

Improving Productivity and Market Success of Ethiopian Farmers

ENVIRONMENTAL MONITORING PLAN

Atsbi Weberta Wereda

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Environmental Monitoring Plan (EMP): Atsbi Wereda

1. Introduction

The project covered by this EMP is the 2006 programme of technology packages being introduced in Atsbi Wemberta Wereda, Tigray Region, a Pilot Learning Wereda (PLW) of IPMS Ethiopia, that are considered likely to have potential environmental impacts.

Three types of potential impact of the programme of intervention are considered in the *Environmental Screening and Assessment Report* (EASR) for this PLW:

- Principal environmental impacts, defined as potential effects directly attributable to the concerned IPMS activity (see Table (i) of the EASR);
- Cumulative environmental impacts, defined as the possible long-term effects of the concerned activity, including the accumulated effects of multiple activities that may arise in association with, or encouraged by, the concerned activity (see Section 5 of the EASR);
- Impacts of the environment on the performance of the concerned activity (see Section 6 of the EASR).

A follow-up program to ensure that the recommended mitigating measures are implemented as required will be conducted by the staff of the Environment and Natural Resources Unit in the Wereda Office of Agriculture, with support from IPMS as appropriate. This EMP provides the basic framework for the follow-up.

2. Mitigating Measures to be Monitored

The following Tables set out the potential impacts and related mitigating measures, and the monitoring to be conducted for each mitigating measure.

Table (a) shows the indicators to be monitored for the implementation of mitigating measures designed to address the **potential impacts** of the following activities:

- Land Closure for Livestock and Bee Forage, and Improved Watershed Management
- Development of Irrigation Potential
- Cultivation of crops with Agrochemicals
- Use of Livestock and Poultry Drugs and chemicals

Table (b) shows indicators to be monitored for the implementation of mitigating measures designed to address the **potential cumulative impacts** of:

- Ground-Water Pollution and Water-Table decline
- Expanded growing of new crops
- Ratio of Cash:Food Crop Production
- Urban Zero-Grazing

It should be noted that the cumulative impacts considered *should include those regarded as unlikely but possible*. It is important to be able to show that IPMS has looked ahead, and has taken precautions to deal with such eventualities, should they occur, unlikely though some people may consider them to be.

Table (c) shows indicators to be monitored for implementation of mitigating measures to address the **potential impacts of the environment on the activity**:

- Extended periods of drought
- Small land holdings
- Frost
- Land degradation

In each case, the statement of impacts and mitigating measures are set out in summary. More detail can be found in the *Environmental Assessment and Screening Report* for Atsbi Wemberta Wereda.

Table (d) in Section 3 summarises the basic information on the indicators and how the data will be collected.

Table (a) Matrix of Potential Environmental Impacts

Activities	Land Closure for Livestock and Bee Forage, and Improved Watershed Management			Development of Irrigation Potential			Cultivation with Agrochemicals			Use of Livestock Drugs & Chemicals		
Likely Impacts	Closure of land for developing bee and livestock (cut and carry) forage might oblige cattle to seek marginal grazing lands			Use of irrigation may result in salinisation and consequent soil encrustation	Use of excessive irrigation may result in depletion of ground water	Shallow wells and water harvesting ponds may pose a hazard to human and animal life, especially children	Uncontrolled or careless use of agrochemicals leading to pollution of groundwater, leading to health hazards for human and animal life, including bees.			Uncontrolled or careless use may pollute groundwater, leading to health hazards for human and animal life.	Because of improved livestock health, numbers may increase, leading to overgrazing ¹	
Mitigating Measures	Common agreement with cattle-owners (farmers) using the land for grazing and staff of the OoARD Natural Resources regarding area closure	Zero-grazing, presently being promoted by the OoARD will be encouraged, incorporating controlled grass harvesting from closed land		To be identified by detailed study	To be identified by detailed study	To be identified by detailed study	Draw up an Integrated Pesticide Management (IPM) plan covering natural methods, and acquisition, application, accidents, storage and disposal of agrochemicals.	Implement IPM plan	Take into account proximity to PAs dependent on apiculture, when determining location of use	Draw up a Drugs and Chemicals Management (DCM) plan, covering acquisition, application, accidents, storage and disposal of livestock veterinary drugs and chemicals.	Implement DCM Plan	Encourage enhanced community-based veterinary service delivery mechanisms, awareness and market linkages, to ensure env. sustainable livestock prod.
Indicator	Number of meetings held between farmers and OoARD	Change (increase) in plant composition	Increase in biomass production	To be identified	To be identified	To be identified	Existence of IPM plan	IPM plan being used by DAs and farmers	Coverage of topic in location plan.	Existence of DCM Plan	DCM plan being used by DAs and farmers	DAs and OoARD are promoting these initiatives in FTCs
Who collects?	OoARD	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO
How?	Reports	Grid samples	Grid samples	Reports and visits	Reports and visits	Reports and visits	Check whether IPM plan is published	Make spot checks on site	Check activity design document ²	Check whether PCM plan is published	Make spot checks	Check FTC curriculum
When?	Annual		Annual	To be identified	To be identified	To be identified	Annual ³	Annual	Before activity starts	Annual ⁴	Annual	Annual
Where?	Activity site (7 PA s)		Activity site (7 PA s)	OoARD	OoARD	Wereda OoARD	IPMS Office	Activity site	OoARD/RDO	IPMS Office	Activity sites	Wededa FTC Office

¹ It is expected that as livestock marketing is enhanced, market take-off will increase and intensive livestock management will be encouraged. As a result, this impact is expected to have a low probability.

