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# MALI LIVESTOCK FOR GROWTH (L4G)

## ENVIRONMENTAL MITIGATION & MONITORING PLAN (EMMP)

March 2015

This publication was produced for review by the United States Agency for International Development.  
It was produced by AECOM for the Livestock for Growth Project, contract number AID-688-C-14-00004.

# USAID/MALI LIVESTOCK FOR GROWTH (L4G)

## ENVIRONMENTAL MITIGATION & MONITORING PLAN (EMMP)

**Submitted to:**

USAID/Mali

**Prepared by:**

AECOM

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# ACRONYMS

22 CFR 216	Title 22, Part 216 of the U.S. Code of Federal Regulations on environmental procedures
AEG	Agriculture and Economic Growth
BEO	Bureau Environmental Officer
CCA	Climate Change Adaptation
CFR	U.S. Code of Federal Regulations
COR	Contracting Officer's Representative
CSA	Climate Smart Agriculture
EGSSAA	Environmental Guidelines for Small-scale Activities in Africa
EMMP	Environmental Mitigation and Monitoring Plan
ESF	Environmental Screening Form
ESR	Environmental Screening Review
FEBEVIM	<i>Fédération des Organisations de la Filière Bétail et Viande</i>
FOFBEV	<i>Fédération Nationale de la Filière Bétail-viande</i>
FtF	Feed the Future
ICD	Initiative Conseils Développement
IEE	Initial Environmental Examination
IER	<i>Institut Economie Rural</i>
IFP	<i>Institut de Formation Professionnelle</i>
IPR/IFRA	<i>Institut Polytechnique Rural de Formation et Recherche Appliquée</i>
IR	Intermediate Result
GCC	Global Climate Change
GDP	Gross domestic product
GMO	Genetically modified organisms
GOM	Government of Mali
L4G	Livestock for Growth
LMIS	Livestock Market Information System
MEO	Mission Environmental Officer
MFI	Microfinance Institution
OVM	Ordre des Vétérinaires de Mopti
PADESO	<i>Programme d'Appui au Développement Durable de l'Elevage au Sahel Occidental</i>
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan
PO	Producer Organization
PPE	Personal Protective Equipment
PSA	Public Service Announcement
RIFAB	<i>Rizerie et Fabrique d'Aliments Bétails</i>
SLPIA	Service Local Production et Industrie Animale
USAID	U.S. Agency for International Development

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# I. INTRODUCTION

The Livestock for Growth (L4G) Project in Mali is a five-year activity funded by the United States Agency for International Development (USAID) that seeks to increase animal production and improve the quality of livestock available at market by improving pastureland management, developing water points, improving livestock feed, improving access to veterinarian services, increasing finance opportunities and expanding market development. The program will also build capacity by training and organizing pastoralists, local governments, private sector and civil society stakeholders, and the GOM, in water management, animal health, and the surveillance of livestock diseases. This program will lead to an overall increase in income and a decrease in poverty for pastoralists. Additionally L4G will indirectly reduce the potential for conflict between pastoralists and farmers, improve the educational status of the children of pastoralists and improve access to higher quality forage. All activities and investments will be focused on serving protected livestock perimeters in the Mopti Region.

L4G's development hypothesis is that Mali's livestock sector will be more competitive and will contribute to increased agriculture gross domestic product and broad-based economic growth if: (1) The quality of livestock improves; (2) Market access and incentives for semi-sedentary and small producers – including women and youth – are expanded; and, (3) The supporting and enabling environment of the livestock sector improves.

This EMMP evaluates potential environmental impacts of project activities in the FY 2015 work plan and proposes mitigation measures to minimize or avoid negative effects. The main documented environmental concerns are: animal health, finding/growing enough for livestock to eat, and animal access to sufficient water sources to satisfy their needs separately from needs of households.

## I.3 ENVIRONMENTAL COMPLIANCE REQUIREMENTS

### I.3.1 USAID REGULATIONS

USAID's environmental policy requires that the potential adverse impacts of USAID-funded and managed activities be assessed prior to implementation via an Initial Environmental Examination or IEE process defined by Title 22, Part 216 of the U.S. Code of Federal Regulations on environmental procedures (22 CFR 216). Activities found to have a significant negative effect on the environment will be subject to an Environmental Assessment in accordance with Part 216.6. USAID may make a Negative Declaration that eliminates the need for an environmental Assessment if the effects can be mitigated or minimized by project design elements. In these cases, USAID requires that the environmental management/mitigation measures be identified as conditions for implementation over the life of the activity, and monitored for compliance and sufficiency.

An Initial Environmental Examination (IEE) for the Accelerated Economic Growth (AEG) Portfolio in Mali was prepared in 2011. It evaluates proposed activities included in the Feed the Future (FtF) strategy for Mali. The IEE identified some project activities as having the potential to do environmental harm if not carried out using appropriately, and assigned a Negative Determination with Conditions for their implementation. USAID requires that an Environmental Mitigation and Monitoring Plan (EMMP) must be prepared to include the mitigation measure specified in the IEE as Conditions for implementation.

The use of pesticides is strictly regulated by USAID, and requires the preparation and approval of a Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) prior to use. The USAID/Mali mission is currently finalizing a PERSUAP for agriculture and livestock related activities. Any pesticides used by L4G as dips or sprays will be subject to the PERSUAP requirements. However, at the time of

preparation of this EMMP, the project only anticipates the use of injected vaccinations and internally applied de-worming medicines. The USAID/Mali MEO has confirmed that the use of these de-worming medicines and livestock vaccination do not require a PERSUAP.

USAID provides a series of Environmental Guidelines for Small Scale Activities in Africa (EGSSA) with separate manuals on managing impacts for livestock and water supply activities. The manuals are intended to provide guidance to implementing partners developing environmental mitigation and monitoring plans for USAID-funded programs and activities.

For the use or other release of genetically engineered plants, USAID requires a biosafety assessment of such testing and/or release. Such field testing or other release cannot occur until USAID's Biosafety Procedures in ADS 201 are completed with respect to the particular uses intended, and until an IEE or amendment is completed for those uses, reflecting the findings in the biosafety review.

### **I.3.2 GOVERNMENT OF MALI REGULATIONS AND INTERNATIONAL LAWS**

Mali's Environmental Code states that the nation's natural resources are part of the common heritage, and that research results, increased value, and economic benefits of its genetic resources shall be shared equitably through laws and regulations; that natural areas/animal and vegetative resources will be protected, biological equilibrium maintained, and environmental issues considered of general interest to sustainable development. Environmental protection and valorization are even part of the National Development Strategy and must be taken into account by public and private programs. Public and Private entities must educate the public on environmental problems, assuring that better information is provided to citizens so that they may participate in environmental management. This speaks of the importance of the extension programs to be implemented by L4G.

**Water Resources.** Under the Water Code, users can create a water point to extract up to 40 cubic meters per day based on a user declaration; government authorization is necessary to create water extraction infrastructure above 40 cubic meters per day. Customary uses are recognized, particularly concerning use of water points, which are to be systematically located throughout the zone and administered by the *cercles* and their management committees. Access through fields to natural water sources is assured. Classified forests are only to be used as pasturelands when refuge from drought is needed, and if the herders assist in maintenance and regeneration of the resources in it. If an animal destroys crops, a land commission sets the fine. Dates of closure and opening of fields to foraging livestock are set by local governing bodies. Corridors crossing international boundaries are to be respected.

**Rural Code.** Mali's legislation on rural land use has the following objectives: (1) increase rural tenure security; (2) better organize and manage rural land; (3) promote sustainable natural resource management and conservation; and (4) better plan and manage the country's natural resources (Cotula 2006).

**Genetically Modified Organisms (GMOs).** Mali is a party to the Convention on Biological Diversity and the Cartagena Protocol on Biosafety. As of 2007, legislation on GMOs was being formulated within the framework of the UNEP/GEF (United Nations Environment Program/Global Environment Facility) program. Using genetically modified seed (with the aim of reducing the need for certain pesticides) is still a controversial way to increase agricultural production, as natural genetic diversity may be lost by manipulating and propagating seed stocks in this way.

At a conference for the USDA and USAID in Burkina Faso, the Presidents of Mali and other countries voiced support for biotechnology, saying it has the potential to increase agricultural production and improve the environment, thus improving the standard of living in their countries. But as of 2007, there were no known trials or commercial release of GMOs.

**Pastoral Code.** This legislation lays out the legitimacy of the migrant herder, but requires the herder to control his animals and respect management of natural resources.

## **I.4 OVERVIEW OF METHODOLOGY**

This report serves as the EMMP for moderate risk L4G activities. The EMMP is based on USAID EGSSA guidelines for livestock and water supply.

The project may provide some loans for livestock and fodder production, seeds and tools for gardening activities and fodder production, or sub-contracts for water harvesting to increase forage production or to buttress the water needs of women's household garden. The same environmental requirements apply to loan beneficiaries and sub-contractors as for the equivalent activities carried out in the respective project components, and L4G will include required mitigation measures in subcontracts and MOUs.

L4G will provide training to beneficiaries and sub-contractors as necessary and oversight to follow the EMMP requirements /conditions that are part of each activity. L4G will monitor activities over the course of implementation of the loan or activity to make sure that the EMMP is followed. Monitoring results are summarized in the EMMP tables in Sections 3.4, 4.4, and 5.4 below, and included in project reporting documents regularly submitted to USAID. The USAID Environmental Officer may visit program sites at least once per year to ensure environmental compliance procedures are being implemented correctly.

To achieve gender equity, the aforementioned actions will require helping women (and youth) obtain access to land. L4G hopes that enlightened mayors, village chiefs, and village elder committees will support efforts to help vulnerable populations have access land.

## **I.2 AFFECTED ENVIRONMENT**

The L4G target sites are situated in Bankass and Koro *Cercles*, Mopti Region, where mixed farming and livestock use are practiced. Livestock raising for meat, dairy products, and cash is used as a way to achieve food security in combination with sedentary farming.

As noted in the IEE, the United Nations Food and Agricultural Organization defines four ecological zones in Mali. From the southern edge of Tombouctou and extending to southern Mopti is the second ecological zone of *Tropical Shrubland* with an average rainfall of 250 to 800 mm per year.

