Climate Smart Innovative Agro-ecology

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Smallholder Agriculture

- Farming remains **the principal livelihood** of poor people in developing countries, and particularly the rural poor
- 85% of all farms are less than 2 ha in size
- There are approximately 451 million of these farms globally
- Farmers develop and keep genetic diversity that is important to respond to climate change and future human needs
- For more than 10,000 years, farmers have conserved, used and improved crops that feed the world.

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"Green Revolution" http//www.cimmyt.org/en/-"

- Past 3 decades = irrigation doubled, 18 folds fertilizer use >20 % per capita food production
- 1950-2000 =Grain production doubled, Yields grew 1-8 tons/ha
- Past decade=Total grain production grew by 145%
- Break through in more favorable agroecological zones

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Conventional agriculture: "Green Revolution" and industrial production

Negative impacts in *five* critical areas:

- **Land** degradation
- Greenhouse gas emissions - **GHG**
- **Water** use, quality and availability
- Loss of **biodiversity**
- Reduction in the diversity of **plant genetic resources** for food and agriculture
- **Ecosystems** connectivity and vigor

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Why Climate Smart Agro-ecology – OP6

- The use of the term "agro-ecology" is to highlight the strong added element of ecological considerations to the usual short-term production oriented agriculture.
- This is necessitated not only by the need to rehabilitate degraded lands but also to adapt to the changing climate which requires strong consideration for sustaining ecosystem services within and adjacent to farms.
- The growing concerns for more healthy food systems, and thus a holistic approach for sustainable farming with multiple benefits from climate resilience to farm productivity.
- Classic agriculture focuses on yields, income and crops, CSA focuses on stability of yields, income, quality and resilience

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What is Climate Smart Agro-ecology

- Uses ecological concepts and principles for the design and management of sustainable agroecosystems where ***external inputs are replaced by natural processes*** based on and ***enhancing natural soil fertility and biological control.***
- FAO: an agriculture that *sustainably increases productivity, resilience (adaptation), reduces/removes greenhouse gases (mitigation) while enhancing the achievement of national food security and development goals*.
- Neufeldt and al. (2013) claim that "any agricultural practice that improves productivity or the efficient use of scarce resources" can be considered climate-smart
- Underlying Principles: Recognizes "farmers rights" which allows and promotes farmers to keep conserving, using and improving plant genetic resources

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Project Typologies and Entry points for Climate Smart Agro-ecology

- 1st Genetic level; Promote ways that encourage adoption; change quality; crop manipulation to make it adaptable
- 2nd Farm level: Support/create farms that are climate smart; water use efficient, e.g: proper crop placement; manage biomass to minimize negative effects of winds, insects, etc..-Agro-ecology approaches/principles promoted
- 3rd Community level-Harmonized synergistic approaches and strategies
- 4th Landscape level: Encourage farmers to get together to share CSA practices

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Key Climate Smart Agro-ecological Strategies and Approach Principles

- Continual learning and Adaptive management
- Common concerns and entry point for interventions- objectives and values are shared; negotiations are based on trust; inclusivity at all levels
- Multiple scales (farm, community and landscape)
- Multi-functionality – landscape provide an array of goods and services
- Multiple stakeholders – resident and non-resident stakeholders
- Clarification of rights and responsibilities of actors (Farmers Rights)
- Participatory and user-friendly monitoring; people agree on assessment and gathering information
- Resilience – system level address threats and recovery and recuperation strategies
- Strengthen stakeholder capacity to deal with on-farm risks
- Negotiated and transparent change logic and good governance at all levels

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What are the Shifts from Classical Agricultural project (OP5) to a CSA project in SGP OP6

Classical Agricultural

- Focus: Yields, Income, and Crops
- Monoculture/capitalist approach as commercial farmers-preferred
- Individual farmers, inefficient use of water,

Climate Smart Agro-ecology

- Focus: Yields, Income, Stability, Resilience, Quality,
- Poly Cultures, farmer organizations, efficient use of water, soil fertility sustained,
- Incorporation of trees and animals into agricultural systems (Agro-Sylvo-pastoral);

