The Federal Environmental Protection Authority

Guidelines on Crop production

NOT FOR CITATION

This guidelines is still under development and shall be binding after consensus is reached between the Environmental Protection Authority and the Environmental

Ethiopia

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INTRODUCTION

These guidelines cover food crops and export/industrial crops (cash crops). They do not consider agro-industries, nor irrigation projects which are discussed in the “Irrigation Guidelines”. Crop productions operations analysed in these Guidelines encompass rainfed and irrigated production process including post-harvest activities (storage, processing, and commercialisation).

These guidelines aim to assist in developing crop production projects that can address the themes of sustainability. They highlight major issues and potential impacts that should be taken into account during the preparation and assessment phases. The appropriate enhancement and mitigation measures should be integrated as early as possible, preferably in the project design.

1. Major Types of Intervention in the Crop Production Sub-Sector

Crop production projects refer to sowing, transplanting, growing and harvesting plant material, including food crops and export/industrial crops.

Food crops include cereals (e.g.: wheat, rice, maize and sorghum) and non-cereals (e.g.: roots/tubers, pulses, groundnuts and bananas/plantains). In these guidelines, both food crops produced under rainfed and irrigated conditions are considered. Generally, this production involves extensive food production systems with low-level of agricultural inputs. Irrigated crops are produced in irrigation schemes developed to increase agricultural production and producer income.

Guidelines) and heavy machinery for ploughing, sowing and harvesting.

Crop production projects can be part of integrated rural development, watershed management, and agroforestry projects. They often include the following technical facilities and components:

- water management infrastructures;
- transport facilities;
- crops storage facilities;
- feeder roads.

2. Specific Characteristics of Crop Production Project

The description and justification of an irrigation project a crop production project shall at least cover the following elements:

- Project layout including a site location map.
- Criteria for selecting project beneficiaries among local people, migrants, women/men, poor people and other vulnerable groups.
- Legal and contractual arrangements, including land tenure, land ownership and water rights.
- Affected groups (directly and indirectly).
- Socio-cultural factors or constraints, such as customs and beliefs.
- Natural and human resources needs.
- Source of water and water management.
- Preparation activities (feeder roads, land clearing and preparation, burning, ploughing, construction of facilities, etc.).

domestic water supply facilities;
diagram illustrating irrigation schemes;
existing and proposed location of human settlements.

Exploitation features:

target crops and justification;
cropping seasons (length and frequency);

- Proposed agricultural techniques;
- Inputs (fertilisers and pesticides);
- Cropping seasons (length and frequency).
- Existing and proposed location of human settlements and public services such as health centres and accident and emergency units.
- Project schedules and costs.
- Maintenance works, operations and associated costs.
- Expected outputs and profitability for producers.
- Post-harvest activities (storage, processing, commercialisation, market information, etc.).
- Organisation, training and support to producers.
- Complementary initiatives related to improvements in host and/or new communities, particularly domestic water supplies, sanitary facilities as well as traditional and modern medical services.
- Consultation approaches and participation mechanisms.

3. Major Issues Related to Crop Production Project

The major issues that can potentially arise when constructing and/or implementing related to an irrigation crop production, project are outlined in the following table.

Crosscutting Theme	Major Issues	Relevant or not
	• Soil conservation. • Groundwater quality. • Agrochemical management. • Pesticide use.	
Population	• Migration. • Population characteristics and dynamics. • Land uses, particularly food cropping land. • Natural resources uses. • Agricultural practices and local customs. • Quality of life.	
Health Outcomes	• Sexually transmitted diseases. • Vector-borne diseases. • Poisoning. • Malnutrition. • Injuries. • Sanitary and hygienic conditions.	
Gender	• Women's workload. • Control over land and land proceeds. • Income-generating activities. • Access to land for subsistence cropping. • Participation in facilities and services aimed at enhancing productivity. • Involvement in decision-making processes.	
Participation	• Participation of affected groups in consultations. • Organisation level of producers and agricultural workers.	
Population	Involuntary resettlement and migration. Changes in land and natural resources uses. Disturbance of agricultural practices. Modification to water access and rights. Changes in the quality of life.	
Poverty	Increased economic activities, jobs and revenues. Improvement in the standard of living.	

Crosscutting Theme	Major Issues	Relevant or not
	Variation in income-generating activities. Changes in access to and control over productive factors. Involvement in decision-making processes.	
Environment	Major changes in the hydrology and limnology of watershed. Degradation of water quality. Overuse and/or misuse of water (over tapping groundwater and irrigation water losses). Erosion, water logging and Stalinization of soils. Loss of vegetation and habitats.	
Civil society	Changes in the level of organisation of producers and agricultural workers.	