The L4G work zone is positioned squarely in the Tropical Shrubland zone of the Sahel region, as measured by rainfall averages across the area. Managing vegetation and water in these areas is an essential element of environmental impact control, so that areas sensitive to drought and erosion do not become even more degraded and barren. Overgrazing or grazing in the wrong place or at the wrong time easily lead to soil impoverishment and erosion in this arid to semi-arid region. Natural vegetation used as forage is also at a premium and risks disappearance.

Project activities will occur in three types of agro-ecological habitats, which are characterized by different geological, agricultural, ecological, and land use parameters:

- 1. Wetlands** are found in both *Cercles* and have the potential for Bourgou and Dolique production.
- 2. Zones away from the Falaises** – These areas are characterized by mostly flat topography, with some variations of slightly rolling terrain; but flat land is the norm. Stones and rock outcroppings are rare. Predominant tree types are Balanzan (*Fadherbia albida*) and *Balanites egyptica*, and some other Acacias. Soils are predominantly sandy to sandy loams. Some heavy clay soils were noted around Bankass in the vicinity of the IFP compound. Organic matter content of all soils observed is suspected to be very low.

- 3. Cultivated areas adjacent to the Falaises** – Vegetation is more abundant and predominantly Balanzan (*Faidherbia albida*) with some scattered *Balanites egyptica*. Soil types are variable, but sandy loams were noted. Water is abundant during the rainy season, and producers make rudimentary efforts to capture and store water. Rocks, boulders, and stones are abundant and free for the taking to build water harvesting structures.

With a view to increase fodder production for the “lean season”, L4G intends to engage in water harvesting actions, Climate Change Adaptation (CCA), and Climate Smart Agriculture (CSA). L4G will work closely with the ICRISAT GCC program in (illustrative list):

- Contour ridge farming on slopes of less than 4%;
- Utilization of available stones from the Falaise for construction of water harvesting systems below the rock massif and within reasonable distance on the adjacent soils to conserve water and improve forage crop productivity (this CCA activity needs to be evaluated and planned as regards soil types, distances to transport stones from the Falaise, and development of physical structures in accordance with soil slope);
- Development of compost bins and enhanced use of compost;
- Improved collection, storage, and utilization of animal manures;
- Potential to make better use of rice by-products (this activity to include the *Office du Riz du Mopti* and *Rizerie et Fabrique d’Aliments Bétails* (RIFAB SA) in Mopti);
- Expansion of areas in *Dolichos lablab* (Hyacinth Bean) production and experiments on its yield potential under different systems;
- Construction and implementation of fodder banks (*banques fourragères*);
- Introduction of proven dual purpose forage varieties (sorghum, millet, groundnut, possibly Bambara Nut, and pigeon pea).

L4G will work closely with the ICRAF program in (illustrative list):

- Introduction of Moringa in women’s irrigated gardens;
- Encouragement of agro-forestry systems that emphasize *Faidherbia albida*, *Balanites egyptica*, and other local species desired by herders and producers.

# 2. ENVIRONMENTAL SCREENING

## 2.1 SCREENING AND RECOMMENDED DETERMINATION

An environmental screening of all Components and tasks identified in the L4G Work Plan is provided in Table 1 below. Components and tasks found to be moderate to unknown environmental risk are addressed by the Environmental Mitigation and Monitoring Plan (EMMP) presented in subsequent sections of this report.

**Table 1. Environmental Screening and Recommended Determination of L4G Activities**

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
<b>Component I. Increased Livestock Productivity</b>						
<b>IR I.1. Enhanced Technology, Innovation, Dissemination and Management</b>						
Task I.1.1 Modernize animal health delivery systems						
<ul style="list-style-type: none"> <li>Build results from initial value chain study and hold discussions with stakeholders to understand constraints and opportunities</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Work with OVM to develop a local network of auxiliary vets supported by <i>mandataires</i> and provide veterinary starter kits to local service providers</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Promote capacity development in improved herd health monitoring and management techniques (e.g. tagging, health records maintenance, vaccination, weaning, feeding, and artificial insemination)</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Mentor OVM to develop a campaign of PSAs promoting herd health</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Conduct training in herd management and breeding practices</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Support FOFBEV, POs, and select PADESO perimeters to engage and use Village Animators as community-based training and TA providers</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Support SLPIA to identify and train locally posted veterinary students to provide free demonstrations and basic extension services at markets in Bankass and Koro for small unaffiliated producers</li> </ul>			✓		✓	
Task I.1.2 Improve communication and develop effective dissemination and communication channels on livestock issues						

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
<ul style="list-style-type: none"> <li>Identify service providers and input suppliers at the retail and wholesale levels and promote effective selling strategies to develop producer capacity</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Link media providers and local partners to develop public service and educational programming</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Coordinate with IER and IPR/IFRA to engage students in internships to provide basic animal health information and demonstrations</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Facilitate south-south exchanges for Malian producers to identify and understand successful approaches to replicate in Mopti</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Support IFP in establishing and maintaining a livestock learning and information center</li> </ul>	✓					
<b>IR 1.2. Increased Access to Quality Inputs and Services</b>						
Task 1.2.1 Improve livestock fodder production and supply						
<ul style="list-style-type: none"> <li>Increase fodder availability by achieving economies of scale with FOFBEV and independent small fodder producers and pilots in improved feed formulations and fattening practices</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Promote and disseminate best practices in improved fodder production techniques and fodder diversification</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Develop and deliver training in proper handling, storage, use of improved feed rations and formulation of mineral supplements</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Strengthen linkages between forage producers and livestock producer groups by organizing market days</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Monitor the effect of technology packages, measure productivity and carry out improved pilot trials</li> </ul>			✓		✓	
Task 1.2.2 Improve access to animal health inputs and services						
<ul style="list-style-type: none"> <li>Provide capacity building in good marketing and business practices for improved animal service delivery</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Encourage the development of campaigns to promote new inputs and package supportive advisory services</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Develop lending products that can be used to acquire materials and expand services</li> </ul>	✓					
Task 1.2.3 Improve access to animal health advisory services						

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
<ul style="list-style-type: none"> <li>Identify and map viable advisory service providers</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Train advisory service providers on improved business and marketing practices</li> </ul>	✓					
<b>Task 1.2.4 Improve access to financial and business development services</b>						
<ul style="list-style-type: none"> <li>Provide training to financial service providers and build awareness of the needs and capabilities of the livestock sector</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Promote awareness to FOFBEV member cooperatives on good savings and loan practices for livestock-related financial transactions</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Identify and engage local business service providers in capacity development for critical business skills</li> </ul>	✓					
<b>Task 1.2.5 Improve access to reliable transport services</b>						
<ul style="list-style-type: none"> <li>Facilitate dialogues with major transport cooperatives to improve understanding of livestock producer needs and priorities</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Identify options to improve independent transport services during peak periods</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Identify banks and financial institutions willing to provide loans to livestock transport services</li> </ul>	✓					
<b>IR 1.3 Improved Pastureland and Water Resources Management</b>						
<b>Task 1.3.1 Assist pastoralists and livestock farmers to improve existing water points for livestock and strategically planning new ones</b>						
<ul style="list-style-type: none"> <li>Update existing maps with water points, including wells, boreholes, natural valley bottom small reservoirs and assess their functionality and capacity for livestock</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Build capacity of community water organizations in water point utilization and maintenance</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Develop information campaigns on good hygiene practices at water points</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Conduct water point analyses and develop action plans for needed construction and/or rehabilitation activities to be funded by other partners</li> </ul>			✓		✓	
<b>Task 1.3.2 Promote improved grazing and pastureland/rangeland management practices for sustainable livestock production</b>						
<ul style="list-style-type: none"> <li>Conduct focus group discussions with ICRAF, ICRISAT and other stakeholders in improved crops and related management practices</li> </ul>			✓		✓	

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
• Help MDR update and/or adapt pastureland management protocols with the new perimeters			✓		✓	
• Train new producer groups in PADESO perimeters on improved grazing and pastureland/rangeland management practices such as forage production techniques, use of improved crop and forage varieties, grazing rotations, animal corridors, soil conservation, and water harvesting near falaises			✓		✓	
• Introduce improved varieties of dual purpose staple crops, including millet, sorghum, Niébé, groundnuts, pigeon pea, Dolique, and cactus pear) for fodder production under rain-fed agriculture, recession agriculture, and water harvesting systems			✓		✓	
• Promote the use of manure with compost and chemical fertilizers to improve soil fertility			✓		✓	
• Provide training, analysis and extension in improved fodder production practices, nutrition, business operations and finance skills, gardening enterprises, and private sector partnerships			✓		✓	
• Promote integrated pest management practices such as scouting, crop rotation, and use of pest and disease resistant varieties to avoid and/or minimize the use of pesticides			✓		✓	
• Identify geological, agro-ecological, and land use parameters of relevant <i>Cercles</i>			✓		✓	
<b>IR 1.4 Improved Community Literacy, Numeracy and Nutrition and Hygiene practices</b>						
Task 1.4.1 Improve community literacy and numeracy						
• Select and work with rural female entrepreneurs to create effective Women's Business Platforms	✓					
• Select and work with rural youth to create effective Youth Business Platforms	✓					
• Target pilot schools to share a curriculum of basic agro-livestock production, livestock business practices, and basic human nutrition and hygiene	✓					
• Provide literacy training to selected FOFBEV cooperatives and POs and encourage village peers to help train other community members	✓					
Task 1.4.2 Improve nutrition and hygiene at the household level						
• Develop messaging for nutrition and hygiene campaigns	✓					

