AGROECOLOGICAL RISK AND RESILIENCE SCREENING TOOL

GUIDANCE FOR CONSIDERING AGROECOLOGICAL IMPACT OF AGRICULTURE INTERVENTIONS AND IDENTIFYING OPPORTUNITIES TO BUILD RESILIENCE IN FOOD SYSTEMS

Version 1.0 for Field Testing and Consultation

CONTENTS

I. Introduction – Principles, Purpose and Method

Improving smallholder agricultural productivity holds great potential to address poverty, improve household nutrition and build resilience. At the same time, this is generally achieved through strategies which modify and intensify the utilization of natural resources. In order to ensure that increases in agricultural productivity are sustainable and do not increase vulnerability over the long term, the likely agroecological impacts of proposed strategies should be examined. This tool seeks to provide a structured approach to looking at the potential agroecological impact of agricultural interventions.

Analyzing the potential of agriculture interventions to do harm to food production systems and create opportunities to build resilience within them requires looking at the entire food system. This includes the agroecological, biological, farming and market, social and political systems, as well as the interactions between these components. A deep consideration of these sometimes complex interactions is necessary in order to ensure program interventions in one area of a food system do not have unintended negative effects in other dimensions of the food system and inadvertently increase vulnerability of households or the agroecosystem. The overall goal of this screening tool is to support productivity and income generation for smallholder farmers with a long term vision towards resilience. The tool utilizes a food system perspective and agroecological principles to guide those who design and implement agriculture and food security programs through a series of inquiries into how their interventions may affect the resilience of food systems and of those who depend on them. This application of **agroecological principles** to context analysis and program design is especially useful in minimizing the depletion of crucial natural capital of smallholder farmers. By identifying opportunities to leverage and maximize available resources in resource scarce environments, programs may enhance the resilience of productive, sustainable agroecosystems and the households, markets, and food systems which rely on them. These agroecological principles include:[1]

1. **Preservation and enhancement of agroecosystem diversity**
2. **Conservation and enhancement of soil health and nutrient cycling**
3. **Supporting ecological pest and disease regulating mechanisms**
4. **Maximizing renewable energy potential**
5. **Supporting and Diversifying livelihoods to manage and mitigate risk exposure**
6. **Prioritizing & enhancing local food production and food security**
7. **Reducing dependence on external synthetic inputs**
8. **Optimizing water use - preserving and regenerating water resources**
9. **Integrating local and scientific knowledge**
10. **Strengthening local organizations**

[1] Adapted from: *http://agroecology.org/Principles_List.html*

What are Food Systems? The components, which may include land, agricultural systems, people and animals, as well as the set of activities and relationships (biological, economic and social) that interact to determine what and how much, by what method and for whom, food is produced, processed, distributed and consumed.

What is a Resilient Food System? For Mercy Corps, resilience is defined as the capacity of communities in complex socio-ecological systems to learn, cope, adapt, and transform in the face of shocks and stresses. A resilient food system is one that has the capacity to 1) absorb or withstand external stresses or shocks, and 2) is able to adapt to and recover from the effects of these stressors or shocks. Applying a resilience lens to food system analysis and programming requires that we pay particular attention to the **interactions** between key components or subsystems - recognizing that shocks, stressors, and even interventions themselves that impact one part of the food system can have additional impacts or unintended consequences on other system components, and potentially, the entire system.

The approach distills food system components into areas of specific relevance to Mercy Corps' Agriculture & Food Security strategies: 1) Agroecosystem Productivity, Health & Sustainability 2) Household Food Security & Nutrition 3) Value Chains & Markets, and 4) Environmental Shocks and Climate Change. By utilizing this tool, program designers and implementers both in the field and at headquarters will be able to better ensure a strategic approach to food security and agriculture that builds resilience and avoids harm in smallholder farm systems.

How and When to Use

In utilizing the tool, those responsible for program development and design are encouraged to convene an 'Agroecological Risk and Resilience' screening session, either in the field or remotely, to thoroughly discuss the guiding questions as they relate to the proposed interventions. The length of the screening session will depend on the size of the program and the types and number of interventions which are being proposed. In general, a half-day should be allocated if adequate consideration is to be given to the questions. It is recommended to designate a facilitator for the screening session as well as a note-taker who will be responsible for recording and collating details of the discussion. On proposals which involve smaller teams or one individual, the screening tool may also be utilized on an individual basis. Teams proposing agricultural interventions are advised to engage with these questions **during** the program design phase, especially **before** defining agricultural or value chain activities to be supported and/or established.