4. Potential Impacts, Enhancement and Mitigation Measures

The potential impacts outlined below are presented by crosscutting theme (one table per theme) to clearly identify the potential interactions between a crop production project and a specific transversal issue.

4.1 Poverty

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Economy	Increased economic activities. Increase in agricultural yields and production, generating additional revenues. Substitution of food imports by local production. Increase in local development and employment. Increase in commercial activities, thus in revenues for the local population. Increased opportunities for agribusiness operations. Constraints for producers to meet profitability objectives. Exclusion of specific groups from project benefits. Change in agricultural prices.	Give preference to local employment (men and women) and local inputs (food, basic material) to the extent possible. Select crop productions on the basis of commercial comparative advantages, soil potentialities and the preferences of the local population (men and women). Favour crop diversification and agri-food processing. Ensure that commercial channels exist to sell crop productions at competitive prices. Base profitability estimates on conservative revenue assumptions. Identify why specific groups are not benefiting from the project and adopt corrective measures as required. Facilitate the access for men and women to production means to ensure high value crop productions. Ensure that the poor and other vulnerable groups still have access to close, productive land for subsistence crop production and/or pasture.

Poverty cont….

Information, education and communication	Exclusion of specific groups from crop production due to a lack of knowledge. Development of additional agricultural and management skills. Training not adapted to the specific needs of the various groups (ex: illiterate men and women, livestock farmers converted to crop production).	Assist groups of individuals (men and women) who may lack the capacity to apply for participating into the project. Develop and implement a literacy program especially aimed at poor people and women. Provide producers, men and women, with the training required to maximize production and revenues (agricultural techniques, management, commercialisation). Ensure that extension services pay a special attention to producers who do not have all the agricultural skills required due to a lack of opportunities (ex: landless people).
Access to infrastructures and services	Development of new infrastructures or improvement to existing ones. Improved access to credit for men and women. Increased pressures on existing social services, including domestic water supply. Production losses and/or contamination due to inappropriate crop storage facilities. Low agricultural productivity due to limited access to agricultural inputs. Loss of crop production due to inadequate commercial services. Increase in social services cost and agricultural input prices.	During project preparation, consult concerned ministries to verify the adequacy of current and proposed infrastructures. Involve the population (men and women) in the maintenance and management of new infrastructures to ensure their sustainability. Ensure adequate social services for addressing the basic needs of the host and migrant populations. Ensure sufficient and convenient domestic water supplies to satisfy people's needs. Assist social service administrations in coordinating their efforts to offer additional services and improve service delivery if required. Provide minimal support to producers (men and women) to organize non-agricultural activities related to crop production (input purchase, technology, credit, commercialisation, market information). Develop safety net measures to protect the poor and other vulnerable groups against price increases in social services and inputs.

4.2 Environment

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Air	▯ Degradation of air quality due to land clearing. ▯ Air pollution associated with aerial spreading of chemical products.	▯ Use appropriate means such as vegetation hedges to avoid dust dispersion. ▯ Comply with aerial spreading regulation on chemical products and favour bio-environmental measures.
Water	▯ Change in surface water runoff. ▯ Degradation of surface water quality downstream of crop production sites due to erosion and high concentrations of nutrients and pesticides. ▯ Degradation of groundwater quality due to excessive agricultural inputs.	▯ During land clearing, avoid crossing permanent waterways; if necessary, locate the crossing where the banks are stable and the narrowest. ▯ Plan and install drainage systems for capturing runoff water. ▯ Maintain a maximum of vegetation along water bodies. ▯ Implement an adequate management system for fertilisers and pesticides in order to avoid the degradation of aquatic ecosystems downstream of the site. ▯ Favour pest management technologies/approaches to minimize pesticide use reducing pollutant concentration in drainage water. ▯ Promote and train farmers (men and women) on agricultural techniques for efficient use of irrigation water. ▯ Use biodegradable pesticides as much as possible. ▯ Control access to water for other purposes than agriculture (safety measures and rules). ▯ Adjust the annual pumped water volumes in accordance with the aquifer annual refill. ▯ Favour agricultural practices reducing water losses and stagnant water such as by alternating wet and dry irrigation for paddy rice. ▯ Ensure proper water management by establishing taxes/tariffs for water users.