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
<ul style="list-style-type: none"> <li>Conduct training workshops in business entrepreneurship and integrate behavior change messages on using additional income for more nutritious foods</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Facilitate training by IFP and ICD for smallholders and women producers to improve milk offtake rates, especially during the dry season</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Promote Moringa production for livestock feed and human consumption</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Help women and vulnerable populations acquire access to land</li> </ul>	✓					
<b>Component II: Increased Domestic and Export Trade</b>						
<b>IR 2.1 Strengthened Market Access and Linkages</b>						
Task 2.1.1 Improve vertical linkages to build trust and sustainable market relationships						
<ul style="list-style-type: none"> <li>Provide training in business negotiation skills</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Identify large-scale buyers and link them to producer organizations and women's groups</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Collaborate with Orange and Malitel to encourage mobile payments for livestock transactions</li> </ul>	✓					
Task 2.1.2 Strengthen horizontal linkages to achieve economies of scale						
<ul style="list-style-type: none"> <li>Mentor IFP and FOFBEV to develop a curriculum for business-focused POs and cooperatives in financial operations, marketing and business planning</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Link independent producers with groups affiliated with FOFBEV and provide assistance to associations transitioning to full-fledged cooperatives</li> </ul>	✓					
Task 2.1.3 Improve producer capacity to identify and achieve market requirements						
<ul style="list-style-type: none"> <li>Develop a FOFBEV-sponsored publication on market requirements and buyer needs</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Provide training to member cooperatives on standards and specifications related to health, weight, nutrition, age, and breed</li> </ul>			✓		✓	
<ul style="list-style-type: none"> <li>Assess and improve the capability of local livestock cooperatives and independent producers to use LMIS and promote LMIS expansion in target Cercles</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Provide training for women and youth business platforms in animal fattening, market sales, and price positioning</li> </ul>			✓		✓	

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
<b>Task 2.1.4 Link producer groups to financial services</b>						
• Encourage local banks and MFIs to expand their reach into target rural communities to improve access for underserved groups			✓		✓	
• Mentor local bank branches such as BNDA and CVECA and key value chain actors such as FOFBEV to develop lending and financial products such as livestock insurance for member cooperatives			✓		✓	
<b>IR 2.2 Decreased Barriers to Trade</b>						
<b>Task 2.2.1 Link livestock sector stakeholders to the regional trade policy dialogue</b>						
• Analyze data on transport costs and major factors affecting market inefficiencies and competitiveness of Mopti livestock for end markets	✓					
• Coordinate with the West Africa Trade Hub Project and USAID/Mali's FTF Policy activity to develop a public-private dialogue between FOFBEV, FEBEVIM, MDR and other actors on export barriers	✓					
<b>Task 2.2.2 Improve transport service provision for the livestock sector</b>						
• Conduct an initial value chain study to understand timing of growing, harvesting and trading in order to plan livestock shipments more effectively			✓		✓	
• Develop and deliver informational radio programming on roadworthiness and transport safety			✓		✓	
• Connect transport service providers to financial services to enable fleet upgrades			✓		✓	
• Pilot incentive-based mechanisms for timely transport			✓		✓	
<b>Component III: Strengthened Local Capacities and Systems</b>						
<b>IR 4.2 Strengthened Capacity of Livestock Actors</b>						
<b>Task 4.2.1 Build capacity of key public sector actors in the livestock value chain to manage donor funds</b>						
• Conduct an initial assessment of MDR's capacity to receive a FARA for PADESO expansion	✓					
• Build capacity in needed areas identified in the assessment	✓					
<b>Task 4.2.2 Engage private sector actors to develop innovative approaches to meet market standards and requirements, and view livestock production and marketing as a business</b>						

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
• Build capacity of cooperatives in market standards and best practices			✓		✓	
• Mentor FOFBEV in developing guidelines for grades, standards and best practices			✓		✓	
• Provide training to cooperatives in using grades, standards, and other best practices			✓		✓	
• Facilitate dialogues between trader, transport and producer groups to improve understanding of the constraints and opportunities of the value chain			✓		✓	
• Work with dynamic private sector firms to support the development of new approaches in market standards and product sales and advertising			✓		✓	
<b>Task 4.2.3 Build management capacity of livestock sector organizations to help them become more professional, increase revenues, and improve service delivery</b>						
• Identify and use relevant tools to assess the organizational management capacity of local organizations	✓					
• Develop necessary organizational plans and other tools to help target organizations improve management ability	✓					
• Conduct annual performance audits to ensure that capacity development of target organizations is on track	✓					
<b>Component IV: Improved Enabling Environment for Livestock Sector</b>						
<b>IR 5.2 Increased Capacity of Civil Society for Policy Analysis and Advocacy</b>						
<b>Task 5.2.1 Build capacity of FOFBEV and OVM to advocate to government on behalf of their membership and drive public-private dialogue</b>						
• Integrate an assessment of policy analysis and advocacy capacity into the operational capacity assessments described in IR 4.2 above	✓					
• Develop innovative approaches to promote financial sustainability, develop capacity, improve service delivery and foster dialogue	✓					
• Facilitate regular policy-driven dialogue between producer organizations and government to identify policy priorities	✓					
• Help FOFBEV and OVM develop and maintain working relationships with local universities, and research organizations regarding policy analysis needs and advocacy platforms for the sector	✓					
<b>Task 5.2.2 Build capacity of universities and think tanks to develop analytical research on livestock issues</b>						

Activities Listed by L4G Work Plan Component, IR, and Task	Screening Result			Findings (complete for all moderate/unknown and high risk activities)		
	No/Low Risk	High Risk	Moderate/Unknown Risk	No significant adverse impact	With specified mitigation, no significant adverse impact	Significant Adverse impact
<ul style="list-style-type: none"> <li>Issue an annual program statement announcement calling for university and think tank proposals for white papers</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Support initial capacity assessment of these proposals</li> </ul>	✓					
<ul style="list-style-type: none"> <li>Assess and work with partners to ensure basic capacity in math, statistics, use of data recording and analysis programs, and technical writing skills</li> </ul>	✓					

## 2.2 DEFINITION OF THRESHOLD/SIGNIFICANCE LEVELS

### 2.2.1 ACTIVITIES OF NO OR LOW RISK

Project tasks involving studies and assessments, capacity building and training were found to bear no risk and were previously issued a Categorical Exclusion in the project IEE. These generally include sub-activities in improving livestock marketing and information systems, improving livestock business management skills and access to credit, training and capacity building, awareness raising, regulatory reform, supporting policy dialogue and data analysis and planning.

### 2.2.2 ACTIVITIES OF HIGH RISK

No activities in the L4G work plan were found to be high risk. In the event that an activity is determined to be high risk and therefore a positive determination, the required process, including an Environmental Assessment, would be followed as outlined in USAID’s environmental regulation 22 CFR 216 and in consultation with the USAID MEO.

### 2.2.3 ACTIVITIES OF MODERATE OR UNKNOWN RISK

Environmental screening identified some low to moderate risk activities having the potential to exert some negative impact on the environment, but with proper mitigation measures, their impact is expected to be negligible. These activities are broadly categorized by four main areas in the following sections of the EMMP:

- Section 3: Provision of animal vaccines and medicines;
- Section 4: Water supply for livestock and community gardens;
- Section 5: Improved fodder production and associated practices;
- Section 6: Livestock value chain activities.

The remainder of this EMMP report describes the scope of each activity type, relevant Malian environmental regulations, potential impacts, and an environmental mitigation and monitoring plan.

Through the implementation of specified mitigation measures, little to no significant environmental impact is anticipated. Mitigation measures will be implemented by project staff and sub-contractors, and will be incorporated into sub-contract agreements where applicable.

**Table 2. Classification of moderate risk (Negative Determination with Conditions) work plan tasks by IEE activity type**

<b>Work Plan Task/Component</b>	<b>IEE Activity Type</b>
<b>EMMP Section 3. Provision of Animal Vaccines and Medicines</b>	
Task 1.1.1 Modernize animal health delivery systems	<b>Modernizing Livestock Veterinary Services</b> (Livestock Value Chain Activity 3, IEE p. 58)
Task 1.2.2 Improve access to animal health inputs and services	
<b>EMMP Section 4. Water Supply for Livestock and Community Gardens</b>	
Task 1.3.1 Assist pastoralists and livestock farmers to improve existing water points for livestock and strategically plan new ones	<b>Development and Rehabilitation of Water Points (Wells, Bore Holes)</b> (Infrastructure Activity 3a, IEE p. 32)
<b>EMMP Section 5. Improved Fodder Production and Related Practices</b>	
Task 1.2.1 Improve livestock fodder production and supply	<b>Improving Livestock Fodder Production</b> (Livestock Value Chain Activity 4 & 8, IEE p. 58) <b>Direct TA and Training to Ag Associations</b> (Cereal Value Chain Activity 3, p. 38-41)
Task 1.3.2 Promote improved grazing and pastureland/rangeland management practices for sustainable livestock production	
<b>EMMP Section 6. Incorporation of Environmental Best Practices in Transport and Financial Services</b>	
Task 1.2.5 Improve access to reliable transport services	<b>Improving Cattle Production, Processing, and Marketing</b> (Productivity and Competitiveness of Livestock Value Chain Activity 5, IEE pp. 58-59)
Task 2.1.3 Improve producer capacity to identify and achieve market standards	
Task 2.2.2 Improve transport service provision for the livestock sector	
Task 4.2.2 Engage private sector actors to develop innovative approaches to meet market standards and requirements, and view livestock production and marketing as a business	
Task 2.1.1 Improve vertical linkages to build trust and sustainable market relationships	<b>Improving Access to Credit for Livestock Value Chain</b> (Livestock Value Chain Activity 7, IEE p. 59)
Task 2.1.4 Link producer groups to financial services	

# 3. PROVISION OF ANIMAL VACCINES AND MEDICINES

## 3.1 SCOPE OF ACTIVITIES

Increasing livestock production in Component I depends on the existence of quality products and services. In partnership with the proposed local partners, the L4G team will develop a network of private sector animal health services and feed suppliers. Screening in Table 1 above identified potential environmental impacts associated with two specific tasks:

- **Task 1.1.1** – Modernize animal health delivery systems; and
- **Task 1.2.2** – Improve access to animal health inputs and services.

Annual vaccination campaigns will be carried out for small ruminants and bovine cattle. At least two vets will be employed and some 40 to 80 or more Auxiliary Veterinarians will be trained to assist in vaccinating.

Private vets in program zones will provide linkages for herdsman and women’s and youth groups to expand their commercial activities and will assist the L4G team in training activities. Private vets will provide vaccinations (PPCB, Pasteurellose, PPR, Charbon Bactridien, Charbon Symptômatique, Clavelée).

## 3.2 AFFECTED ENVIRONMENT

Activities will take place in all three agro-ecological areas described in Section 1 above.

