadzhaevich	Hydrometeorological Center of Uzbekistan	Head of department
8	Pulotov Alim Salimovich	Tashkent Institute of Irrigation and Melioration	Head of the center "EkoGIS"
9	Gafurova Lazizahon Akramovna	National University of Uzbekistan named after Ulugbek	Professor of the Department of Soil Science and Agricultural Chemistry
10	Turapov Ibrahim Turapovich	Tashkent State Agrarian University	Professor of the Department of Soil Science and Agricultural Chemistry
11	Bezborodov German Aleksandrovich	Research Institute on cotton production	Head of the department
12	Berezhnova	Uzbek Research Institutes of	Head of the department

No	Name	Organization	Position
13	Dzhumaniyazova Gulnora Ismailovna	Institute of Microbiology of the Academy of Sciences	Leading Researcher
14	Hakberdiev Obid Eshniyozovich	Tashkent State Agrarian University	Associate Professor, Department of Soil Science and Agricultural Chemistry
15	Jalilova Gulnora Tulkunovna	Tashkent Institute of Irrigation and Melioration	Senior Lecturer
16	Kadirova Dirabo Abdulkarimovna	Tashkent State Agrarian University	Assistant of the Department of Soil Science and Agricultural Chemistry
17	Tashkuzievich Maruf Mansurovich	RI of Soil Science and AgroChemistry	Head, department Head of the component 1
18	Abdulkarimov Nadir Yulchivovich	RI of Soil Science and AgroChemistry	Deputy director Head of the component 2
19	Bahodirov Zafar Abduvalievich	RI of Soil Science and AgroChemistry	PhD, Head of the component 3
20	Shadieva Nilufar Iskandarovna	RI of Soil Science and AgroChemistry	Executor of component 1
21	Saidova Munis Ergashevna	Tashkent State Agrarian University	Executor of component 1
22	Berdiev Tolib Tursunniyozovich	RI of Soil Science and AgroChemistry	Executor of component 1
Media			
23	Shamuradova Hurmatoy	Radio channel "Uzbekistan"	Head of the department
24	Natalia Shulepina	Internet news site - sreda.uz	Internet journalist

№	TECHNOLOGIES and APPROACHES	CRITERIA											Average
		1	2	3	4	5	6	7	8	9	10	11	
		TECHNOLOGIES											
1	Resource-biogas technologies and the use of organic waste for biogas production increase soil fertility and crop yields in farms	2	3	3	2	2	2	3	3	2	2	2	2.4
2	Agrotechnology improve soil fertility, organic matter enrichment it under irrigation by changing cultures "cotton - winter wheat," Crop repeated and intermediate.	3	3	3	3	3	3	3	3	3	3	3	2.9
3	Technology for producing organo-mineral fertilizers from poultry waste combined with the organic materials and minerals by aerobic biothermal fermentation	2	2	2	2	2	2	2	2	2	2	2	1.8
4	Agrotechnology for optimizing the properties of the low-fertile soils and producing organo-mineral fertilizers based on secondary resources	2	2	3	3	2	2	2	2	2	2	3	2.3
5	New bio-fertilizers to improve soil fertility and crop productivity	2	2	2	2	2	2	2	2	2	2	2	1.7
6	Conservation technologies to improving the fertility of degraded soils	2	2	3	2	3	2	2	3	3	2	2	2.5
7	Water-saving irrigation technology for cotton on shielded perforated polyethylene film furrow	3	3	3	3	3	2	2	3	3	3	3	2.9
8	Mulching the soil with polyethylene film (Plastic mulch)	2	2	2	3	3	2	3	2	2	3	2	2.4
9	Technology to increase the fertility of erodible soils under the irrigation	2	2	2	2	3	3	3	3	2	2	2	2.5

[illegible]

№	TECHNOLOGIES AND APPROACHES	CRITERIA											Average
		1	2	3	4	5	6	7	8	9	10	11	
		TECHNOLOGIES											
23	Agroforestry land reclamation for the rehabilitation of degraded irrigated lands (CACILM). Uzbekistan	2	2	2	2	2	2	2	2	2	2	2	2.2
24	Development of seed plots for perennial grasses (CACILM). Kazakhstan	2	2	2	2	2	2	2	2	2	2	2	1.7
25	Autumn and early spring irrigation as a mechanism to improve pastures in the context of climate change in southern Kazakhstan (CACILM)	2	2	2	2	2	2	2	2	2	2	2	1.8
26	Monitoring of pastures (CACILM). Kazakhstan	2	2	2	2	2	2	2	2	2	2	1	1.7
27	Growing bamboo reed (Arundo donax L.) as the shelterbelts around farmer households to protect from hot winds and for other economic purposes. (CACILM) Turkmenistan	2	2	2	2	2	2	2	2	2	2	2	1.7
28	Growing saffron in mountain agriculture – Susamyr valley (CACILM). Kyrgyzstan	2	2	2	2	2	2	2	2	2	2	2	1.7
29	Minimum tillage in grain crop production. (CACILM) Turkmenistan	2	2	2	2	2	2	2	2	2	2	2	1.9
30	Technology on production and application of bio-compost. Kyrgyzstan	2	2	2	2	2	2	2	2	2	2	2	2.2
31	Forest farming on the mountain slopes using moisture-accumulating trenches. (CACILM) Turkmenistan	2	2	2	2	2	2	2	2	2	2	2	1.8
32	Perennial forage grasses for untouched forest cover. Tajikistan	2	2	2	2	2	2	2	2	2	2	2	1.8
33	Drainage ditches on the steep slopes of arable land. Tajikistan	2	2	2	2	2	2	2	2	2	2	2	1.7
34	Recovering poor soil through agroforestry. Tajikistan (CACILM)	2	2	2	2	2	2	2	2	2	2	2	2.0