² PLW Diagnosis and Programme Design or subsequent addendum

³ Once publication of the IPM plan has been verified, subsequent annual checks should record reprints, updates, etc.

⁴ Once publication of the DCM plan has been verified, subsequent annual checks should record reprints, updates, etc.

Table (b) Matrix of Potential Cumulative Impacts

Activities	Ground-Water Pollution and Water-Table decline	Expanded growing of new crops			General encouragement of cash crops n		Expansion of dairying		
Potential Cumulative Impacts	Expansion of fruit and vegetable cultivation might potentially cause groundwater pollution and reduction in the water-table	Loss of species diversity, leading to undue narrowing of the genetic base of the crop concerned. This could mean, for example, that in the event of an outbreak of disease, there is no alternative strain available.			Crop production imbalance, leading to food shortages within, or outside, the PLW.		Uncontrolled adoption of zero-grazing in peri-urban and high-density urban areas, leading to health hazards, noise and smell pollution.		
Mitigating Measures	To be identified by the detailed study	Regional or Wereda Agricultural Office should monitor the production rates of new crop varieties, and should liaise with the Biodiversity Institute to ensure that the gene banks contain alternative varieties.			Ensure that the Wereda Agriculture Office and the Regional Food Security Bureau have planning systems to address such a trend before it becomes a problem.		The project will liaise with the urban Public Health authority and will include their representative in training workshops, in order that any regulations controlling the keeping of cattle in the urban areas are recognized and enforced.		The project will draw upon the results of the specialized research into this issue being promoted by IPMS, and implement as appropriate
Indicator	To be identified	Production rates of new crop varieties,	Inclusion of alternative varieties in Biodiversity Institute gene bank		Existence of Wereda food production planning system	Existence of Reg. food production planning system	Check training workshop participants list	Evidence that regulations are being enforced	To be identified
Who collects?	OoARD/RDO	Regional or Wereda Agricultural Officer	Regional or Wereda Agricultural Office		OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO
How?	Meet Wereda Crop Head	Collect market survey data	Collect gene bank data	Check workshop participation list	Meet Wereda Crop Head	Meet Reg. Crop Head	Check workshop participation list	Physical observation	To be identified
When?	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Where?	OoARD	Wereda Office	Biodiversity Institute	IPMS Office	Wereda Agric Office	Regional Agric Office	Urban and peri-urban areas	Urban and peri-urban areas	To be identified

Table (c) Matrix of Potential Impacts of the Environment on the Project

Environmental Phenomenon	Extended Periods of Drought		Small landholdings		Frost, insect pests and diseases		Land degradation
Potential Impacts	Reduced food and food availability, leading to deterioration in household livelihoods.		Hampers introduction of new technologies (crops, livestock, management systems)	Low productivity of plots due to low input system (hoe culture, use of less fertilizer and traditional farming system)	Frost may cause death of bees	Insect pests and diseases cause damage to crops and reduce productivity	Poor productivity of newly introduced technologies
Mitigating Measures	TOT in <i>in-situ</i> water harvesting methods to wereda level experts who are to train DAs so that farmers are then trained.		Training of DAs and farmers to help them focus on high value production systems		Use of intermediate bee hive from made local materials (cow dung and soil to give warmth)	Draw up an Integrated Pesticide Management (IPM) plan covering natural methods, and acquisition, application, accidents, storage and disposal of agrochemicals.	The wereda office Agric. is currently conducting many land management options including area closure
Indicator	Number of DAs and farmers trained	Number of farmers practicing <i>in situ</i> water harvesting	Number of DA and farmers trained	Number of new high value technologies introduced (new varieties, new livestock species, management systems)	Number of intermediate hives produced used	Existence of IPM plan	Increased vegetative cover of hills and soil conservation structures
Who collects?	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO	OoARD/RDO
How?	Check data on number of farmers using trained	Check data on number of farmers using <i>in-situ</i> water harvesting	Assessments and check data on the number of DAs and farmers trained	Assessments and check on new technologies introduced	Assessments and check on list of farmers using these types	Check whether IPM plan is published	Physical observation
When?	Annual	Annual	Annual	Annual	Annual	Annual ⁵	Annual
Where?	OoARD Office	OOARD reports	OOARD reports	OOARD reports	7 PAs where queen rearing is practiced	IPMS Office	Wereda

⁵ Once publication of the IPM plan has been verified, subsequent annual checks should record reprints, updates, etc.