It is important to note that the screening questions are meant as guidance for engaging teams to reflect on system interactions and not all questions will be applicable to all smallholder farm systems. A simple yes or no answer to most questions does not necessarily infer that harm is or is not being done. To make such determinations, an understanding of the underlying specific agroecological, economic and food security contexts, as well as the situation specific trade-offs which might be necessary for increasing

productivity and ensuring sustainability is important. Thus, while the screening sessions will be useful in assisting teams to identify key issues of concern, the next, and perhaps most important and intensive, step in the process will be to conduct extensive follow up research on points of concern and potential opportunities identified during the screening session. It is expected that technical staff and generalists may not have expertise in all themes addressed and that further follow up research will be necessary to reach the ultimate goal of the tool – mitigating risk and identifying opportunities to build resilience in smallholder farm systems.

The tool consists of two sets of questions. The first section, "Do No Harm Guiding Questions," facilitates users in identifying potential harmful practices, while the second section supports users to actively identify "Potentials for Building Resilience." In order to use this tool effectively, practitioners should apply it alongside, not in substitute of, the secondary data analysis and assessments which normally accompany program development with regards to the local agroecosystem, agricultural and value chain context as well as associated ecological vulnerabilities, both long and short term. The ***Natural Resource Summary*** *(*Tables A and B in Annex 2) can be used to summarize the locally specific natural resource capacities, constraints and vulnerabilities which are necessary to understand when conducting the agroecological analysis.

Users of the tool are encouraged to utilize following worksheets provided at the end of the document to support information gathering, sharing and decision making: (1) **Proposed Project Intervention Screening Worksheet** (2) **Agroecological impacts and mitigating actions and resiliency building** (3) **Do No Harm and Resilience Opportunities Summary Form** and (4) **Decision Making Based on Best Bet Analysis.** Finally, some teams utilizing the tool will find that many of these questions have not yet been asked of current or past programs. However, this should not be a point for discouragement but an opportunity for increasing understanding of complex system interactions and improving program quality into the future.

II. Do No Harm Guiding Questions

The screening questions in this section seek to address four broad categories of sustainable food and nutrition systems identified by Mercy Corps: 1) Agricultural production and sustainability; 2) Household food security and nutrition; 3) Value chains and markets; 4) Environmental and Climate Change and other shocks and stressors.

Agricultural Production and Sustainability:

Agroecosystem Diversity

- Is there a risk that program activities, messaging and incentives will actively or inadvertently reduce the diversity of crops, plants or animals farmers incorporate on their farm?
  - In what ways might the program actively promote or inadvertently encourage or incentivize monoculture production systems or low crop diversity?

- Could program activities result in limiting or decreasing genetic diversity of each crop species?
  - Are there risks to diversity associated with introduction of new seed varieties, non-native or invasive species of animals or plants?

- Could program activities result in reduced diversity of other production system elements that support crop quality and quantity? For example: What are the potential effects of production strategies on diversity of beneficial insects, soil biology, soil nutrients and mycelium?

Reduced Reliance on External Agricultural Inputs: General

- Is the program recommending, facilitating and/or incentivizing the use of external inputs, such as fertilizers, herbicides, insecticides or fungicides? Which inputs is the program engaging with?

- Are the recommendations or facilitated linkages to access the specific inputs based on evidence of need with regard to identified production barriers? Can these barriers be overcome in ways which would not require farmers to invest money in inputs - for example, using available on-farm soil modifiers?

- If the program is recommending the use of external inputs for soil fertility or pest management, what are the potential long term impacts of each input on the following?
  - Health of beneficial organisms (i.e. natural enemies of pests) or wildlife
  - Water resources
  - Soil nutrients and health
  - Human health

- Does depending on certain inputs leave farmers vulnerable to price increases and volatility of fossil fuel markets? How seriously may this affect farm net profits?

- Can we conclude that the use of these inputs is economically and ecologically viable over the long-term?

- If synthetic inputs are promoted, can the program work with existing extension officers and farmers to ensure trainings and education on appropriate dosing and application as well as the potential negative impacts of excessive use of synthetic pesticides and fertilizers on human health and the environment?

Focus: Soil Health and Quality

- Are inorganic fertilizers currently used? Which ones and what specific needs are they fulfilling?

- Is the program promoting the use of synthetic, inorganic fertilizers?
  - If so, what specific issues or problems in soil fertility were identified that would be addressed by these fertilizers?
  - If synthetic fertilizer is proposed, what are the potential effects of the proposed fertilizers on the soil biology, PH, and salinity? What are potential unintended consequences long-term?
  - Have other options to address these underlying soil fertility issues been proposed? What options are being explored?