№	TECHNOLOGIES AND APPROACHES	CRITERIA											Average
		1	2	3	4	5	6	7	8	9	10	11	
TECHNOLOGIES													
36	Agroforestry (Forest Gardening). Tajikistan	2	2	2	2	2	2	2	2	2	2	2	1.8
37	Transition from grazing land to fruit and fodder plots. Tajikistan	2	2	2	2	2	2	2	2	2	2	2	2.1
38	Agroforestry (Forest Gardening). Intercropping. Tajikistan	2	2	2	2	2	2	2	2	2	2	2	1.8
39	Mulching rainfed vineyards on terraces in loessial hilly areas. Tajikistan	2	2	2	2	2	2	2	2	2	2	2	1.8
40	Dune fixation and reforestation on drift sands around settlements in the Karakum desert. (CACILM) Turkmenistan	2	2	2	2	2	2	2	2	2	2	2	1.7
APPROACHES													
41	Farmer Field Schools in irrigated areas	2	2	2	2	2	2	2	2	2	2	2	2.1
42	Joint - pasture -use planning. Kyrgyzstan – CACILM	2	2	2	2	1	2	1	2	2	2	1	1.5
43	Community - based forestry in Karakalpakstan. Uzbekistan - CACILM	2	2	2	2	2	2	2	2	2	2	2	2.3
44	Joint- pasture management. Kyrgyzstan – CACILM	2	2	2	2	2	2	2	2	2	2	2	1.7
45	Organization of the forestry units at school to involve youth into the environment conservation activity. Kazakhstan – CACILM	2	2	2	2	2	2	2	2	2	2	2	2.1
46	Pasture management through the restoration of transhumance system and radical improvement of pastures. Kazakhstan	2	2	2	2	2	2	2	2	2	2	2	1.8

№	TECHNOLOGIES AND APPROACHES	CRITERIA											Average
		1	2	3	4	5	6	7	8	9	10	11	
APPROACHES													
47	Farmer Field Schools. Tajikistan	1	1	1	1	2	1	1	1	2	2	1	1,4
48	Mapping in pasture -use planning. Kyrgyzstan - CACILM	2	2	2	2	2	2	2	2	2	2	2	1,7
49	Involving villagers to joint planning activities aimed at ensuring of agricultural sustainable development and effective land management. Tajikistan	2	2	2	2	2	2	2	2	2	2	2	1,7
50	Sustainable land management support at sub-district ("jamoot") level. Tajikistan	2	2	2	2	2	2	2	2	2	2	2	1,6
51	Voluntary support in the form of labor services. Tajikistan	2	2	2	1	2	1	2	1	1	2	1	1,5
52	A joint initiative of the land users. Tajikistan	2	2	2	2	2	1	1	1	1	1	1	1,5
53	Choosing of SLM technologies to reduce the risk of natural disasters. Tajikistan - CAMP Kuhiston	2	1	1	2	1	2	2	1	1	1	1	1,5
54	Establishment of rural farmer schools and Support. Tajikistan	2	2	1	1	1	1	1	1	1	1	1	1,4

THE RESULTS OF THE PRIORITIZATION	
Ecosystem	Name of technology
Irrigated	Technology 1. Agrotechnology to improve soil fertility, enriching soil organic matter under irrigation by Crop rotation "cotton - winter wheat" with repeated and intermediate crops
	Technology 2. Water-saving irrigation technology for cotton production on screened furrow perforated polyethylene film
	Technology 3. Conservation-biogas technology and the use of organic waste for biogas production to improve soil fertility and crop yields in farmer households
	Technology 4. Agrotechnology to prevent secondary salinity on reclaimed slightly saline soils in irrigated agriculture
	Technology 5. Technology to increase the fertility of eroded irrigated soils
Water conservation technologies	Technology 1. A method for improving the quality of cotton by irrigation furrow on land damaged by irrigation erosion
	Technology 2. Mulching the soil with plastic film
	Technology 3. Using artesian saline water for irrigation farming in the Kyzyl Kum
Reinfed	Technology 1. Zero and minimum tillage on degraded rainfed and irrigated soils, restoration and conservation of soil fertility for crop production
	Technology 2. New technology of minimum tillage for crop
	Technology 3. Agrotechnology to optimize the properties of poor soils and produce organic fertilizers based on secondary resources
Rangelands	Technology 4. Saving technologies for improving the fertility of degraded soils
	Technology 1. Rotation of pastures in the desert regions of Uzbekistan (CACILM)
	Technology 2. Improvement of land in arid conditions through the development of high-quality pistachio plantations (CACILM) Uzbekistan

Thank you !

Спасибо за внимание!