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What are the Shifts from Classical Agricultural project (OP5) to a CSA project in SGP OP6

Classical Agricultural

- Environment is secondary objective;
- Use of fertilizers/pesticides for quick yields;
- Use of traditional knowledge less mainstreamed in production processes and farms fertility

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- Environment and Social safeguards are the primary objectives.
- Build, innovate and adapt on traditional knowledge

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Cultivation of wild endangered species (cumin, rhubarb, etc) and direct cooperation with NPAs

- 20 demonstration plots were established;
- 2 ha degraded lands were properly rehabilitated;
- 8 seed plots were established to receive seeds of rare and endangered plants for their further growing by the population;
- 12 micro nurseries for reproduction of horticultural crops and their wild relatives were established;
- Area under rare and endangered species is increased by over 1 ha

Project name: "Conservation and Recovery of Unique Native Wild Relatives of Plants Jointly with Communities Adjacent to Protected Areas of Kulyab Zone of Khatlon region". NGO "Ganji Tabiat"
Total project amount: $ 68,034 .00
Co-financing partners: The Christensen Fund

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Use of biological methods to Control Pesticides

- 1 small biologic factory for growing and producing entomophages (lacewings) was established;
- Total production of useful insects in the factory is 1,5 mln/ year;
- Use of this biological control methods reduced use of pesticides by 5.9 tons/ ha.
- 200 ha of degraded were properly rehabilitated by local farmers using insects;
- Over 100 local farms received access to the biological factory and biological pest control;
- 600 ha of agricultural lands increased its productivity from 4 to 7 metric centners;
- Incomes of local target farmers increased.

Project name: "Beneficial Insects as Important Factor in Protecting Lands against Erosion". NGO "Durandesh"
Total project amount: $ 39,736
Co-financing partners: NGO contribution

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Introduction of helioglasshouses and tunnel technologies:

- Demonstration plots organized as helioglasshouses of French (2 helioglasshouses: 10x5 m) and Chinese (2 helioglasshouses: 10x5 m) types and 12 tunnel technologies were established and introduced in the target households;
- 12 small compost and 5 biohumus pits were organized in the households to further develop ecological agriculture and improve soil fertility;
- Each family having 0.1 ha of a land plot reduced its expenditures on mineral fertilizers by up to USD 100; increased crop productivity and marketable appearance gave extra USD 200-250).

Project name: "Fostering Strengthening of Local Capacities and Community-Based Adaptation to Climate Change in Bobojon Gafurov district of Sughd region" NGO "APPR Nau"
Total project amount: $74,665.00
Co-financing partners: Act Central Asia, YGPE

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Introduction of composting method "From Garbage to Garden":

- 25 tones of biocompost (non-polluting organic fertilizer) produced yearly and used to enhance the fertility of 3-5 ha of land;
- Alternative waste disposal methods prevented the burning and/or destruction of 25 tons of organic wastes (fallen leaves, foodservice waste, agricultural wastes, and human biowastes) in a year;
- Crop productivity is increased by 12-15% (potato, tomatoes, wheat, cucumbers)
- Direct impact of the project received 350 beneficiaries, where 170 were women.

Project name: Demonstration of Innovative Agro-biotechnologies and Waste Disposal Methods Adapted to Climate Change in 6 Dekhkan Farms of Vakhdat Town .Association of Women Scientists of Tajikistan (AWST)
Total project amount: $60,535
Co-financing partners: NGO contribution, UNDP/GEF-supported SLMP (Sustainable Land Management Project)

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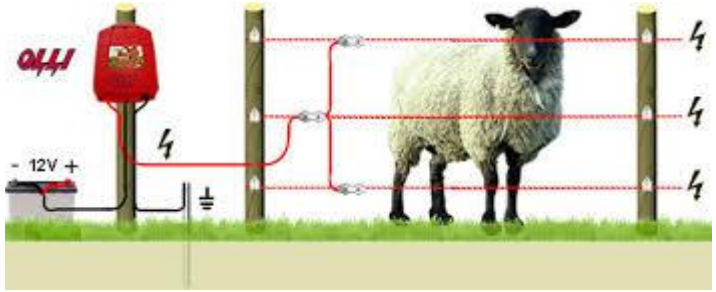
Introduction of contour line method for tree plantation (fruit trees, almond, nuts, etc).