- How do current soil preparation and cropping practices affect soil conservation and quality?

- Would you characterize the proposed production strategies as capable of building long term soil fertility? Alternatively, will production techniques potentially deplete or 'mine' nutrients from the soil without replenishing them?

- Does the program promote agricultural practices that may increase soil erosion?

Focus: Pest and Disease Regulating Mechanisms

- Will the program support the use of wide-spectrum synthetic pesticides? Fungicides?
  - Have the potential agroecological and human impact of the proposed pest and disease management strategies been assessed? What are the potential effects on soil biology, beneficial organisms that predate on pests and on water resources? What are the known effects of these pesticides/fungicides on human health?
  - If pesticides or fungicides are needed, is training sufficient with respect to dosage, protection of water sources and the potential harmful effects to farmers and their families if used/stored/disposed of inappropriately?
  - If pesticides and/or fungicides are being promoted, what is their cost and how does this impact farmer's net profits?
  - What additional low-cost, on farm, agroecological options to addressing these underlying pest and plant disease issues might be researched and proposed?

Focus: Optimize Water Use, Preserve and Regenerate Water Resources

- How much water will the intervention require? What is the source of this water? Reliability of water sources? How will water use be monitored?

- Will agricultural activities promoted by the program require irrigation systems?
  - If so, what are the water sources available to farmers?
  - Are the water sources renewable?
  - Can the cost and maintenance of any irrigation scheme be justified long-term given local income and poverty profiles?

- In general terms, describe the potential water footprint of the proposed intervention? Could any activities promoted by the program have a potential negative impact on water resources (depletion, contamination, disruption of water resources for this or other communities for agricultural and non-agricultural use)?

Support Sustainable Livestock Production

- Will interventions increase the number of livestock? (i.e. restore to normal levels or increase above past numbers through re-stocking, improved animal health, introduction of more intensive production systems, or an increase in available feed resources?)

  - Are there sufficient grazing/ fodder resources in the natural environment to support this increase? (check for existing signs of over-grazing, estimate likely percent increase in total livestock population, consider an animal feed resource inventory where appropriate)

- What proportion of the proposed nutrition of any additional animals and current livestock population will be directly provided through project actions? (rangeland improvement, irrigation, fodder production, animal feed market development, increased crop by-product availability)

- What proportion of the livestock diets will be met by (a) grain/cereals, (b) agricultural by-products (including straws) and (c) natural vegetation (grasses and browse)[2]? What are the carbon and water footprints of these inputs? Have the various economic, food security and agroecological trade-offs (costs and benefits) of using grain/cereal feeds been considered?

- Is there sufficient, reliable access to surface drinking water throughout the year? If not, how will water be sourced?
  - Does the planning and provision of water for livestock consider the likely effects on livestock densities and movements and related environmental impacts?

- Is there likely to be competition for resources between targeted project livestock keepers and (a) existing livestock keepers (b) existing horticulturalists? What are the agroecological implications (positive and negative) of any changes/interactions in resource flows?

- Does **conflict over natural resources** by livestock producers currently occur? Consider the potential for increases or other changes in livestock production systems to aggravate/cause conflict, especially due to increased environmental pressure and natural resource competition.

[2] This would be best expressed as a proportion of mega-joules of energy rather than by feed intake weight.

- Is increased off-take of animals proposed or planned?
  - In normal times through shortened production periods and/or improved market access? If so, how much shorter will the time animals take to reach saleable age be?
  - In drought, through emergency destocking?

  To analyze these questions it is useful to disaggregate the livestock population by species and for each species into breeding animals and younger/male stock intended for fattening/marketing.

- Is there an **animal health plan** for the new animals and clear identification of animal health services with capacity to deliver the animal health program? Increasing animal populations without adequate animal health services and disease control capacity not only risks the loss of the introduced assets with no return on resources consumed but may also support propagation of disease within and beyond the wider community herd/flock.
  - If animals are introduced from outside the existing production-marketing system, has the potential of introducing diseases been considered and mitigation measures put in place?
  - Is the consumption of milk or other livestock products an intended outcome of the project? If yes, have the **food safety** risks of milk-borne and other zoonotic diseases been considered (e.g. brucellosis) and appropriate animal and/or public health measures put in place? What capacity is there to deliver the appropriate services?
  - How are milk and meat handled? Are there basic food hygiene issues which should be addressed to ensure safe animal products?