## 3.3 POTENTIAL IMPACTS

Potential environmental impacts involve the risks associated with the chemicals, medicines and sharp needs and instruments used in animal vaccination programs.

**Table 3. Potential impacts and mitigating actions associated with the provision of animal vaccines and medicines through Tasks 1.1.1 and 1.2.2.**

<b>IMPACTS</b>	
<b>Task 1.1.1 Modernize animal health delivery systems</b>	
<b>Task 1.2.2 Improve access to animal health inputs and services</b>	
<b>Risks associated with these activities:</b>	<b>Mitigating actions and conditions</b>
<p><b>Vaccination program (more than 100,000 animals vaccinated each year):</b></p> <ul style="list-style-type: none"> <li>▪ Due to the relatively large numbers of animals being vaccinated, safe use and disposal of needles should be practiced to avoid harming disposal sites and particularly dump site pickers.</li> <li>▪ Chemicals and drugs and their packaging should be managed for expiration dates and proper disposal.</li> <li>▪ Good hygiene and protective clothing should be used as</li> </ul>	<p>(1) Develop a waste management plan requirement for each vaccination site.</p> <p>(2) Provide training to project beneficiaries in safe handling and disposal practices for needs and sharps.</p> <p>(3) After each vaccination operation, monitor for proper disposal of sharps and expired chemicals and drugs: burial and/or burning of veterinary inputs as appropriate.</p> <p>(4) Prohibit the use of expired chemicals and</p>

<b>IMPACTS</b>	
Task 1.1.1 Modernize animal health delivery systems	
Task 1.2.2 Improve access to animal health inputs and services	
<b>Risks associated with these activities:</b>	<b>Mitigating actions and conditions</b>
appropriate.	medicines.  (5) Prohibit the use of dips and sprays for pesticides without a PERSUAP.

### 3.4 ENVIRONMENTAL MITIGATION AND MONITORING

The EMMP for activities involving the provision of vaccines and medicines is provided in Table 4 below. These measures follow the environmental conditions set forth in the L4G IEE for Activity 3, Modernizing Livestock Veterinary Services (p. 58).

**Table 4. EMMP for Modernizing livestock veterinary services (Tasks 1.1.1 and 1.2.2)**  
**Person Responsible for Overseeing EMMP:** Tom Gardiner, Chief of Party

<b>EMMP</b>			
Task 1.1.1 Modernize animal health delivery systems			
Task 1.2.2 Improve access to animal health inputs and services			
Impacts described in Table 3 above			
<b>IEE or EA Condition</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Timing and Responsible Parties</b>
<b>IEE Condition, p. 58:</b> <i>“Medicines and nutritional supplements are properly disposed of in accordance with local regulatory requirements and good practices”</i>	<b>Objective:</b> Minimize risk of injury from sharps and exposure to medicines or chemicals  <b>Mitigation:</b> Develop and implement a waste management plan requirement for each vaccination site, including training in implementing the plan	<ul style="list-style-type: none"> <li>▪ Document development of waste management plan for each vaccination site, including dates for meetings, training, or other communications of the plan requirements to veterinarians working at each site</li> <li>▪ Document training or meetings with private and auxiliary vets outlining the need to implement and document their safe hygiene and disposal practices during vaccination</li> <li>▪ Have vets document and monitor for proper disposal of sharps and expired chemicals and drugs: burial and/or burning as appropriate</li> <li>▪ Document follow up with spot check visits to ensure that best practices are being implemented</li> </ul>	<b>Responsible Party:</b> L4G DCOP  <b>Timing:</b> <ul style="list-style-type: none"> <li>▪ Waste management plan and training: Prior to initiation of activities at each vaccination site</li> <li>▪ Spot check visits to ensure good practices are followed in using and handling medicines, and in disposal of sharps and chemicals: at least once during implementation at each vaccination site</li> </ul>
<b>IEE</b>	<b>Objective:</b> Minimize risk of	<ul style="list-style-type: none"> <li>▪ Screen for and document</li> </ul>	<b>Responsible Party:</b> L4G COP

<b>Condition, p. 58:</b> <i>“Good-practice design and operation standards must be implemented, generally consistent with USAID’s EGSSAA”</i>	exposure to pesticides <b>Mitigation:</b> Prohibit the use of pesticides used in dips or sprays without the preparation of a PERSUAP	activities that use pesticides, checking that the pesticides are covered by a USAID-approved PERSUAP	<b>Timing:</b> Prior to implementation of each activity
	<b>Objective:</b> Minimize unsound environmental approaches to animal service delivery <b>Mitigation:</b> Incorporate best practices in environmentally sound standards into capacity building curricula and information campaigns on animal services	<ul style="list-style-type: none"> <li>▪ Document to verify: 1) a review of capacity building curricula and information campaigns to identify entry points; and 2) the incorporation of environmentally sound standards as appropriate</li> </ul>	<b>Responsible Party:</b> L4G COP <b>Timing:</b> Prior to implementation of each activity

# 4. WATER SUPPLY FOR LIVESTOCK AND COMMUNITY GARDENS

## 4.1 SCOPE OF ACTIVITIES

Clean water and good hygiene are critical to maintaining livestock health, and livestock access to potable water is a constraining factor in the livestock value chain. L4G will work with the Decentralized branches of the Ministry of Livestock and the Ministry Hydraulic Resources to facilitate the delivery of appropriate and affordable small-scale livestock water points. Results of environmental screening shown in Table 1 above identified potential environmental impacts associated with the following L4G task:

- **Task 1.3.1** – Assist pastoralist and livestock farmers to improve existing water points for livestock and strategically plan new ones.

For water mapping activities, L4G will undertake a comprehensive, participatory mapping exercise with the *Direction Régionale de Productions et Industries Animales* (DRPIA) and livestock organizations. This exercise will update water resources and points, as well as livestock drinking water needs in order to create an action plan to facilitate organizational planning.

L4G will help livestock organizations update existing maps with water points (wells, boreholes, natural valley bottom small reservoirs) and assess their functionality and capacity for livestock. Where maps do not exist, as may be the case with new perimeters, the L4G team will help livestock groups create them. L4G will ensure that women, youth, and small producers are included in mapping exercises, and that their knowledge and experiences are captured. In areas with severe water scarcity, L4G will facilitate discussions between existing cooperatives and herdsmen on their water needs, and will provide technical assistance to identify potential sites for new boreholes where underground water is available.

The L4G technical team will carry out water harvesting actions to enhance food security and augment fodder production, while improving environmental stability. L4G will promote water harvesting along the naturally occurring water flow lines of the falaise, making use of natural check dams (points along water courses where natural waterfalls occur) and rock outcrops where cement masonry check dams, fitted stone check dams, or permeable dams are appropriate and feasible to build. Dam construction on the falaise must be aesthetically appealing and fit the natural beauty of the landscape. For this reason, L4G will avoid constructing gabion cage check dams on the falaise as these are less aesthetic than natural stone works. Water storage will take place at the base of the falaise.

Water harvesting can be as simple as using Zai planting pits (fortified with manure dug into the pit) or encouraging contour ridge farming on flat fields. Where stones are abundantly available, they can be used to construct contour stone bunds (0% to 3% slope), contour rock wall terraces (4% to >25% slope), fitted stone check dams, permeable dams, and cement reinforced stone check dams. Water can be stored in stone-cement-lined reservoirs.

Stones, transported from the falaise to cropped lands within 2-3 km of its base (mainly using donkey and horse carts), can be used to construct contour stone bunds, contour rock wall terraces, and permeable dams. Dolique can be introduced along lands adjacent to the falaise since water harvesting actions along the rock water courses and in farmers' fields will improve aquifer recharge and water accessibility for fodder production. Other legumes to be encouraged are pigeon pea, cowpea, and groundnut. Where water becomes more abundant, consideration will be given to plant maize and sorghum – both will be dual purpose types – fodder and grain.

All L4G soil conservation and water harvesting construction will follow detailed technical specifications and will require use of quality control check lists. L4G will encourage South to South Technical transfer using Cape Verdean technicians and Nigerien certified stone masons (trained by the Cape Verdean Technician in 2013). Learning exchange visits will be an important teaching tool used to encourage improved farmer / herder use of rainwater.

L4G will introduce Moringa as a human nutrition food (leaves) through irrigated garden sites. Other African vegetables can inter-planted below the Moringa canopy, to further enhance food production capacity. An anticipated challenge is to ensure that women producers have access to water sources. Surface water can be harvested and stored at the base of the falaises; but cement-lined wells or boreholes will be required in zones that are away from the abundant water resources of the falaises.

## **4.2 AFFECTED ENVIRONMENT**

The garden sites and water points will be identified prior to implementation.

## **4.3 POTENTIAL IMPACTS**

The main potential adverse impacts or concern are siting water sources in appropriate areas; unsound construction that makes new structures dangerous to human and livestock health; and failure to manage structures once they are built or rehabilitated.

Several of the activities mentioned in the proposal and the Year 1 work plan have not yet begun, including mapping of existing livestock water points and rehabilitation of livestock-oriented watering points. This is the right moment to apply sound environmental design.

Poor siting or construction of water points can cause disease and erosion, and should be avoided. A checklist of environmental criteria for siting water points for proper use will be used, drawing on USAID's EGSSAA guidelines for Agriculture and Water Supply and Sanitation. These criteria will be incorporated in the sensitization and training sessions of L4G, to minimize environmental impact. Environmental criteria will consider:

- Adequate water quality;
- Availability of water a sustainable water supply<sup>1</sup>;
- Ease of access<sup>2</sup> without causing environmental damage to natural habitats;
- Adequate topography and drainage to minimize or avoid erosion and/or standing water;
- Adequate water yield to meet demand;
- Proximity of existing downstream and upstream water sources and potential impact;
- Potential for community conflict;
- Ability of users to maintain water point<sup>3</sup>.

Water point mapping and development or rehabilitation require community participation in all phases to mitigate potential impacts and be successful, including demand-driven implementation, shared cost and labor, behavior change, choice of design, integration of livestock water supply and sanitation and soil erosion measures, financial component, provision for operation and maintenance (Table 5). L4G partners are well-versed in the right way to go about setting up the program and should provide mainly positive

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<sup>1</sup> A sustainable water source in which water of acceptable quality is readily available at all times of the year without jeopardizing water supply for other uses. Water extraction or rehabilitation activities must not cause harm to sensitive ecosystems such as wetlands or areas surrounding natural springs, streams, rivers or other water bodies.