Environment cont…

Soil	Prevention of soil erosion due to the presence of perennial crops and on-farm agro-environmental practices. Increased soil fertility through natural resources management practices. Soil compaction due to repetitive mechanical works. Soil erosion resulting from site clearing and cultivation on steep slopes and in sedimentation problems. Loss of organic matter and nutrients by removal of vegetation and leaching. Soils contamination from spilling of hazardous materials and misuse of pesticides and fertilisers.	Minimise the use of heavy machinery and limit their circulation to minimal areas. Minimise and clearly define the land clearing areas. Apply organic matter to improve soil structure and fertility. Promote the implementation of agroforestry techniques well adapted to the site (e.g. alley cropping, live fences, parklands., etc). Avoid steep slopes and level the land (terrace on slopes) as much as possible. Maintain vegetation edges in order to reduce wind erosion. Use biodegradable pesticides and avoid pesticides which accumulate in sediments and soils. Manage safely hazardous materials and pesticides. Leach out periodically the land in order to dilute salts. Select salt tolerating crops in coastal areas Favour perennial crops (coffee, tea, etc.) and open-field covering during the non-cropping season (such as after sugar cane harvest). Minimise the utilisation of fertilisers and pesticides to reduce agricultural pollution.
Ecosystems	Encroachment in ecologically sensitive areas. Reduction of biodiversity.	Minimise the length of works in sensitive areas. Forbid any encroachment in ecologically sensitive or protected areas. Establish a perimeter of protection around sensitive ecosystems such as wetlands and unique habitats sheltering endangered species. Minimise sedimentation in spawning grounds downstream of the site. Take into account reproductive habitats, wetlands, spawning grounds and protected ecological areas.

Environment cont…

Flora	• Increase in vegetation due to the presence of perennial crops. • Damages to trees (during infrastructure construction). • Loss of vegetation due to land clearing. • Loss of forest products (fuel wood, timber, non timber forest products). • Increased vulnerability to insects and pests due to monoculture.	• Clearly mark the land clearing areas. • Protect the trees from machinery. • Plan for recuperating timber and fuel wood obtained from land clearing and identify mechanisms to distribute the products to the local population. • Avoid destroying the vegetation along water bodies. • Ensure the plantation of indigenous species in cleared areas and also in combination with crop productions. • Promote the development of community nurseries, preferably operated by women. • Promote the implementation of agro forestry parklands systems (tree planting combined with cropping productions). • Promote the use of improved fuel wood stoves and other biomass saving devices. • Minimise the utilisation of fertilisers by using alternative agro-environmental practices. • Preserve wild food and medicinal plant supplies. • Encourage farmers to use irrigation wastewater for growing trees.
Fauna	• Perturbation of terrestrial, aquatic and avian wildlife. • Fragmentation and degradation of wildlife habitats. • Increase in poaching due to migration and non-resident workers.	• Preserve migration corridors for wild and domestic animals. • Avoid selecting any site sheltering endangered species. • Control illegal fishing and hunting, in particular by non-resident workers.
Natural and cultural heritage	• Loss of cultural, religious and historical heritage as well as aesthetic resources. • Breach in agreements with traditional authorities concerning cultural, religious, historical and aesthetic sites and resources.	• Early in the project planning process, carry out an archaeological survey in the potential areas containing artefacts and preserve discovered artefacts. • Negotiate with and involve traditional authorities in the preservation and monitoring of important cultural, religious, historical and aesthetic sites and resources, as well as in the arrangements for potential compensation for the communities. • During land clearing, ensure an archaeological surveillance in the potential areas containing artefacts and in case of a discovery, advise the concerned authorities.

4.3 Population

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Demographic trends	Project allocation criteria (for access to crop land, credit, etc.) favour large families, encouraging population growth. Increased population and ethnic diversity after migration. Temporary imbalance between men and women due to male workers and migrants, which can lead to an increase in sexually transmitted diseases.	Establish allocation criteria that are not based on family size. Work closely with host communities to facilitate the integration and acceptation of migrants. Plan human settlements in order to prevent promiscuity among new settlers and between migrants and the local population. Whenever possible employ women or married men with nearby families. Assist non-resident workers and migrants in order to encourage their families to rapidly join them.
Migration and resettlement	Migrants living in better conditions with an equivalent or increased income. Decreased standard of living for involuntarily displaced people, if any. Inappropriate living conditions for non-resident workers and their families. Constraints in adjusting to new productive activities. Population pressure due to the arrival of migrants attracted by new cropping opportunities. Unplanned human settlements.	Plan adequate settlement areas with appropriate housing and services (water and sanitation) for non-resident workers and their families. Provide temporary food supplies to migrants and involuntarily displaced people, if any. Provide complementary training /support to facilitate adjustment during the transition period. If required, ensure appropriate funding for resettlement as well as productive land compensations in accordance with the priorities of displaced men and women. Establish controls in order to avoid unorganised settlements.