- How will **animal waste** be managed?
  - Is there an estimate of the likely amount of animal waste which will be produced? Consider both processing waste (and related water consumption) as well as production related waste (most important for mono-gastric species -chickens, ducks, pigs- kept in peri-urban settings).
  - How will effective containment and collection of waste be achieved?
  - Is there a risk that animal or processing waste (at production, market and processing locations) could contaminate water sources and peri-urban areas? If so, what mitigating actions and management plans are proposed to prevent this occurring?
  - Will animal waste be recycled back into agricultural systems? If so, how? Are there public health issues relating to zoonotic disease transmission to consider?
  - Can the waste be used as an organic fertilizer, promoting an integrated approach and re-cycling nutrients? If so, is there a written plan to quantify and appropriately manage waste production and processing to generate energy (e.g. biogas) or to compost waste and use as an organic fertilizer? (Planning is necessary to reduce potential pathogens and improve bio-availability of nutrients).

- Has the potential **loss of biodiversity and loss of local breeds** been considered? Introducing 'improved' breeds can actually reduce diversity by replacing or diluting the genetic pool represented by traditional breeds - the livestock equivalent of mono-cropping. Introduced, 'improved' breeds may produce more under favorable conditions but has their resistance to endemic diseases and tolerance of harsh conditions been considered? How have trade-offs between risk reduction and production maximization been determined?

- Is a **change in crop production/land use** proposed? How is the current crop/land use integrated with livestock production and how are the new crop/land use practices being integrated with livestock production? (e.g. feeding of straws, crop by-products post-harvest and post processing agri-byproducts)

- Is there a plan to use animals for ploughing or other **draught power** actions? If yes, what measures are in place to ensure that increased tillage will promote conservation of soil structure rather than damage it? What are the fossil fuel savings of using draught power?

Household Food Security and Nutrition - Food Availability and Access

- Do farmers currently consume a proportion of the food grown on their land? If so, which crops? What proportion of diet is produced on farm?

- Do farmers currently sell a proportion of the food grown on their land? If so, which crops?

  Estimate
  - a. % of landholdings dedicated to producing food consumed in household
  - b. % of household food needs met by own production for consumption
  - c. % of landholdings dedicated to crops sold for income
  - d. % of household food needs met by income generated from farming activities
    [Total income generated over 1 year/12] / Monthly cost of diet for local HHs

- Will the current program shift the proportions or amounts of land allocated and food grown for consumption or sale? If so, how? How is this expected to impact household food security?

- If income gains are expected from the intervention, what are they?
  - What % of household food needs will this increase in income meet?
    [Total increase in income generated over 1 year/12] / Monthly cost of diet for HH
  - Is this improvement sufficient to significantly improve household food security?
  - Would increasing activities focusing on production for consumption hold more potential for increasing food availability and access at the household level?

- Is there potential that program activities will encourage or incentivize farmers to shift current production patterns in ways which will reduce diversity of pathways to food availability and access for the smallholder household? For example, shifting farmer households to over depend on production either for income or production for consumption, may increase vulnerability by over exposing farmer households to risk to one type of shock (i.e. market shocks, fuel price increases, climate related crop failure and natural disasters).

- Will the production strategies promoted for income generation provide sufficient net income to ensure year round food access for the household? Do we have evidence of improved food security nutritional outcomes for other local farmers who have already adopted similar strategies being promoted?

- Will the proposed production strategies result in sufficient combined 'production for consumption' and income to cover the dietary needs for average households? If there is a gap, how will is this gap be filled by households? Other livelihoods?

Household Food Security and Nutrition - Food Utilization

- Is the program potentially encouraging or incentivizing farmers to change production patterns in ways that would decrease diversity of nutritious crops grown on the farm which are directly consumed by the household?

- Is behavior change and/or nutrition education programing included in the agriculture component of the program to ensure production methods and choices take a nutrition sensitive approach?

- Are households receiving appropriate training to prepare, cook and utilize new crops and animal products for improved nutrition as well as harvest and store crops and animal products for conserving nutrients?

Value Chains and Markets:

- Could promotion of certain crops and livestock products increase exposure to income uncertainty due to price volatility in local and/or international markets? Have proposed crops been assessed for price volatility in local and international markets?

- If market linkages are being facilitated with extension services has the program conducted analysis of agroecological effects of extension services which will be provided and promoted?

- Are market linkages and services to smallholder farmers potentially increasing dependence on external services or external inputs for production? What are the potential risks, both currently and into the future, of depending on off-farm, external input markets for production?