<sup>2</sup> Ease of access implies that the site will not require clearing of vegetation or the creation of a road or trail to reach the site.

<sup>3</sup> This criterion also takes into account the potential for the improvement of basic water supply facilities to attract increased human activity and migration in the area, and potential unplanned land use consequences which may not be sustainable.

impacts throughout the program life. The challenge will belong to villages to carry on new improved behavior and infrastructure management.

**Table 5. Potential impacts and mitigating actions associated with water supply activities for livestock and community gardens through Task 1.3.1.**

<b>IMPACTS</b>	
Task 1.3.1 Assist pastoralists and livestock farmers to improve existing water points for livestock and strategically planning new ones	
<b>Risks associated with these activities:</b>	<b>Mitigating actions and conditions</b>
<p><b>Mapping and development of drilled or dug water sources:</b></p> <ul style="list-style-type: none"> <li>▪ Poor siting causes soil to erode around the structure</li> <li>▪ Poor siting causes contaminated mud or standing water to accumulate around the base, leading to water-borne illness</li> <li>▪ Water contamination by animals and their feces</li> <li>▪ Water quality may not meet minimum standards for potential human consumption</li> <li>▪ Water downstream may be depleted</li> <li>▪ Sustainability depends on community participation and appropriate behavior</li> </ul>	<p><b>Devise an overall, documented, systematic approach that includes:</b></p> <ol style="list-style-type: none"> <li>(1) Integrate human capacity, participatory, cost-sharing, and demand-driven principles in planning and development.</li> <li>(2) Consider <b>topography</b> and <b>drainage</b> when siting water sources (use a checklist for correct siting practices)</li> <li>(3) Map out existing livestock water sources upstream and downstream; communicate with those users.</li> <li>(4) Provide for separate spaces/structures for animals and people; build protective structures as appropriate, if required.</li> <li>(5) Attempt to quantify and predict water usage rate for each site</li> <li>(6) Set up water management committees that oversee proper use, maintenance, and repair of structures</li> <li>(7) Assume any watering points may also be used for human consumption and provide minimum water quality testing of bacteria and arsenic</li> </ol>

## 4.4 ENVIRONMENTAL MITIGATION AND MONITORING

The EMMP for water point development is provided in Table 6 below. It includes mitigation measures to ensure that sound construction and management practices will be used to safeguard the water quality and sustainability of all types of water sources. These measures follow the environmental conditions set forth in the L4G IEE for Infrastructure Activity 3a, Development and Rehabilitation of Water Points (p. 32).

**Table 6. EMMP for Mapping Water Points (Task 1.3.1)**

Person Responsible for Overseeing EMMP: Tom Gardiner, Chief of Party

EMMP			
Task 1.3.1 Assist pastoralists and livestock farmers to improve existing water points for livestock and strategically planning new ones			
Impacts described in Table 5 above			
IEE or EA Condition	Mitigation	Monitoring	Timing and Responsible Parties
<p><b>IEE Condition, p. 32 (Activity 3a):</b> “Environmental management conditions established by the ERF process must be generally consistent with good-practice guidance of USAID’s EGSSAA (agriculture, irrigation, and construction chapters)</p>	<p><b>Objective:</b> Incorporate environmental sustainability in the mapping, prioritization, and/or selection of water points</p> <p><b>Mitigation:</b> Use environmental criteria from EGSSAA (including water and sanitation chapter) and other relevant sources to select priority water points, and communicate to beneficiaries the importance of using these criteria in the sustainability of water points, including:</p> <ul style="list-style-type: none"> <li>▪ Adequate water quality</li> <li>▪ Availability of sustainable supply</li> <li>▪ Topography and drainage</li> <li>▪ Ease of access</li> <li>▪ Adequate yield to meet demand</li> <li>▪ Proximity of existing upstream and downstream uses</li> <li>▪ Potential for conflict</li> <li>▪ Ability of users to maintain the water point.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify and record activities that require the ERF process</li> <li>▪ Document in the ERF the development and application of environmental criteria to map and prioritize water points</li> <li>▪ Document communications with beneficiaries on the importance of these criteria and how to use them</li> </ul>	<p><b>Responsible Party:</b> L4G DCOP</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>▪ Apply criteria during the preparation of ERFs when required;</li> <li>▪ Document the development of criteria and communications to beneficiaries prior to mapping exercises</li> </ul>
<p><b>IEE Condition, p. 32 (Activity 3a):</b> “Environmental management conditions established by the ERF process must be generally consistent with good-practice guidance of USAID’s EGSSAA (agriculture,</p>	<p><b>Objective:</b> Incorporate environmental sustainability in the siting, construction, and use of water points</p> <p><b>Mitigation:</b> Devise an overall, documented, systematic approach to siting, installing or improving, and monitoring structures to include:</p> <ul style="list-style-type: none"> <li>▪ Environmental site selection criteria described above</li> <li>▪ Human capacity, participatory, cost-sharing, and demand-driven principles</li> <li>▪ Site and water point assessments such as</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify and record activities that require the ERF process</li> <li>▪ Document the process of identifying and developing water sources, including the steps mentioned and use this as a checklist or standard for each site and/or each ERF</li> <li>▪ Document in the ERF the development and application of environmental sustainability measures and criteria to map and prioritize water points; and conduct site assessments;</li> </ul>	<p><b>Responsible Party:</b> DCOP and the two field coordinators</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>▪ Apply criteria during the preparation of ERFs when required;</li> <li>▪ Document communications and/or training to beneficiaries on applying appropriate guidelines and sustainability measures prior to implementing the water point construction activity</li> <li>▪ Spot check visits to ensure good practices are followed, at least once during implementation at each site</li> </ul>

<b>EMMP</b>			
Task 1.3.1 Assist pastoralists and livestock farmers to improve existing water points for livestock and strategically planning new ones			
Impacts described in Table 5 above			
<b>IEE or EA Condition</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Timing and Responsible Parties</b>
irrigation, and construction chapters)	<p>calculating water usage rate for each site;</p> <ul style="list-style-type: none"> <li>EGSSAA guidelines</li> </ul>	<p>and relevant EGSSAA guidelines</p> <ul style="list-style-type: none"> <li>Document communications with beneficiaries on the importance of these criteria and how to use them</li> <li>Conduct and document findings from spot check visits on the implementation of EGSSAA guidelines by beneficiaries</li> </ul>	
	<p><b>Objective:</b> Minimize risk of contamination of human drinking water sources by livestock</p> <p><b>Mitigation:</b> Provide for separate spaces / structures for animals and people IF water source is for both humans and livestock; build protective structures as appropriate.</p>	<ul style="list-style-type: none"> <li>Identify and record sites / activities that require separate spaces / structures for animals and people because the water source is used for both humans and livestock</li> <li>Document the development of protective structures at these sites</li> <li>Document communication with beneficiaries on the importance of maintaining separate spaces with these protective structures</li> </ul>	<p><b>Responsible Party:</b> DCOP and the two field coordinators</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>Identify and record sites / activities prior to implementation</li> <li>Document development of protective structures and communication as needed</li> </ul>
	<p><b>Objective:</b> Minimize risk of contamination or poor water quality of human drinking water supply</p> <p><b>Mitigation:</b> Conduct water quality testing for arsenic, total coliforms at a minimum, and other parameters based on water resource characteristics and provide appropriate treatment accordingly</p>	<ul style="list-style-type: none"> <li>Identify and record sites / activities that require water quality testing</li> <li>Conduct water quality testing to ensure that water meets the following requirements: Arsenic &lt; 0.01 mg/L; total coliforms not detectable within any 100 mL sample; other parameters within acceptable limits</li> <li>Document the provision of appropriate treatment where applicable</li> </ul>	<p><b>Responsible Party:</b> DCOP and the two field coordinators</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>Identify and record sites / activities prior to implementation</li> <li>Conduct water quality testing at the onset of project and quarterly</li> <li>Provide appropriate treatment as required, prior to using the water source for human drinking water supply</li> </ul>
	<p><b>Objective:</b> Avoid creating reservoirs of standing water that</p>	<ul style="list-style-type: none"> <li>Discuss and document appropriate location of watering points with</li> </ul>	<p><b>Responsible Party:</b> DCOP and the two field coordinators</p> <p><b>Timing:</b></p>

<b>EMMP</b>			
Task 1.3.1 Assist pastoralists and livestock farmers to improve existing water points for livestock and strategically planning new ones			
<b>Impacts described in Table 5 above</b>			
<b>IEE or EA Condition</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Timing and Responsible Parties</b>
	<p>harbor vector-borne disease</p> <p><b>Mitigation:</b> Prohibit the creation of watering holes or reservoirs near villages and places where people sleep, and discuss risks with beneficiaries.</p>	<p>beneficiaries in order to minimize risks of vector-borne disease associated with areas that may provide breeding habitat for mosquitos and other disease vectors</p>	<ul style="list-style-type: none"> <li>▪ At the onset of activity</li> </ul>
<p><b>IEE Condition, p. 32 (Activity 3a):</b></p> <p>“Environmental management conditions established by the ERF process must be generally consistent with good-practice guidance of USAID’s EGSSAA (agriculture, irrigation, and construction chapters)</p>	<p><b>Objective:</b> Improve the environmental sustainability of water points through sound management practices</p> <p><b>Mitigation:</b> Establish water management committees to oversee proper use, maintenance, and repair of structures</p>	<ul style="list-style-type: none"> <li>▪ Document the establishment of water management committees and the discussion or training in proper use, maintenance and repair of structures</li> </ul>	<p><b>Responsible Party:</b> DCOP and the two field coordinators</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>▪ As necessary</li> </ul>

# 5. IMPROVED FODDER PRODUCTION AND RELATED PRACTICES

## 5.1 SCOPE OF ACTIVITIES

Currently, most livestock producers depend upon foraging and pasturelands to fatten animals. As a generalization, foraging involves a need to send animals to sites where natural resources are found in sufficient quantity to offset calories used to arrive at the site. It can be destructive and inefficient when resources are scarce or distant, which is the case in most Sahelian environments. L4G activities to improve fodder and foraging efficiency involving potential environmental impacts include intensification and fattening programs focused at the village level, the introduction of improved varieties, and increased use of fertilizer. Results of environmental screening shown in Table 1 above identified potential environmental impacts associated with the following L4G tasks:

- **Task 1.2.1** – Assist pastoralist and livestock farmers to improve existing water points for livestock and strategically plan new ones; and
- **Task 1.3.2** – Promote improved grazing and pastureland/rangeland management practices for sustainable livestock production.