Population cont…

Natural resources and land management	Increased access to productive land for beneficiaries of the project. Valorisation of unproductive water resources. Change in land and natural resources uses (e.g. irrigation, agricultural intensification). Preference for cash/export cropping over food cropping. Increase in cropping season length in irrigated crop development project. Change in land values and price. Perturbation of traditional agriculture (cash crops versus traditional ones, export crops versus food production). Insufficient arable land to satisfy subsistence agricultural needs. Restriction for livestock grazing. Increase of fuelwood and timber use due to migrants. Disruption of land uses leading to social conflicts.	Take into account the various land uses while designing the project. Coordinate project with other land users (men and women). Provide access to productive land to those loosing productive means (men and women owning or cultivating the land). Offer alternative revenue opportunities to men and women deprive from land to practise traditional agriculture. Plan corridors for migrating livestock. Develop alternative grazing areas to compensate for those lost. Ensure sufficient land is allocated to subsistence cropping to ensure food security. Prevent food insecurity by allocating land and credit to food cropping. Integrate crop production project and traditional agricultural land into development plans.
Quality of life	Improvement in quality of life due to new economic opportunities and adequate compensations for losses. Improved local food availability and supply. Changes in way of life, jeopardising traditional cultural values. Social conflicts due to migrants, non-resident workers and producers (divorces, ethnic tension, etc.).	Establish a formal consultation mechanism with local authorities to discuss issues disturbing inhabitants and to find solutions satisfying all stakeholders. Train farmers(men and women) in the field of agro-environmental practices. Implement an adequate communication plan to inform the local population on natural resource management. Involve local authorities in monitoring implementation activities and compensation agreements. Ensure that part of the crop production is accessible on local markets. Ensure appropriate support from social services to prevent conflicts among groups.

4.4 Health Outcomes

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Communicable diseases	Changes in exposure to: ▯ Water borne diseases e.g.: diarrhoea and cholera associated with poor sanitary conditions. ▯ Water related diseases e.g.: malaria, onchocerciasis, filariasis associated with settlement location and design and with occupation. ▯ Water contact diseases e.g.: schistosomiasis and swimmer's itch associated with domestic and occupational behaviour. ▯ Water washed diseases e.g.: scabies and skin infections associated with poor sanitary and hygienic conditions. ▯ Sexually transmitted infections e.g.: HIV/AIDS associated with migration and economic change. ▯ Other vector-borne diseases e.g.: trypanosomiasis associated with project location. ▯ Respiratory infections e.g.: TB associated with crowding.	▯ Appropriate domestic water supply to address additional needs. ▯ Facilitate the implementation of appropriate latrines and other sanitation facilities. ▯ Information, education and communication about occupational safety. ▯ Environmental management for vector control; contact avoidance via settlement location and design and use of bednets and repellents; focal insecticide and molluscicide application. ▯ Strengthen medical services to ensure rapid diagnosis and treatment. ▯ Safe food storage and handling. ▯ Implement HIV/AIDS prophylaxis for men and women through appropriate health promotion as well as wide distribution and use of condoms; employment opportunities for project-affected women; provision of family accommodation for non-resident workers. ▯ Design project settlement housing to avoid crowding, and provide ventilated kitchens and access to efficient stoves. ▯ Refer to measures proposed under environment and poverty crosscutting themes as they address many health determinants of communicable diseases.

Health Outcomes cont…

Non-communicable diseases	• Poisoning associated with misuse of agricultural insecticides and pesticides that may be acute, chronic, intentional or unintentional.	• Comply with regulations on pesticides and insecticides imports and management. • Safely manage pesticide/insecticide storage (appropriate containers, labelling, locked facilities). • Provide appropriate training for all family members on the safe use of pesticides/ insecticides (using masks and gloves). • Strengthen medical services to ensure rapid diagnosis and treatment. • Inform the populations on the risks of disease by using wastewater containing fertiliser and pesticide.
Malnutrition	• Increased and diversified food supply all year long fulfilling basic local needs. • Easier access to food due to increased revenues generated by diversified and/or irrigated crop productions. • Improvement in nutritional status due to increased food supply and access.	• Ensure that part of the food production is directed to local markets to maintain or increase food supply and access. • Make provision for subsistence as well as cash crops. • Plan for complementary food supply during the transition period when subsistence food supply may decrease. • Strengthen medical services to ensure rapid diagnosis and treatment.
Injuries	• Appearance of or increase in domestic and communal violence, for example resulting from land disputes. • Occupational injuries due to a lack of attention to safety at work.	• Plan stabilisation and evacuation of injured. • Prevent communal and domestic violence through awareness and through resolution of land disputes. • Develop, communicate and implement safety and preventive measures for temporary and permanent agricultural workers and producers (men and women). • Plan equipment for moving heavy loads such as donkey carts and ergonomic equipment for men and women.