- 3 nurseries were established in the mountain slope areas (counter line methods to prevent land erosion and landslides);
- 10 ha of forest area were properly rehabilitated applying best practices;
- 4 ha "Park of fruits" with special endangered species of fruit trees at an altitude of 2500 m a.s.l. were established;
- 20 farmers received a permanent job in the the established nurseries after the project completion

Project name: ""Climate Change and Adaptation Impact on Conservation, Recovery and Reproduction of Gene Pool of Horticultural Crop Endemic Varieties. Establishment of Agro-Forest Nursery Using Endemic Varieties. Use of Skills and Best Practices in Mountain Horticulture on Rainfed Slopes". NGO "Rushnoi"
Total project amount: $100.000
Co-financing partners: The Christensen Fund

Example 6: Tajikistan
Introduction of electric shepherd

- 6 installations were introduced to the 100 local farmers;
- Grass formation and pasture management of 500 ha were properly improved;
- 90 ha of degraded lands were properly restored – rationality introduced;
- 600 direct beneficiaries were trained on rational land use, growing fodder seeds, and combating desertification and soil degradation;
- SLM best practices demonstrated;



Project name: Sustainable and Efficient Management of Community Pastures (500 ha) through Better Forage Base and Regulated Livestock Grazing in Obisangbur, Dashti-Marzo and Fathaobod Kishlaks of Fayzabad Rayon
Service Center of agriculture, enterprise and information
Total project amount: $43,400
Co-financing partners: NGO contribution

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Example 7: Uzbekistan
Conservation agriculture

- Current practice
  - Excessive mechanical processing
  - Absence of crop rotation
  - Removal or combustion of plant residues
  - Excessive use of water

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Example 7: Uzbekistan
Conservation agriculture

- Proposed/tested practice
  - No tillage – land cultivation method of direct crops seeding into the soil without tillage , covered with mulch
    - Recovery of soil fertility
    - Restoration of soil moisture.
      2 000 cub/m/ha of water saved per season
    - Reduction of seasonal saline accumulation from 0.8% to 0.35%

    - Increase of profitability from 1.4% up to 13.2%
    - Decrease of CO2 emissions for 0.17tons/ha due to less consumption of fuel from 93 litres/ha to 8 litres/ha
    - Decrease of nitrous oxide emissions for 1.82 tons/ha

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Eligible SGP Agro-ecology Projects

- Support home gardens that are multi-story and multi-species systems
- Domestication of wild relatives and genetic resources
- Introduction/promotion of agro-forestry and agri-sylvo-pastoral systems
- Landscape planning/farm planning (proper crop placement for efficient use of water)
- Promote projects with broader applications on productive landscapes with innovative methodologies/practices
- Projects demonstrating continual learning and adaptive management;
- Multi-functionality – productive landscape provide an array of goods and services;
- Multiple stakeholders – resident and non-resident stakeholders fully involved
- Participatory and user-friendly monitoring: people agree on assessment and gathering information;
- Resilience – system level address threats and recovery/recuperation processes

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Key indicators at global and National Levels

- Number of farmer-leaders involved in successful demonstrations of typologies of agro-ecological practices incorporating measures to reduce farm based emissions and enhance resilience to climate change.
- Number of farmer organizations, groups or networks disseminating improved climate-smart agroecological practices
- Number of communities that demonstrate or are showing increasing levels of adaption benefits
- Number of farmers with multiple cropping systems in a landscape
- Number of hectares brought under productive and sustainable management practices (*contributes to Landscapes level indicators*)

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