- Are market linkages increasing cost of production for smallholders? Are increased costs guaranteed to be offset by resulting optimized productivity, or potentially exposing farmers to increased risk?

- Are crop and/or livestock insurance products available for small holders to help manage risks relating to greater investment costs and input and output price fluctuations?

- Is participation in selected value chains financially and ecologically viable for households?

General

- What actions are planned to build awareness of agroecological principles and practices amongst farmers and agricultural institutions? (public and private sectors and civil society groups)

- To what extent has indigenous knowledge of farmers, livestock keepers and other users of natural resources been solicited in assessing and analyzing intervention strategies and how has the information and decision making been communicated and shared with those who will be affected by the project?

- What monitoring measures will be implemented to confirm do no harm assumptions and identify and remedy any unintended negative consequences? Document and promote positive ones as well. To what extent are local producers and institutions engaged in this process and will results and findings be shared?

III. Potentials for Building Resilience

The guiding questions in this section seek to identify opportunities to layer activities through the program which build resilience in agroecosystems, agricultural productivity and households of the program area. Where agroecological approaches are employed, consideration should also be given to ensuring that there will be adequate, sustainable, local technical support systems and those agroecological impacts will be monitored and measured.

Promoting Agroecosystem Diversity

- How can the program actively work to increase the number, diversity and genetic diversity of crops and/or animals on the farm?

- How can the program leverage crop diversity to serve multiple on-farm and household functions? Examples include: production of biomass for fuel, mulching, compost; companion planting to maximize beneficial relationships in soil nutrient demands and regeneration; integrated cover crops and maximized vertical space potentials.

- How can crop diversity in space and over time increase beneficial interactions to build soil fertility? Have cover cropping, use of nitrogen fixing legumes and trees, cycling plant and animal byproducts into the soil been considered and introduced?

Enhance Soil Fertility

- What opportunities exist for the program to support the production and use of organic or biological fertilizers, especially locally available soil modifiers, promote cover crops and integrate crop rotations and companion planting to increase consistent availability of nitrogen and other nutrients?
    - Is there an opportunity for the program to introduce or enhance composting practices to build soil nutrients?
    - What on-farm resources are farmers currently using or could the potentially use to improve soil fertility?

- How can the program support farmer uptake of soil conservation practices, such as living barriers and swales for erosion control in steep slopes?

- How can the program promote mulching and mulch production?

Ecological Pest and Disease Regulating Mechanisms

- How will the program promote biological or cultural pest control practices? What local and traditional strategies exist for protecting crops from identified threats?

- Will the program promote diversified crop production that may help resist pest and disease pressures?

- Which production strategies can be promoted that minimize negative impacts on beneficial insect populations and support beneficial plant-insect relationships? Can the program support plantings of 'insectary' habitats to attract beneficial insects?

Maximize Renewable Energy Potential

- Can the program explore the use of renewable energy sources?
  - Is there an opportunity to support renewable household energy use, such as firewood from agroforestry plots, live fences, windbreaks shaded crops and/or woodlots?
  - Is there available and appropriate renewable technology, such as solar, small hydrological and wind, etc., which could be tested or promoted?

- What alternative to fossil fuel based agricultural inputs have been identified? Are these viable economically and ecologically at the scale needed for farmers targeted in the program?

- How can the program support farmers in building more efficient nutrient cycling systems to reduce future financial and environmental costs of external inputs (e.g. composting, mulching, gravity fed systems, livestock integration, agroforestry practices)?

- Can farmers be introduced to design principles which emphasize use of energy gradients (gravity), element placement and 'zones' which enable energy savings, both human labor and otherwise, to accomplish tasks and move resources (water, waste, compost etc.)?

Optimize Water Use, Preserve and Regenerate Water Resources

- Can the program integrate sustainable water management and conservation practices?
  - If water is scarce, can the program support water management and harvesting practices to maximize resources, reduce waste and loss to evaporation? (Swales; net and pan techniques; planting soil retaining and water sinking tree and grass crops on contour, integration conservation agriculture practices, timely watering and recycling waste water)
  - If irrigation is being used, how is the program monitoring conservation and replenishment of water sources?
  - If water is scarce or linked to disease, can the program integrate grey water systems?

- Can the program integrate knowledge transfer to extension workers and farmers regarding adequate use and conservation of water as well as prevention of contamination?

Integrated Livestock Production

- Have livestock interventions been considered as part of a resilience-building approach? (Diversification of livelihoods, risk spreading/management, potential productive synergies with cropping to enhance nutrient cycling, improved dietary diversity, asset development, improved food security)

- What diversity both within livestock production (a mix of species and production systems) and between livestock and cropping systems has been considered?