Health Outcomes cont…

Psychosocial disorders and well-being	• Stress and anxiety associated with rapid social change, loss of traditional authority, loss of spiritual assets, uncertainty and locus of control, severance, exclusion and marginalisation, gender related problems and domestic disputes leading to suicide, physical and mental abuse, child marriage, labour and sale, and communal violence • Well-being associated with improved income, stability, work opportunities, settlements, health, empowerment, education and training.	• Refer to measures proposed under other crosscutting themes as those address many causes of psychosocial disorders and factors contributing to well-being.

4.5 Gender

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Division of labour (paid and unpaid work)	Increased child labour. Additional time spent by children, women and men on agricultural activities. Increased workload for women as their reproductive work is not reduced.	Establish rules among producers to limit child work. Provide agricultural technologies to both women and men to reduce time spent on crop production activities. Plan support initiatives to reduce women's reproductive workload. Select crop productions that do not require free agricultural labour to be profitable.
Income-generating activities (money or kind)	Increased incomes for women when agricultural work is remunerated or crop revenues shared. Development of processing and post-harvest activities. Decreased incomes for women when agricultural work is not remunerated or income-generating activities are not carried out anymore. Women not compensated for the loss of land used for traditional cropping. Limited participation of women in project benefits due to cultural barriers	Ensure that men and women cultivating cropland within the project have access to crop revenues. Establish mechanisms to ensure that women get remunerated for their agricultural work, such as a registration process. Ensure that women are directly paid for their work, avoiding intermediaries. Promote post-harvest activities generating added value to crop productions. Ensure that not only land owners but also men and women occupying / cultivating the land are compensated for their losses. Ensure that project promoters do not reinforce cultural barriers affecting adversely women.
Access to and control over productive factors	Unequal access to and control over cash crops by men and women. Women affected by the loss of crop production traditionally controlled by women. Crop production training does not respond to women producers' demands. Limited access of women to services offered to producers (storage, credit).	Establish, and change if required, the allocation criteria for accessing and controlling cash crops to ensure men and women involvement. Establish suitable mechanisms to facilitate access to productive means for both men and women. Provide women involved in crop productions with training adapted to their specific needs. Ensure that agricultural services offered to men and women are designed in a gender sensitive way. Develop mechanisms to increase credit access and facilities adapted to women. Consider targeting women beneficiaries when inequities exist and persist.
Involvement in societal organisation	Involvement of women in decisions related to agricultural production. Women involved in agriculture get organised to obtain training and/or support adapted to their specific needs.	Establish agricultural structures such as cooperatives recognising men and women as producers and members. If cultural barriers do not allow mixed structures, develop independent structures for women. Ensure that women and their organisations get involved in all phases of the project planning process. Facilitate the creation of women groups when women express an interest in being better organised and represented.

4.6 Participation

Component	Potential Beneficial and Adverse Impacts	Enhancement and Mitigation Measures
Consultations	Integration of men's and women's concerns into the crop production project design. Community involvement and participation in the project development process. Increased support for the project among affected populations. Exclusion of specific groups from consultations, particularly women.	Consult affected men and women at all phases of the crop production project. Provide the opportunity to all affected groups (men and women) to participate in consultations by offering adapted consultation mechanisms. Use consultations to determine traditional patterns of right and responsibilities concerning crop production and to identify ways to increase the involvement of excluded groups (men and women). Inform consulted men and women on how their concerns were taken into account.
Civil society strengthening	Creation of new groups and organisations. Capacity strengthening of existing and new crop producers associations (men and women). Disruption of existing agricultural groups. Loss of power of traditional leaders over land allocation and land use.	Ensure that men and women have the opportunity to organise themselves in groups representing their interests. Integrate existing agricultural producer associations within the new groups and organisations or establish collaboration. Establish a consultation mechanism with traditional authorities to ensure that their views are considered during the planning and implementation phases. Facilitate the participation of civil society organisations in the planning and implementation of crop production initiatives.

