Climate Change Adaptation through Improved Farming Systems
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Analyses of Agriculture Systems: Resources – Data - Information
Origins and Underlying Causes for Proliferation of Farming Systems

- Inherent Physical Vulnerability and Resilience
- Threats arising from current land use and development practice
- Threats arising from changing economic parameters:
  
  A. Stimulation of investment, increasing export and market orientation of the producers, tourism development. One of the consequences of these forces has been an expansion of mono-culture practices, often combined with contract farming for investors. This has led to a gradual yet pervasive transformation of farming and food production systems. The single most important factor for market-oriented production is the price (followed by quality of the goods) which usually requires the producer to streamline and rationalize agricultural production. This process needs the gradual introduction of a set of technologies for land management, water supply, seed and crop selection, pest management, harvesting, storage, etc. in order to reduce cost and, subsequently, offer reduced prices. However, because of the highly competitive environment for some agricultural products, the farmer is often forced to go beyond limitations of the agro-ecosystem, leading to various forms of environmental degradation (e.g. through the overuse of agriculture inputs causing negative impacts on water quality and soil fertility).
  
  B. The investment or work of a farmer into his/her farming system pays off only if the basic natural parameters (agricultural land, soil fertility, grazing land, water access, productive seeds, labour force, etc) remain relatively constant. In this regard the gradual introduction of market economics and inappropriate technologies into a traditional farming system based on subsistence smallholder farming has the effect of dismantling critical protective environmental features in-built within the system; inherited by experience and experience-based knowledge and observation.
  
  C. The consequences of changes in economic parameters affecting agriculture and food production is an important strategic issue; it is especially relevant in the context of quality and substance of the sector’s resilience to climate change. Given the small size of Lao PDR’s economy, squeezed between the substantial economic forces of China, Vietnam and Thailand, demand from their markets can easily have the effect of re-structuring agricultural production of Lao PDR, leading to a rapid transition away from subsistence farming. While re-structuring the agricultural sector in Lao PDR is unavoidable, and supply and demand are in principle central functions for production and productivity, attention has to be paid by GoL to the negative side-effects of such processes – and to the additional risks presented by increasing climatic variability and change.
General CCA Strategies Agriculture

- Natural Resources Management
  - Efficient and equitable water management, protection watershed
  - Forest protection and regenerative rehabilitation
  - Strategic use of land resource: use, access, ownership
  - Soil fertility improvement
- Farming systems: “Eggs in many baskets”, agro-biodiversity
- Innovative Production Systems
- Climate smart varieties and species
- Supply chain management - reworking value chain
- Conservative application of credit and finance systems
- Matching on- with off-farm opportunities: local production and processing, marketing
- Renewable resources and energy
Characteristics Upland Farming Systems

CCA Goal: Long-term arrest of declining resource base (forests, biodiversity, soils and water resources) and measures to regenerate these, reflective to critical local micro climate

- Variable farm conditions: slope, altitude, soil fertility, ethnic practice
- Several parcels: hilly “side slope”, “valley bottom”, uncultivated land
- Farms depending on forests for a wide range of good and ecological services
- Low soil fertility
- Critical water management
- Changing landscapes and erosion
- Limited infrastructure, roads, markets, services
Characteristics Lowland Farming Systems

CCA Goal: Long-term arrest of declining resource base (forests, biodiversity, soils and water resources) and measures to regenerate these, reflective to sustainable market analyses, including CC damages into cost of production

• Industrialization, commercialization, mechanization of agriculture
• Larger parcels of land - cash crop orientation
• Monoculture systems
• Lower level of bio-diversity
• Access to water, water management, irrigation
• Vulnerability to animal disease outbreak
• Soil fertility
Water Management

CCA Goal: manage availability, quantity and quality of water under unpredictable CC conditions

1. Minimizing water runoff in the farms: contour planting, soil erosion control, diversion, gully checks
2. Construction and improvement of village and farm ponds
3. Efficient use of water from irrigation systems and ground water, micro irrigation, trip irrigation
4. Improving soil water holding capacity
5. Adapted farming during floods
6. Protection of watersheds and groundwater
Soil Fertility Improvement

CCA Goal: minimize losses from dry or wet conditions through healthy plants on fertile soils

1. Enhancing role of legumes through multiple cropping: peanut, mung bean, rice bean, cow pea etc.
2. Enhancing role of trees: water infiltration, build up organic matter, protect micro-organism, pump up nutrients, leaf biomass
3. Integrating livestock production: natural fertilizer, on-farm forage/fodder production
4. Bio-fertilizers: composting, bio-extract liquids from fermentation of vegetables and fruits
5. Mulching: protective cover, straw for improving soil
Innovative Production Systems

CCA Goal: improve access to nutrients, conserve moisture, avoid chemicals – adapt to natural processes

1. System for Rice Intensification SRI
2. Direct Seeded Mulch-based Cropping Systems (SVC): conservation agriculture
3. Organic agriculture: small scale vegetable production
Crop Diversification

CCA Goal: increase diversity to compensate low yields of main crop affected by climatic variations, flood and drought

1. Legumes and vegetables with 1-3 month harvesting period
2. Multiple cropping – the right crop combination
3. Planning for intercropping
4. Community production of vegetable seeds and planting materials
Gardens and Nurseries

CCA Goal: promote knowledge on CCA, diversification, income generation, nutrition, health, enhanced food security – household resilience

1. Market production
2. Home gardens
3. School gardens
4. Seed production and nurseries,
5. Community-managed or commercially organized
Integrated Pest Management IPM

CCA Goal: resilience of crops, livestock, farm family against new or modified pests and diseases appearing with changes in temperature and water regime

1. Successful as part of Farmer Field Schools FFS
2. Ecosystem approach
3. Healthy soil – multiple cropping – knowledge on harm and helpful biology – hygiene – botanical pesticides – use and disposal of pesticides
Post-harvest Handling

CCA Goal: minimize loss of production associated to changes in water regime, flood, drought, temperature, singular climate events, wind, new pests and diseases

1. Optimize harvesting practice and timing
2. Cleaning – Drying
3. Sorting
4. Packaging
5. Cooling
6. Storage
7. Processing
Review Extension Materials

CCA Goal: consult and document local knowledge and existing extension materials on adaptive technologies

1. Documentation local practice
2. Leaflets
3. Brochures
4. Manuals
5. Handbooks
6. Research Centres
7. Internet
8. Build up a CCA knowledge base at NAFRI
THANK YOU VERY MUCH

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