- Can livestock and cropping be better integrated to create beneficial relationships within the farm system and enhance nutrient cycling? (e.g. use of crop straws and agricultural byproducts as animal feed to replace grain-based diets, pig-duck-fish production systems, duck-rice production, understory grazing)

- Can animal production systems be designed to improve delivery of **environmental services** (e.g. rangeland management and seed dispersal (ruminants), pest control and organic fertilization (poultry), feces removal (pigs))? Is bee keeping viable economically and likely to provide substantial environmental services (pollination)?

- Can the program support the improved management of animal waste to promote healthy environments and nutrient cycling, whilst reducing use of inorganic fertilizers?

- Can the program integrate management of rangeland and other grazing areas to reduce soil compaction, increase biomass quality and quantity and promote soil quality to better sustain the livestock population?

- How might animal traction support timely preparation and cultivation of (more) land for small holders through reduced labor and availability of sustainable, local resources? What technologies could be introduced to improve efficiencies of animal traction?

- In what ways do livestock products and services strengthen important, resilience building social bonds and develop social capital?

Household Food Security and Nutrition: Food Availability and Access

- Will the program seek to increase the diversity and redundancy of paths to food access for smallholder farmer households? (i.e. ensure access to food is not dependent on only one pathway, purchase or production) What can the program do to increase diverse production for both income and for consumption?

- What additional measures can be taken to secure food access in the case of failure in one or more food system components (crop failure, market failures, disasters, insecurity)?
    - How might the program mitigate potential threats to household resilience by smoothing food access and consumption throughout the year and reduce seasonal hunger?
    - What can the program do to reduce farmer's exposure to food price volatility in local and international markets?
    - What local structures might the program facilitate to enable collective food purchasing and agricultural sales in order to obtain the best prices, avoid or capitalize on seasonal fluctuations, and mitigate against high food prices for staples (e.g. corn, wheat, etc.)?
    - Will the program support food storage practices which reduce losses and that are nutrition sensitive?

Household Food Security and Nutrition: Food Utilization

- What gaps have been identified in availability and consumption of local foods required for good nutrition?
    - How can the program support the diversification of foods 'produced for consumption' which fill these consumption gaps?
    - What strategies can the program use to encourage production of crops which meet nutrition gaps in the local population, especially with regards to protein and critical micronutrients (Iron and Vitamin A)?

- How can the program facilitate markets for nutritious crops which meet local dietary gaps in a way that will increase farmer's incomes and make these nutritious foods widely available in markets?

- Can the intervention layer programming in such a way that provides farmer households with appropriate knowledge to prepare, cook and utilize new crops for improved nutrition?
  - Are trainings at the adequate educational levels?
  - Are trainings culturally appropriate and focused on easily adopted technologies?

Value Chains and Markets

- Where a value chain based approach is used, can it promote locally appropriate technologies and inputs that can be adopted, managed and cost-effective in the long-term?

- Can the program support partnerships with multiple value chain actors? (Especially for communities producing commodities such as coffee, cacao, tea, sugar, etc.)

- Can the program work with extension agents to expand the services provided to farmers to include agroecological practices and farm system design?

- Can the program facilitate the functioning of robust local food markets?

Climate Change and Vulnerability to Shocks

- What is the vulnerability profile in the project area with ecological and climactic shocks?

  - Have droughts, floods, landslides or other ecological and climatic extreme events been a challenge in the past?

  - What has been the impact of those events on critical, natural resources (soil, water sources), infrastructure (storage facilities, irrigation, roads, animal shelter)and the agricultural activities HH/communities are engaged in?

  - Does any evidence exist that the frequency or intensity of extreme weather events, such as hurricanes, storms, tsunamis, etc. are expected to increase?

  - Are there adequate risk reduction plans or systems in place or are they planned as part of this work?

- Are temperatures and precipitation projected to change in the project area over the long-term?

  - What are the observed trends from weather stations and satellite data for temperature and precipitation changes in the project area?

  - What are the perceptions of the communities we are working with regarding temperature and precipitation changes in the project area?

  - What do climate models show regarding projected changes for temperature and precipitation in the program area?

- How would changes in the following trends affect the proposed program goals over the long term?
  - Timing of precipitation?
  - Length and timing of seasonal events?
  - Total annual rainfall?
  - Distribution of rainfall?
  - Minimum temperatures?
  - Maximum temperatures?
  - Average annual rainfall?