As part of its program to introduce either forage crop varieties or dual purpose (food and fodder) crops, L4G will offer dual-purpose cowpea, dual-purpose sorghum (Sepon-82 and MaliSorg), improved peanut varieties, Dolique - Hyacinth Bean (*Dolichos lablab*), pigeon pea (*Cajanus cajan*), and Cactus pear to increase the amount of locally available fodder, which is currently always in short supply. L4G's plan to grow some 500 to 800 hectares of additional fodder crops will allow the average farmer in the program to increase their livestock fattening activities.

L4G will encourage Farmer Managed Natural Regeneration and planting and protection of Balanzan and other trees in agroforestry systems. Producers / herders will identify tree species of preference for fodder production. L4G will support community-based nurseries to produce seedlings. Out-planted trees will require protection and watering for 2-3 years. L4G will consider paying incentives for tree survival. This work will be done in conjunction with ICRAF and possibly ICRISAT.

Current intensification of agriculture practices in the Sahel include capturing rainwater more efficiently, controlling weeds (especially *Striga*), judiciously using inputs that improve plant growth, and introducing improved seed varieties such as *Striga*-resistant sorghum. An alternative that the project will explore is to control *Striga* in millet and sorghum fields by encouraging the planting of sesame as a rotation crop. Sesame is easy to grow, it has a very high drought tolerance, it is resistant to most pests and diseases, and it provides cash crop income and family nutrition (sesame bars, roasted, fried and altered dishes, and sesame oil). This crop is not within the purview of ICRISAT authorized FtF crops, so it would require further study and promotion using local and regional varieties. L4G proposes that if sesame is approved as a rotation crop in Bankass and Koro, varietal trials and production recommendations can be carried out with IER technicians.

Depending on farmers/herders' motivation and interest, L4G will encourage inter-planting of edible legumes with millet. L4G will promote groundnut production with improved varieties and application of gypsum to promote pod filling and increased productivity. Contour ridge farming and contour barriers of

*Andropogon guyanus* will be encouraged on land with 2% to 5% slope, again with the view to maximize water harvesting. If stones are available, contour stone bunds can be built on slopes of 1% to 3%.

L4G staff confirm that no GMOs will be used or introduced in the program.

L4G will build the capacity of livestock groups inside the PADESO perimeters and in the Mopti area to better utilize animal manure for soil fertility while minimizing negative impacts on the environment and water sources. Project staff and partners will provide training sessions on new techniques for dry land livestock waste and soil management, as well as techniques to apply manure with other fertilizers (compost or chemical fertilizers).

## **5.2 AFFECTED ENVIRONMENT**

The program is implemented in the *Cercles* of Bankass and Koro in the Mopti Region. Support and TA may also be provided to MOLF PADESO perimeters, but these need to be collaboratively identified with MOLF. All L4G villages are open to introduction of improved varieties to increase fodder production. As for seed multiplication, this may occur only for proven fodder crops (Dolique, Bourgou, pigeon pea, groundnut, cowpea, and dual purpose (grain and fodder) staple crops).

The activity sites of L4G are in the northern Sahel and are therefore subject to extreme potential drought conditions from year to year, as well as soil conditions that are poor in nutrients due to ever-shorter fallow periods, erosion and nutrient leaching, acidic soils, and low soil organic matter content (and thus low water-holding capacity). Livestock grazing is frequently carried out on the same lands at different times of the year, with animals living off crop residues from agricultural production. This contributes to enriching farm soil through additional manure from grazing activity. However, if the balance of animal numbers does not match available forage, overgrazing can occur.

A normal concern for any USAID-supported fodder production activity is whether it causes degradation or destruction in legally protected areas. Classified forests are legally protected by the Malian government, and therefore will be avoided in USAID agro-livestock programs. L4G staff has confirmed that villages in the program area are not located near any protected forest reserves, thereby eliminating potential risk to these particular protected areas.

## **5.3 POTENTIAL IMPACTS**

Households with lactating animals are sent to the distant pastoral zones or else around village pasture lands. All animals return to the village agricultural areas after harvest to feed on crop residues. A concern with this practice is that thousands of new animals could be added to possibly heavily-used areas to graze in the pastoral zones.

The ultimate environmental concern with this number of animals is feeding with natural vegetation on uncultivated land. There is also a potential for overgrazing when too many animals are concentrated into grazing or watering areas, which leads to vegetation replacement by less-preferred species; bare areas that erode; water sources that become silted or polluted or contaminated; as well as potential conflicts over access and usage.

Introduced crop varieties will require evaluations to ensure that the varieties are appropriate to the climate and environment, and will not cause harm to existing species or exacerbate climate change impacts such as desertification.

**Table 7. Potential impacts and mitigating actions associated with Tasks 1.2.1 and 1.3.2**

<b>IMPACTS</b>	
<b>Risks and Mitigation Associated with Improved Fodder Production and Related Practices</b>	
<b>Risks associated with these activities:</b>	<b>Mitigating actions and conditions</b>
<p><b>Livestock intensification and animal fattening program (influx of &gt;8,000 animals in the first year):</b></p> <ul style="list-style-type: none"> <li>▪ Tethered animals escape or are released and cause environmental damages outside fields</li> <li>▪ Native vegetation may be overharvested for forage since it is at no cost</li> <li>▪ Native vegetation is omitted as a cost factor when calculating economic benefits</li> </ul>	<p>(1) As a baseline, follow up with animal producers and buyers to find out the volume, quality, and species of natural forages (as opposed to agricultural residues) that are used to feed each animal, and how far away one must go to collect them.</p> <p>(2) Follow up on baseline information in the following season and include a photo documentary as a way to monitor impact on natural vegetation and assure sufficient pasture and crop residues are available.</p> <p>(3) Continue sensitization campaigns on maintaining control over animal displacement and feeding through local radio and peer visits</p> <p>(4) Include native vegetation as a cost factor when calculating economic benefits</p>
<p><b>Introducing improved fodder varieties:</b></p> <ul style="list-style-type: none"> <li>▪ A requirement for increased use of chemical fertilizers and treatments may put economic burdens on producers and be unsustainable;</li> <li>▪ Accelerated soil and water depletion can occur if poor cultivation practices are widely used</li> <li>▪ Limited seed sources will diminish genetic diversity in hardier traditional crop stocks</li> <li>▪ Some introduced varieties that are inadequately tested or treated can introduce new pests that impact local, more adapted varieties. Examples given by the Tropical Agricultural Association (TAA 2002) are given: <ul style="list-style-type: none"> <li>• A new high-yielding maize variety imported into Senegal in 1948 brought in a new strain of rust which killed off local maize.</li> <li>• FAO introduced sweet varieties of cassava from South America to replace the bitter varieties used in Africa. They carried a cassava mite pest that has since spread widely.</li> </ul> </li> <li>▪ Incentives may be created for extensive monocropping, leading to increased vulnerability to pests and disease</li> <li>▪ uncertain continued access to improved seeds for future crops</li> </ul> <p>Further risks associated with possibly imminent climate change (language borrowed from Senegal</p>	<p>(1) Introduce varieties that are appropriate to the agro-climatic conditions of each site; <b>USE CERTIFIED SEED</b></p> <p>(2) Avoid introduction of invasive species that take over native species' niches and become pests themselves (example: the ornamental water hyacinth)</p> <p>(3) Practice measures in the WTO agreement on Sanitary and Phytosanitary Standards (1995) that provide for: <ul style="list-style-type: none"> <li>○ Internationally-determined standards for Sanitary and Phytosanitary Standards</li> <li>○ Risk assessment based on scientific principles and evidence</li> <li>○ Consistency in application of appropriate levels of protection</li> </ul> </p> <p>(4) Use the Integrated Pest Management Plan to design an extension and monitoring program with regular follow-up, so as to avoid pesticide use, dependency, and expense to producers</p> <p>(5) Monitor the impact of intensification activities on land use, assuring no land degradation or forest habitat destruction occurs</p> <p>(6) Plan for future seed production beyond the life of the program <b>(L4G is integrating this into its program)</b></p> <p>(7) Hold imported plants in quarantine and check for parasites and disease before releasing into the environment (TAA 2002)</p>

<b>IMPACTS</b>	
<b>Risks and Mitigation Associated with Improved Fodder Production and Related Practices</b>	
<b>Risks associated with these activities:</b>	<b>Mitigating actions and conditions</b>
<p>PEA): varieties that do not perform well at higher temperatures during crucial moments in the life cycle of the crop (germination, flowering, pollination) will lead to eventual underproduction</p>	
<p><b>Increasing fertilizer use</b> (some language here is from USAID fertilizer fact sheet applied to West African agriculture intensification programs):</p> <ul style="list-style-type: none"> <li>▪ Misapplication of natural or chemical fertilizers is wasteful, and can contribute to groundwater contamination, soil acidification, and eutrophication of surface water, especially due to heavy rainfall</li> <li>▪ Nitrogen fertilizers produce nitrates that are readily leached in sandy soils and can contaminate water used by humans and livestock; these also acidify soil, leading to reduced mineral availability, nodulation failure in legumes, and a requirement to add lime</li> <li>▪ Phosphorus fertilizers in excess cause algal blooms and eutrophication of water bodies; cadmium as an impurity in fertilizer manufacturing accumulates in potatoes and leafy vegetables thence in kidneys and livers of animals</li> </ul> <p>Heavy use of chemical fertilizers can kill soil organisms and thus reduce nutrient retention and potentially contaminate surface and ground water</p>	<p><b>(1)</b> Respect doses prescribed for each fertilizer, for each crop. Recommend and follow minimum dosage levels, with emphasis on efficient micro dosing; train farmers and women in precise fertilizer micro-dosing techniques as well as safe handling procedures</p> <p><b>(2)</b> Use both organic and inorganic fertilizers, as well as compost and household residues</p> <p><b>(3)</b> Promote agroforestry for better nutrient cycling</p> <p><b>(4)</b> Avoid overuse of fertilizers especially near water sources <b>(L4G includes micro-dosing in its training programs)</b></p>

## 5.4 ENVIRONMENTAL MITIGATION AND MONITORING

The EMMP for activities on the introduction of improved fodder varieties is provided in Table 8 below. It includes mitigation measures for the impacts described in Table 7 above. These measures follow the environmental conditions set forth in the L4G IEE for Activity 4 (p. 58) and Activity 8 (p. 59).