5. External Factors

There are four major external factors that may jeopardise the outcomes of an irrigation crop production project:

- **Threats from wild animals**

Hippopotamus, monkeys, birds and other wild animals can destroy partly or totally crops and reduce crop revenues. To prevent such threats, it is recommended to plan and implement crop protection measures such as fencing and guarding. Live fences implemented along farm borders constitute an effective agro forestry technique to protect crops against noxious animals.

- **Natural disasters**

Natural disasters (floods, drought, and plagues) can cause the loss of harvest as well as injuries and mortality. However, a well-planned crop production project normally takes into account the risks related to natural disasters. To minimise these risks, the project shall comply with recognised safety measures. Moreover, the establishment of an alert mechanism and emergency procedures permits to reduce damages when a natural disaster occurs. In addition to the early warning mechanism, it is critical to establish suitable prevention and mitigation measures to help farmers (men and women).

- **Social Instability**

The emergence of community violence, vandalism, civil war, border raids and boundary disputes are phenomena that generate social instability and can lead to migration, disruption of the food chain, injuries, epidemics and mortality. Good

6. Hazard Management

The main hazards associated with an irrigation project a crop production project are the following:

- **Hazardous materials spills**, resulting in water and soil contamination, aquatic wildlife poisoning, health and water supply problems.

- **Pesticide misuse**, resulting in acute and chronic poisoning of people and wildlife, as well as bioaccumulation.

In order to prevent or minimise these hazards, appropriate risk management measures shall be designed and implemented.

7. Environmental and Social Monitoring

The following table presents potential indicators that could be used to monitor the implementation of an irrigation crop production project. The appropriate indicators for a specific project shall be selected according to the project context, major anticipated impacts and the cost of data collection and processing.

Component	Indicators
Poverty	
Economy	Annual revenues and profits generated by crop production compared to projected revenues and profits. Number of jobs created (directly and indirectly). Number or proportion of producers failing to reimburse their debts. New economic activities created in agri-food sector (processing, services, inputs). Average salaries for export/industrial cropping workers (men and women) in comparison to average national salaries of agricultural

Component	Indicators
Environment	
Soils	▯ Volume of sedimentation downstream of project area. ▯ Concentration of organic compounds in sediments. ▯ Main physical and chemical soil fertility parameters (ex. : salinity, pH, organic matter content, capacity of exchange, water retention capacity). ▯ Area under cropping productions.
Water	▯ Groundwater static level and refilling capacity. ▯ Parameters of *WHO Guidelines for Drinking-water Quality* for evaluating the physico-chemical characteristics of underground and surface water quality (upstream, on the site and downstream). ▯ Level of agricultural pollutants in wastewater.
Flora	▯ Biomass per inhabitant. ▯ Evolution of forest area.
Fauna	▯ Damages to crop production (area and/or quantity).
Population	
Demographic trends	▯ Population growth and ethnic composition.
Migration and resettlement	▯ Integration level of migrants in host communities (survey). ▯ Number of informal settlements built by migrants.
Natural resources and land management	▯ Subsistence production in calories per inhabitant. ▯ Number of conflicts between livestock farmers and crop producers.
Quality of life	▯ Level of satisfaction of local people (survey).
Health Outcomes	
Communicable diseases	▯ Prevalence rates of water contact and water washed diseases as well as sexually transmitted infections. ▯ Number of vector breeding sites and vector density. ▯ Outpatient attendance records. ▯ Quantities of drug supplied and used from health services and local shops. ▯ Availability of condoms, impregnated bednets and mosquito repellents.
Non-communicable diseases	▯ Prevalence rates of pesticide poisoning. ▯ Inventory of exposure sites including pesticide storage

Component	Indicators
	production project.
Income-generating activities	Proportion of crop production revenues received and managed by men and women in families participating in the project.
Access to and control over productive factors	Proportion of men and women owners and/or tenants within the crop production project. Level of satisfaction of women toward project investment decisions and management methods (survey). Number of women and men using facilities (storage, post-harvest, credit, commercialisation, etc.).
Involvement in societal organisation	Number of women and men involved in agricultural cooperatives or farmers organisations.
Participation	
Civil society strengthening	Evolution in the number of agricultural organisations. Conflicts among new and existing organisations involved in agriculture. Level of participation of farmers organisations in the decision-making processes.