- Is there a potential for change in the suitability of crops for the region? (i.e. Are crops that were suitable once, becoming unsuitable due to climate change?)

- What steps can the program taking to support the agricultural systems and ecological systems on which they depend to better absorb and adapt to shocks, identified changes in climate (temperature and precipitation) and disaster vulnerabilities (build agroecological resilience).

  - Can the program focus on supporting communities to identify threats to their farm system, production capacities and price volatility due to other potential shocks (climate shocks, conflict and insecurity, market volatility)?
  - Can the program identify and integrate agroecological practices that will support longer term building and regeneration of productive natural capital? (e.g. soil and water conservation, agroforestry, land re-greening or regeneration projects)
  - Will the program layer climate smart agriculture practices/training into current program activities?
  - Can the program integrate climate change adaption and disaster risk reduction strategies for the target agroecosystems and households in the region?
  - Can the program or country office undertake a comprehensive vulnerability assessment?

IV. Worksheets

Worksheet 1: Proposed Project Intervention Screening Worksheet

Proposed project/ livelihoods strategy or activity	Estimated resource consumption and agroecological effect				
	Water	Natural vegetation	Soils	Fertilizer usage	Land-use
Activity/ Strategy 1:					
Activity/ Strategy 2:					
Activity/ Strategy 3:					
Activity/ Strategy 4:					
Activity/ Strategy 5:					

Worksheet 2: Agroecological Impacts and Mitigating Actions***

Proposed agricultural intervention # / project code: _____						
Natural Resource	**Potential Adverse effects** **Environmental costs** **Short and long-term**	**Assumptions**	**Severity score[3] (1-5)**	**Mitigating action(s)**	**Effectiveness of mitigating action relative to size of adverse effect (1-5)**	**Potential Impacts on Resilience of agroecosystem and Smallholder Farmers (environmental benefits)**
Water						
Vegetation						
Soil						
Land-use						

*** Worksheet 2 should be repeated for each proposed project intervention or group of interventions

[3] The severity could be considered as the anticipated long-term/ irreversible changes an intervention is perceived to be likely to cause where a score of 5 represents highly damaging changes whilst a score of 1 represents mild changes with limited agroecological impact. Evidence-based reasoning and the articulation of assumptions will help to justify severity level selection. Higher levels of uncertainty over potential outcomes should be accompanied by upward adjustments of the likely severity of impact in accordance with the principle of uncertainty and do no harm.

Worksheet 3 – Do No Harm and Resilience Opportunities Summary Form

DO NO HARM AND BUILDING RESILIENCE TOOL SUMMARY		
Identified Potential to Do Harm		
Identified Program Strategies, Practices Promoted and/or Issues Identified	**Potential Negative Impacts & Further Questions Which Need to be Answered?**	
Program Activity 1		
Program Activity 2		
Program Activity 3		
Program Activity 4		
Conclusions and comments on identified potentials of program to undermine agroecological and food system resilience?		Adequate steps taken to avoid harm? [Yes/No]
Identified Potentials to Build Resilience		
Program Goals and Issues the Program Addresses	**Potential to Build Resilience and Additional Resources and Skills Needed**	
Program Goal 1		
Program Goal 2		
Program Goal 3		
Program Goal 4		
Conclusions and Comments on Additional Opportunities to Build Agroecological and Food System Resilience		Integrating Strategies to Promote Agroecological Resilience? [Yes/No]

Worksheet 4: Decision Making Based on Best Bet Analysis

It is recognized that agricultural livelihoods almost invariably alter the natural environment. The aim is to identify to what extent this is happening, what win-wins exist to enhance the environment through livelihood strategies and agroecological actions, what mitigation measures can be employed to reduce negative impact and how possible short-term negative impact is anticipated to be reversed over a longer-time frame to ultimately achieve maximum sustainable yield from an ecosystem.