**Table 8. EMMP for Improved Livestock Fodder Production and Related Practices (Tasks 1.2.1 and 1.3.2)**

**Person Responsible** for Overseeing EMMP: Tom Gardiner, Chief of Party

<b>EMMP</b>			
<b>Task 1.2.1 Improve livestock fodder production and supply</b>			
<b>Task 1.3.2 Improve grazing and pastureland/rangeland management practices for sustainable livestock production</b>			
<b>Impacts described in Table 7 above</b>			
<b>IEE or EA Condition</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Timing and Responsible Parties</b>
<p><b>IEE Condition, p. 58 (Activity 4):</b>  <i>“A comprehensive review shall be performed of the previous introduction of non-indigenous species in a similar ecosystem before planning its use or risking introducing it by accident into a project area. Observe strictly quarantine and phytosanitary (plant health) regulations.”</i></p> <p><b>IEE Condition, p. 58 (Activity 4 &amp; 8) and p. 38 (Activity 3):</b>  <i>“[Training and]good-</i></p>	<p><b>Objective:</b> Manage risk of introducing new or exotic varieties of fodder</p> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>▪ Use varieties that are appropriate to the agro-climatic conditions of each site</li> <li>▪ Use only certified seed in L4G activities</li> <li>▪ Conduct assessment or environmental review prior to the introduction of non-native species such as pear cactus</li> <li>▪ Prohibit introduction of invasive species that take over native species’ niches and become pests themselves</li> <li>▪ Practice measures in the WTO agreement on Sanitary and Phytosanitary Measures (1995) that provide for Internationally-determined standards for pest and disease control measures and risk assessment based on scientific principles and evidence</li> <li>▪ Plan for future seed production beyond the life of the program</li> <li>▪ Hold imported plants/seeds/stock in quarantine; check for parasites and disease before releasing (TAA 2002)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Assemble documentation from ICRISAT and other organizations being used for seed multiplication; examine for appropriateness to the milieu</li> <li>▪ Hold and document a discussion with ICRISAT and Ministry of Rural Development concerning international standards for pest and disease control measures for <b>the varieties they promote</b> and for <b>any variety that comes from outside Mali</b>; verify and document what the standards mean for L4G sites and crops</li> <li>▪ Verify whether certified improved seeds are available and favor acquiring them (document findings)</li> <li>▪ Produce a long-term plan for seed production; a verification should be made that research is not going on in large areas</li> <li>▪ Carry out and document an assessment on managing the risks of introducing the exotic pear cactus species prior to implementation</li> </ul>	<p><b>Responsible Party:</b> L4G DCOP and regional coordinators</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>▪ Prior to implementation of activities using seeds or introducing new or exotic fodder varieties</li> </ul>

<b>EMMP</b> <b>Task 1.2.1 Improve livestock fodder production and supply</b> <b>Task 1.3.2 Improve grazing and pastureland/rangeland management practices for sustainable livestock production</b> <b>Impacts described in Table 7 above</b>			
IEE or EA Condition	Mitigation	Monitoring	Timing and Responsible Parties
<i>practice design and operation standards must be implemented, generally consistent with USAID's EGSSAA (agriculture and irrigation chapters)"</i>	<ul style="list-style-type: none"> <li>▪ Manage exotic plant species to avoid introducing new pests, particularly from live fencing and inadvertent use of fast-growing species (see above heading on introducing new varieties)</li> </ul>		
<b>IEE Condition, p. 58 (Activity 4):</b> <i>"Good-practice design and operation standards must be implemented, generally consistent with USAID's EGSSAA (agriculture and irrigation chapters)"</i>	<b>Objective:</b> Manage risk of introducing genetically modified organisms (GMOs) <b>Mitigation:</b> Prohibit the use of GMOs	<ul style="list-style-type: none"> <li>▪ Screen and confirm that GMOs are neither used nor promoted by the project</li> </ul>	<b>Responsible Party:</b> L4G COP <b>Timing:</b> <ul style="list-style-type: none"> <li>▪ Prior to implementation of activities using seeds or introducing new or exotic fodder varieties</li> </ul>
<b>IEE Condition, p. 58 (Activity 4):</b> <i>"Agricultural extension will conform to the relevant aspects and provisions of the 2009 FTF PERSUAP, and to fertilizer best practices as set out in the USAID/AFR Fertilizer Factsheet"</i>	<b>Objective:</b> Manage environmental, health and safety risks of fertilizer use <b>Mitigation:</b> Sensitize farmers on fertilizer best practices in L4G extension program, based on the USAID/AFR Fertilizer Factsheet: <ul style="list-style-type: none"> <li>▪ Respect doses prescribed for each fertilizer and for each crop</li> <li>▪ Use both organic and inorganic fertilizers, as well as compost and household residues</li> <li>▪ Promote agroforestry for better nutrient cycling</li> <li>▪ Manage for water bodies near fields that will be impacted by</li> </ul>	<ul style="list-style-type: none"> <li>▪ Document the design of the fertilizer portion of the extension program around the four bullet points listed in the column at left, in addition to other relevant IPM and agroforestry topics</li> <li>▪ Document the development and implementation of <b>crop-specific</b> plans that promote improved varieties, pest / disease resistant varieties, and crop rotation for key fodder crops of millet, sorghum, cowpea, groundnut, pigeon pea, Dolique, Bourgou, Cactus</li> </ul>	<b>Responsible Party:</b> L4G DCOP <b>Timing:</b> <ul style="list-style-type: none"> <li>▪ As necessary</li> </ul>

<b>EMMP</b> <b>Task 1.2.1 Improve livestock fodder production and supply</b> <b>Task 1.3.2 Improve grazing and pastureland/rangeland management practices for sustainable livestock production</b> <b>Impacts described in Table 7 above</b>			
IEE or EA Condition	Mitigation	Monitoring	Timing and Responsible Parties
	fertilizer runoff  <b>Objective:</b> Manage risk of land degradation from over-use of fertilizers <b>Mitigation:</b> <ul style="list-style-type: none"> <li>Implement sensitization campaigns and peer exchange visits to promote fertilizer best practices as set out in the USAID/AFR Fertilizer Factsheet</li> <li>Monitor the impact of excessive fertilizer use</li> </ul>	Pear <ul style="list-style-type: none"> <li>Establish photo baseline of soil and other relevant environmental conditions</li> <li>Develop a timeline for reporting on site conditions (quarterly, biannually, yearly) as appropriate given environmental baselines</li> <li>Document training provided to local environment committees in <b>recognizing and reporting on</b> signs of erosion, excessive fertilizer use, abuse of forest resources (establish baseline or before-and-after photos)</li> </ul>	<b>Responsible Party:</b> L4G DCOP and the two field coordinators  <b>Timing:</b> <ul style="list-style-type: none"> <li>Establish photo baseline and provide training at the onset of activity at each site</li> <li>Quarterly, biannual, or yearly reporting of site conditions, based on site-specific timeline developed</li> </ul>
	<b>Objective:</b> Manage environmental, health and safety risks of pesticide use <b>Mitigation:</b> <ul style="list-style-type: none"> <li>Prohibit the use of pesticides and bio-pesticides without a relevant PERSUAP to guide the selection of appropriate and safe pesticides as well as safe use practices</li> <li>Follow guidelines in the USAID-Approved West Africa CORAF PERSUAP for any L4G procurement, training and use of pesticides</li> </ul>	<ul style="list-style-type: none"> <li>Screen for and document activities that use pesticides, checking that the pesticides are covered by the USAID-approved PERSUAP</li> <li>Monitor project activities for training, use or procurement involving pesticides, and document the implementation of guidelines in the West Africa CORAF PERSUAP where applicable</li> </ul>	<b>Responsible Party:</b> L4G COP  <b>Timing:</b> <ul style="list-style-type: none"> <li>Conduct screening prior to the implementation of any activities using pesticides</li> <li>Monitor and document implementation of guidelines as necessary</li> </ul>
<b>IEE Condition, p. 59 (Activity 8):</b> <i>“TA and promotion will (1) incorporate and promote sound environmental management practices (see guidance on such practices</i>	<b>Objective:</b> Manage risk of land degradation and damage to natural/native vegetation from overgrazing <b>Mitigation:</b> Monitor the impact of intensification activities on land use, assuring no land degradation or forest habitat destruction occurs <ul style="list-style-type: none"> <li>As a baseline, follow up with producers and animal buyers to find out the volume, quality, and species of natural forage (as opposed to agricultural</li> </ul>	<ul style="list-style-type: none"> <li>Develop and use interview sheet to collect data on one page as soon as practicable in the field, selecting a few typical villages to sample</li> <li>Document data collection using the above sheets and analyze for average amount of each forage type per animal that is being used</li> <li>Engage a university student to weigh and document actual feeding amounts if a more precise study is</li> </ul>	<b>Responsible Party:</b> L4G DCOP (oversight) and monitoring and evaluation by L4G Field Coordinators  <b>Timing:</b> <ul style="list-style-type: none"> <li>As necessary</li> </ul>

