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Developing an Environmental Management Plan

Workshops on Environmental Management of Socioeconomic Development Programs in Post-Conflict Sierra Leone

March 9-13, 2009
March 16-20, 2009

EMP Framework

COVER SHEET

Environmental Screening Form

Identifying Potential Impacts and Associated Mitigation Measures

Environmental Monitoring and Evaluation Tracking Table

Identifying Potential Impacts and Mitigation Measures

#	Sub-activity or component	Description of Impact	Mitigation Measures
1	Component 1		
2	Component 2		
3			
4			

Environmental Monitoring and Evaluation Tracking Table

Description of Mitigation Measure	Responsible Party	Monitoring Methods			Estimated Cost	Results			Recommended Adjustments
		Indicators	Methods	Frequency		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
						1			
						2			
						3			
						4			

Example of an EMP

Agricultural Irrigation Project – Background Information

- Renovated / rehabilitated early 1980”s
- Uses water taken from high level river source and irrigates valleys and hillside lands with two sub perimeters amounted about 140 hectares
- One dam is made of stems, hay, leaves, dirt, and stone
- The other one is made of stone and dirt

Example of an EMP

Agricultural Irrigation Project – Background Information

- The canals are hand made and carry open water from upstream
- The surrounding hillside is completely deforested
- Roads: In bad conditions
- System maintenance (committee not functional)

- Water distribution. Lands registration to receive irrigation water was done since early 1980's. It is impossible for new lands to get access to water except if someone shortcuts the system.

Example of an EMP

Agricultural Irrigation Project – Background Information

- Canals are used for many purposes: irrigation, bathing and washing clothes
- At the end of the dry season there is not enough water for all the perimeters
- During heavy rains people do not get water because of canals sedimentation due to hillside erosion
- No wet land nor critical wild life habitat.
- There is no soil issue because water from high lever river source

Example of a Completed EMP

3-b. Identification of Mitigation Plan (Table 2)

#	Sub-activity or component	Description of Impact	Mitigation Measures
1	Dam and primary canals Construction	Flooding	Designing and building the dam and canals in a way that excess of water won't damage the dam (excess flows, removable dam etc….)
2			Technical assistance on soil conservation - Crop diversification – canal width
3		Soil erosion	Establishment of structures of flow regulation at the canal level
4			Protect upper slope with fruit trees (mangoes, citrus, avocado local Weeds)
5		Water lost (from evaporation and leaching but also from canal blockage from dirt, debris etc….	Primary canals are constructed with cement to prevent water seepage
6			Training on maintenance for Water committee after heavy rain
7		Health issue (drinking irrigation water because it appears cleaner)	Education on water quality/use/management Control by Water committee
8		Water contamination /Improper use of the irrigation water	- Separating use by construction washing stations and animal use stations
9		Social impact of inequality of water use increasing # of people using the water	-Existing water committee reinforcement -Land Registration
10	Bridges and drainage system for Road rehabilitation	Deforestation	Working with local officials to control deforestation
11		Sedimentation (because of drainage system)	Sedimentation control (silt screen and hay bails- local weeds)

Example of a Completed EMP

3-c. Environmental Monitoring and Evaluation Tracking Table (Table 3).

#	Description of Mitigation Measures	Responsible	Monitoring Methods			Estimated Cost	Results			Recommended Adjustments
			Indicators	Methods	Frequency		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
	Establishment of structures for flow regulation at the canal level	Project agricultural technician	• # of doors and other structures built • # of hectares under erosion control by plot •% of hectares not eroded due to the application of new structures	Reports / Field visit Midterm evaluation	Quarterly					
	Protect upper slope with fruit (mangoes, citrus, avocado) and forest trees	Project agricultural technician	# of trees planted and survived • # of hectares protected by trees planted • Decrease in canal clean up frequency • # m3 of sediment collected after each clean up.	Reports / Field visit / Comparison with baseline information / Midterm evaluation	Quarterly /Annual					
	Primary canals are constructed with cement to prevent water seepage	External firm (engineer)/ M&E person/ Water association committee	• # of kms of line canals built with cement • # of additional hectares irrigated	Reports / Field visit / Comparison with baseline information / Midterm evaluation	Quarterly					

Why is it important to budget for monitoring & mitigation measures during project design?

- Helps to ensure long-term project sustainability on economic and environmental levels
- Lowers risk of project failure and costly future corrective measures
- Helps prevent projects from going over budget
- Protects livelihoods and security of inhabitants
- Makes project management more efficient

Tool for Budgeting Environmental Monitoring and Mitigation Measures

#	Description of Mitigation Measures	Responsible	Monitoring Methods			Estimated Cost	Results			Recommended Adjustments
			Indicators	Methods	Frequency		Dates Monitored	Problems Encountered	Mitigation Effectiveness	
	Establishment of structures for flow regulation at the canal level	Project agricultural technician	• # of doors and other structures built • # of hectares under erosion control by plot •% of hectares not eroded due to the application of new structures	Reports / Field visit Midterm evaluation	Quarterly					
	Protect upper slope with fruit (mangoes, citrus, avocado) and forest trees	Project agricultural technician	# of trees planted and survived • # of hectares protected by trees planted • Decrease in canal clean up frequency • # m3 of sediment collected after each clean up.	Reports / Field visit / Comparison with baseline information / Midterm evaluation	Quarterly /Annual					
	Primary canals are constructed with cement to prevent water seepage	External firm (engineer)/ M&E person/ Water association committee	• # of kms of line canals built with cement • # of additional hectares irrigated	Reports / Field visit / Comparison with baseline information / Midterm evaluation	Quarterly					

What additional information (and/or set of assumptions) not found in the previous matrix is needed to accurately budget monitoring and mitigation measures during project design?

Environmental Management Reporting Timeline