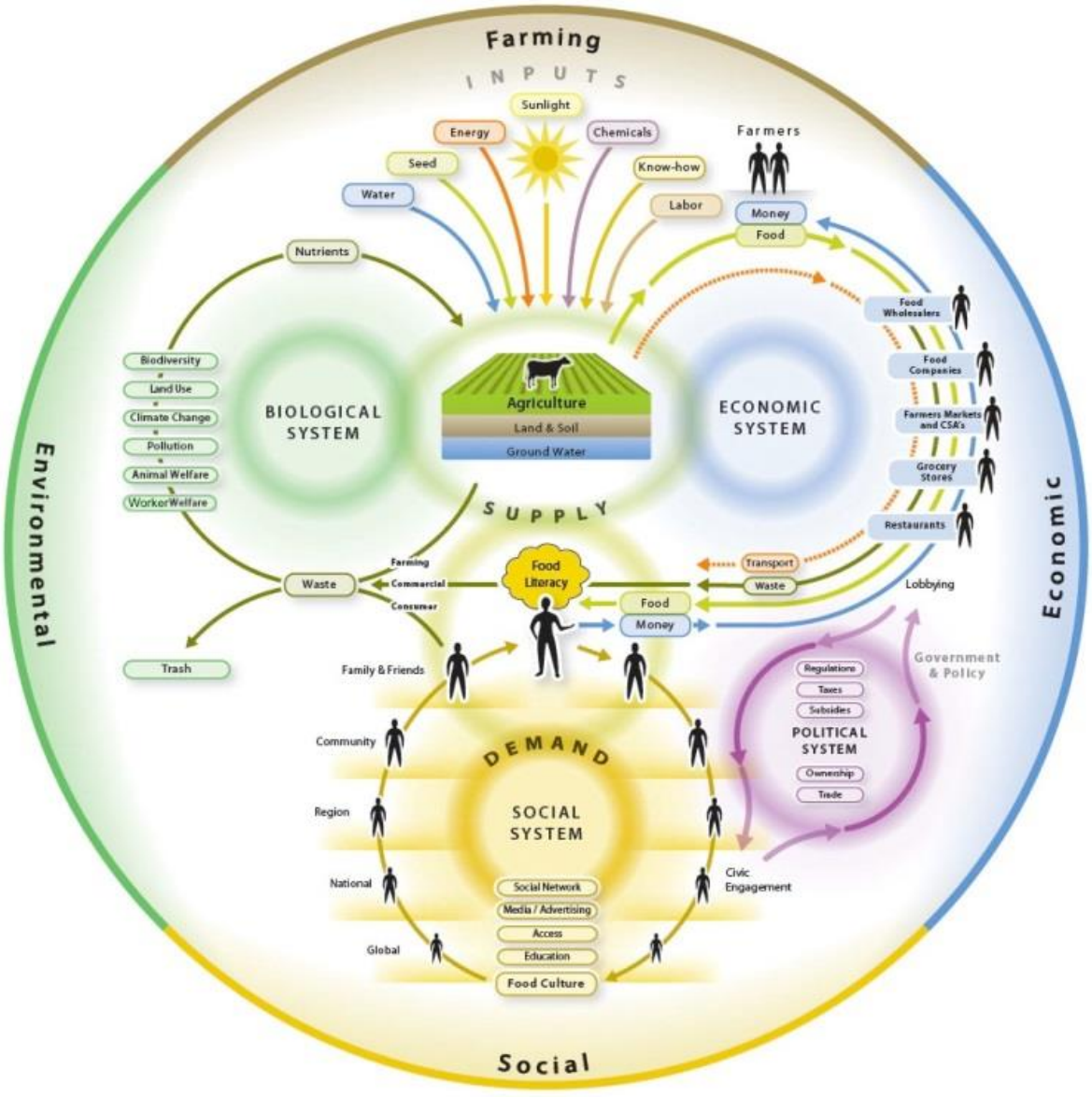
Project design must weigh the available information, consider the uncertainties and select intervention strategies, articulating what agroecological mitigation measures will be implemented and the anticipated agroecological impacts. This should include assumptions and can be used to monitor and adapt projects and ultimately evaluate strategies on an agroecological basis.

Proposed Activities and Estimated Agroecological Impact

Selected Project Activity	Natural resource(s) affected and positive or negative agroecological impact	Justification notes including programmed mitigation measures	Assumptions

V. Annexes

Annex 1: Food Systems Diagram



Diagrammatic representation of the global food system and its multiple components and interactions
(Source: Nourish Food System Map; used with permission from http://www.nourishlife.org/teach/food-system-tools/).

Annex 2: Natural Resource Summary

Based on an assessment of the natural resource base, the local agroecosystem, agricultural and value chain context as well as associated ecological vulnerabilities, both long and short term, it may be useful to summarize the main natural resources and agroecological capacities and vulnerabilities.

The tables below are intended to summarize, synthesize and prioritize information to identify the key natural resource comparative advantages/ strengths and constraints in the current context and guide strategy development.

Table A: Natural Resource Capacities

Main natural resource capacities and comparative strengths	Description	Issues/ comments

Table B: Natural Resource Constraints and Vulnerabilities

Main natural resource constraints and Vulnerabilities	Description	Issues/ notes

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