Table (d): Summary of Mitigating Measure Indicators

Indicator	Who collects	How	When	Where
For Potential Impacts:				
Number of meetings held between farmers and Wereda OoARD	Wereda OoARD/RDO	Reports	Annual	Wereda OoARD
Change (increase) in plant composition	OoARD/RDO	Grid samples	Annual	Activity site (7 PA s)
Increase in biomass production	OoARD/RDO	Grid samples	Annual	Activity site (7 PAs)
Additional development of Irrigation Potential indicators to be identified	OoARD/RDO	Reports and visits	To be identified	Wereda OoARD
Additional development of Irrigation Potential indicators to be identified	OoARD/RDO	Reports and visits	To be identified	Wereda OoARD
Additional development of Irrigation Potential indicators to be identified	OoARD/RDO	Reports and visits	To be identified	Wereda OoARD
Existence of IPM plan	OoARD/RDO	Check whether IPM plan is published	Annual	IPMS Office
IPM plan being used by DAs and farmers	OoARD/RDO	Make spot check on site	Annual	Activity site
Coverage of topic in topic plan	OoARD/RDO	Check activity design document	Before activity starts	OoARD
Existence of Drug and Chemical Management (DCM) Plan	OoARD/RDO	Check whether DCM plan published	Annual ⁶	IPMS Office
DCM plan being used by DAs and farmers	OoARD/RDO	Make spot checks	Annual	Activity sites
DAs and OoARD are promoting these initiatives in FTCs	OoARD/RDO	Check FTC curriculum	Annual	Wededa FTC Office
For Potential Cumulative Impacts:				
Production rates of new crop varieties	Reg/Wereda Crop Expert	Collect market survey data	Annual	Wereda Agric. Office
Inclusion of alternative varieties in Biodiversity Institute gene bank	Reg/Wereda Crop Expert	Collect gene bank data	Annual	Biodiversity Institute
Existence of wereda/Regional food production planning system	Reg/Wereda Crop Expert	Wereda OoARD/RDO	Annual	Wereda/Regional Agric. Office
Check training workshop participants list	OoARD/RDO	Check workshop participation list	Annual	Urban and peri-urban areas
Evidence that Public Health regulations are being enforced	OoARD/RDO	Physical observation	Annual	Urban and peri-urban areas
Additional zero-grazing indicators to be identified from special research	OoARD/RDO	To be identified	To be identified	To be identified
For Potential Impact of Environment on the Project				
Number of DAs and farmers trained on <i>in-situ</i> water harvesting	OoARD/RDO	Check data on number of farmers trained	Annual	OoARD
Number of farmers using <i>in situ</i> water harvesting	OoARD/RDO	Check data on number of farmers using <i>in-situ</i> water harvesting	Annual	OoARD
Number of DAs and farmers trained	OoARD/RDO	Assessments and check data on the number of DAs and farmers trained	Annual	OoARD
Number of new high value technologies introduced (new varieties, new livestock species, management systems)	OoARD/RDO	Assessments and check on new technologies introduced	Annual	OoARD
Number of intermediate hives used	OoARD/RDO	Assessment and check on list of farmers using of intermediate hives	Annual	OoARD
Existence of IPM plan	OoARD/RDO	Check whether IPM plan is published	Annual ⁷	

⁶ Once publication of the DCM plan has been verified, subsequent annual checks should record reprints, updates, etc.

⁷ Once publication of the IPM plan has been verified, subsequent annual checks should record reprints, updates, etc.

4. Environmental Indicators

Note that the mitigating measure indicators listed in Tables (a) to (c), and summarised in Table (d), are designed to verify that the mitigating measures are being implemented as intended. It is not intended that the long-term effect of the mitigating measures on the environment should be formally monitored within the scope of the IPMS project, particularly as in most cases such 'state of environment' changes will be measurable only in the long-term. Such monitoring is normally the responsibility of the Wereda authorities. However, the IPMS staff concerned will be alert to any significant environmental change that may occur during the implementation of the programme.

There may be exceptions to this general rule. In the case of special topics of environmental concern on which IPMS is arranging for special research to be conducted, the monitoring will include actual environmental impacts. In the case of Atsbi Wemberta Wereda, *The Potential Cumulative Environmental Impacts of the chemicals on bee population* and *study on sustainable use of Ground Water for Irrigation in Gergera watershed* are two such topics. Depending on the outcome of these researches, additional environmental indicators may in due course be generated for inclusion in the regular monitoring programme outlined in the present EMP.

5. Sources for the EMP

The sources of information used for this Environmental Monitoring Plan are as follows:

- The data provided in *Environmental Assessment and Sceening Report, Atsbi Wemberta Wereda*, June, 2006;
- The contributions of participants in the IPMS Environmental training Workshop, Yirgalem, Dale Wereda, SNNPR, 1-2 June, 2006, including the Dr. Gebremedhin Woldewahid (IPMS Atsbi RDO), Nigus Esmael (Tigray BoARD, Head Department of Forestry) and Hailay Berhane (wereda Head, OoARD);
- Consultation with: CIDA Environmental Advisor, Mr. Tamene Tiruneh
- Consultation with: IPMS Project Manager, Dirk Hoekstra.