<b>EMMP</b> <b>Task 1.2.1 Improve livestock fodder production and supply</b> <b>Task 1.3.2 Improve grazing and pastureland/rangeland management practices for sustainable livestock production</b> <b>Impacts described in Table 7 above</b>			
IEE or EA Condition	Mitigation	Monitoring	Timing and Responsible Parties
<i>in EGSSAA Part III) and (2) convey Malian environmental requirements pertaining to these operations.”</i>	residues) that is being used to feed each animal, and how far they must go to collect it. <ul style="list-style-type: none"> <li>Follow up on baseline information in the following season and include a photo documentary as a way to monitor impact on natural vegetation and assure sufficient crop residues are available</li> <li>Value natural (native) vegetation as a cost factor when calculating economic benefits</li> </ul>	required or desired <ul style="list-style-type: none"> <li>Document the correlation of volumes of vegetation used with baseline and next-year site quality and distance to find forage and include natural vegetation in benefit calculations</li> <li>Photograph natural forage species and sites for signs of harmful harvest practices - before and after</li> <li>Document the development of a radio extension program on the use of natural vegetation in combination with other sources of forage / feed</li> </ul>	
	<b>Objective:</b> Manage risk of land degradation from escape of tethered animals <b>Mitigation:</b> <ul style="list-style-type: none"> <li>Implement sensitization campaigns on maintaining control over animal displacement and feeding through local radio, posters, and peer exchange visits.</li> </ul>	<ul style="list-style-type: none"> <li>Document the implementation of sensitization campaigns as appropriate</li> </ul>	<b>Responsible Party:</b> L4G DCOP and the two field coordinators <b>Timing:</b> <ul style="list-style-type: none"> <li>As necessary</li> </ul>

# 6. INCORPORATION OF ENVIRONMENTAL BEST PRACTICES IN LIVESTOCK TRANSPORT AND FINANCIAL SERVICES

## 6.1 SCOPE OF ACTIVITIES

Commercial production by livestock and fodder producers generates a higher need for reliable transport and financial services. L4G will incorporate environmental best practices in activities involving improvement in these services. For example, the team will work with transport service providers to disseminate messages on the importance of maintaining safe, roadworthy vehicles and sound environmental transport practices through Tasks 1.2.5 and 2.2.2. The project will also incorporate environmental considerations where appropriate in activities to improve standards for the livestock sector and in capacity building for potential loan recipients and loan providers or microfinance institutions. Results of environmental screening shown in Table 1 above identified potential environmental impacts associated with the following L4G tasks:

- Task 1.2.5 – Improve access to reliable transport services;
- Task 2.1.3 – Improve producer capacity to identify and achieve market standards;
- Task 2.2.2 – Improve transport service provision for the livestock sector;
- Task 4.2.2 – Engage private sector actors to develop innovative approaches to meet market standards and requirements, and view livestock production and marketing as a business;
- Task 2.1.1 – Improve vertical linkages to build trust and sustainable market relationships; and
- Task 2.1.4 – Link producer groups to financial services.

## 6.2 AFFECTED ENVIRONMENT

Activities will take place in all three areas described in Section 1 above.

## 6.3 POTENTIAL IMPACTS

Activities involving livestock transport and marketing may have adverse indirect consequences if performed without environmental awareness and knowledge of sustainable practices. Potential environmental impacts in loan development programs may also have indirect adverse consequences. As veterinarians and input suppliers provide more cost-efficient services to livestock producers, the health and fecundity of the livestock will improve. More cattle may be raised on a parcel of land, resulting in possible overgrazing. More cattle may also require additional transport or processing services. With proper training in environmentally sustainable practices to all stakeholder groups, these impacts can be controlled.

**Table 9. Potential impacts and mitigating actions associated with Tasks 1.2.5, 2.1.3 and 2.2.2, 4.2.2, 2.1.1, and 1.3.2.**

<b>IMPACTS</b> Task 1.2.5 Improve access to reliable transport services Task 2.1.3 Improve producer capacity to identify and achieve market standards Task 2.2.2 Improve transport service provision for the livestock sector Task 4.2.2 Engage private sector actors to develop innovative approaches to meet market standards and requirements and view livestock production and marketing as a business Task 2.1.1 Improve vertical linkages to build trust and sustainable market relationships Task 2.1.4 Link producer groups to financial services	
Risks associated with these activities:	Mitigating actions and conditions
<p><b>Livestock intensification through improved cost-effective service delivery:</b></p> <ul style="list-style-type: none"> <li>▪ Tethered animals escape or are released and cause environmental damages outside fields</li> <li>▪ Native vegetation may be overharvested for forage since it is at no cost</li> <li>▪ Native vegetation is omitted as a cost factor when calculating economic benefits</li> </ul>	<p>(1) As a baseline, follow up with animal producers and buyers to find out the volume, quality, and species of natural forages (as opposed to agricultural residues) that are used to feed each animal, and how far away one must go to collect them.</p> <p>(2) Follow up on baseline information in the following season and include a photo documentary as a way to monitor impact on natural vegetation and assure sufficient pasture and crop residues are available.</p> <p>(3) Continue sensitization campaigns and awareness training on maintaining control over animal displacement, overgrazing, and transport practices</p> <p>(4) Include native vegetation as a cost factor when calculating economic benefits</p>
<p><b>Increased transport services through intensification or better service provision:</b></p> <ul style="list-style-type: none"> <li>▪ Overgrazing or land degradation in areas where animals are held prior to or during transport</li> <li>▪ Unsafe, inhumane transport practices</li> </ul>	<p>(1) Provide a review of impacts and develop guidelines on environmentally sound and safe transport practices to promote environmental, animal and human health and safety</p> <p>(2) Incorporate best practices in sensitization campaigns and training for stakeholders involved in Tasks 1.2.5, 2.2.2, 4.2.2, 2.1.1, and 2.1.4</p>

## 6.4 ENVIRONMENTAL MITIGATION AND MONITORING

The EMMP for these activities is provided in Table 10 below. It includes mitigation measures for the impacts described in Table 9 above. These measures follow the environmental conditions set forth in the L4G IEE for Activity 5 (p. 58) and Activity 7 (p. 59).

**Table 10. EMMP for linking producer groups to transport and financial services and increasing access to credit (Tasks 1.2.5, 2.1.3, 2.2.2, 4.2.2, 2.1.1, and 2.1.4)**

**Person Responsible** for Overseeing EMMP: Tom Gardiner, Chief of Party

<b>EMMP</b> Tasks 1.2.5, 2.1.3, 2.2.2, 4.2.2, 2.1.1, and 2.1.4 Impacts described in Table 9 above			
<b>IEE or EA Condition</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Timing and Responsible Parties</b>
<p><b>IEE Condition, p. 59 (Activity 5):</b> “Good practice design and operation standards must be implemented, generally consistent with USAID’s EGSSAA (construction, livestock, food processing, leather processing chapters as relevant)”</p>	<p><b>Objective:</b> Stakeholders understand potential impacts and use best practices to minimize environmental, animal, and human health and safety</p> <p><b>Mitigation:</b></p> <ul style="list-style-type: none"> <li>▪ Provide a review of impacts and develop guidelines on environmentally sound and safe transport practices to promote environmental, animal and human health and safety</li> <li>▪ Target stakeholders needing sensitization in transport, business and marketing activities</li> <li>▪ Incorporate best practices that address impacts based on EGSSAA in sensitization campaigns, training for stakeholders, and development of improved sector standards</li> </ul>	<ul style="list-style-type: none"> <li>▪ Document the review of potential direct and indirect impacts of specific task activities</li> <li>▪ Identify and record stakeholders needing sensitization in transport, business and marketing activities</li> <li>▪ Document the development and implementation of guidelines on best practices to protect environmental, animal and human health in transport, business and marketing practices</li> <li>▪ Document the delivery of sensitization campaigns and training modules that address the implementation of appropriate guidelines</li> </ul>	<p><b>Responsible Party:</b> L4G DCOP (oversight), Monitoring and evaluation by L4G Field Coordinators</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>▪ Conduct a review of potential direct and indirect impacts of specific task activities prior to their implementation</li> <li>▪ Identify stakeholders prior to implementation of activities</li> <li>▪ Monitor implementation through spot checks as necessary, with at least one spot check per activity or site</li> </ul>
<p><b>IEE Condition, p. 59 (Activity 7):</b> “Capacity development will (1) incorporate and promote sound environmental management practices (see guidance on such practices in EGSSAA Part III) and (2) convey Malian environmental requirements pertaining to these</p>	<p><b>Objective:</b> Manage risk of land degradation and damage to natural/native vegetation from overgrazing</p> <p><b>Mitigation:</b> Monitor the impact of intensification activities on land use, assuring no land degradation or forest habitat destruction occurs</p> <ul style="list-style-type: none"> <li>▪ As a baseline, follow up with producers and animal buyers to find out the volume, quality, and species of natural forage (as opposed to agricultural residues) that is being used to feed each animal, and how far they must go to collect it.</li> <li>▪ Follow up on baseline information in the following season and include a photo documentary as a way to</li> </ul>	<ul style="list-style-type: none"> <li>▪ Develop and use interview sheet to collect data on one page as soon as practicable in the field, selecting a few typical villages to sample</li> <li>▪ Collect data using interview sheets and document analysis of average amount of each forage type per animal that is being used</li> <li>▪ Engage a university student to weigh and document actual feeding amounts if a more precise study is required or desired and correlate volumes of vegetation used with baseline and next-year site quality and distance to find forage</li> <li>▪ Include natural vegetation in</li> </ul>	<p><b>Responsible Party:</b> L4G DCOP (oversight), Monitoring and evaluation by L4G Field Coordinators</p> <p><b>Timing:</b></p> <ul style="list-style-type: none"> <li>▪ As necessary</li> </ul>

EMMP Tasks 1.2.5, 2.1.3, 2.2.2, 4.2.2, 2.1.1, and 2.1.4 Impacts described in Table 9 above			
IEE or EA Condition	Mitigation	Monitoring	Timing and Responsible Parties
operations.”	<p>monitor impact on natural vegetation and assure sufficient crop residues are available</p> <ul style="list-style-type: none"> <li>▪ Value natural (native) vegetation as a cost factor when calculating economic benefits</li> </ul>	<p>benefit calculations</p> <ul style="list-style-type: none"> <li>▪ Photograph natural forage species and sites for signs of harmful harvest practices - before and after</li> <li>▪ Document the development of a radio extension program on the use of natural vegetation in combination with other sources of forage / feed</li> </ul>	

# 7. LIST OF EMMP CONTRIBUTORS

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