ENVIRONMENTAL ASSESSMENT AND SCREENING REPORT

on the project

Improving Productivity and Market Success of Ethiopian Farmers

Pilot Learning Wereda:

Alamata

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ENVIRONMENTAL ASSESSMENT AND SCREENING REPORT

Improving Productivity and Market Success of Ethiopian Farmers (IPMS)
Pilot Learning Wereda: Alamata

1. Project Description

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

The Responsible Authority is CIDA.

The intervention programme concerned consists of five inter-related technology packages to be adopted and disseminated under the IPMS: (i) Wetlands reclamation, (ii) Development of irrigation potential of the PLW, (iii) Cultivation with agrochemicals, (iv) An improved animal feed programme, and (v) Use of livestock veterinary drugs.

The technology packages constitute components of an integrated programme for the PLW, implemented by the local farmers through the wereda agricultural office and facilitated and supported by IPMS. They are screened here as one project for environmental assessment purposes due to the fact that they are to be implemented jointly and their impacts are interrelated and therefore best assessed jointly.

The project is a point project, limited to the geographic extent of Alamata Wereda.

It should be noted that other activities for this PLW planned or under consideration, such as introduction of new crop varieties that are accompanied by no significant changes in technology or production method, and no environmental linkages or potential impacts, are not included in the ‘project’ screened in this Screening Report.

The project activities may be summarized as follows:

1.1 Wetlands Reclamation

A large marshy area has remained unused and is creating a health hazard for human beings and cattle due to stagnation and neglect. It started emerging some ten years ago as a result of the rising water-table, one cause of which, it has been suggested, may be the introduction of soil and water conservation measures on the surrounding mountain slopes.

The water-logged area concerned is not a natural wetlands; it consists of agricultural land formerly used for cultivation, and forming part of several hundred farmers’ agricultural plots under the wereda land distribution programme,
The outer reaches of the wetlands will be ploughed mechanically and re-used for cropping, with crop varieties suitable for the water-table of less than one metre. IPMS will consider the introduction of permanent fruit crops in order to reduce the water-table, while at the same time contributing to improved livelihoods.

The moderately waterlogged area will be ploughed by oxen and the possibility of raised beds will be explored. The inner reaches will be studied as to their potential use, including the possibility of rice cultivation. It is expected that with increased use of irrigation (see other technology packages), the depth of water will gradually recede and the area permanently under water will steadily diminish.

### 1.2 Expansion of Crops under Irrigation

There will be development of the irrigation potential of the PLW, incorporating the use of existing boreholes which have been completed but not utilized, as well as rainwater harvesting, surface water and spate irrigation. Crops under irrigation are likely to be cotton (presently grown in the PLW on a limited scale) and, to a lesser extent, sesame. These crops will be promoted in both existing croplands and newly-cropped common lands.

In addition, IPMS will introduce through the wereda agricultural office new crop varieties (e.g., Chickpeas, fruit and vegetables), and will encourage increased cultivation of such crops, with expanded use of irrigation. In most cases existing methods of irrigation such as spate irrigation will be employed, but in some cases borehole-based irrigation may be introduced.

### 1.3 Cultivation with Agrochemicals

The cotton expansion programme will be accompanied by the use of agrochemicals. Expansion of sesame will require a more modest use of agrochemicals.

The fruit and vegetable expansion programme will be based on organic fertilizers, and will not involve the use of agrochemicals.

### 1.4 Improved Animal Feed Programme

The project will introduce expanded sorghum residue utilization for animal feed. Sorghum stalks, which are presently produced in the PLW in large quantities, will be mechanically chopped and mixed with area and water. This process will break down the sorghum, enabling animals to extract the required nutrients.

### 1.5 Use of Livestock Veterinary Drugs and Chemicals

The improved dairy as well as cattle fattening programme will be accompanied by the modest utilisation of veterinary drugs and chemicals. It is intended that these will be
supplied by private suppliers in and around three Farmer Training Centres, the volume depending on the demand.

2. Description of Project Surroundings

The PLW, with a 2003 population of 128,872, consists largely of a valley running between two ranges of small, undulating mountains which are very steep and have low vegetative cover. Some 75% of the PLW is covered by an alluvial floodplain consisting of silt deposition from seasonal rivers running in mountain gulleys, forming a relatively fertile, loamy soil. However, as most of the top soils from the mountains of the surrounding weredas is eroded. What ever is coming in the form of flood to Alamata is no more fertile, instead covers the already existing fertile soils in the plains of the wereda. To the west is a ‘peninsular’ of mountainous, intermediate highland landscape. The four project activities considered here will be focused principally on the alluvial plain.

The main road from Mekele (to the north) and Addis Ababa (to the south) runs through Alamata town, the principal town of the PLW. Traffic presently using the northern section of this road will in due course be diverted to a highway presently being reconstructed to the west of the PLW. All other roads in the PLW are secondary dirt roads linking areas in the east and west to the main road.

The farmers cultivate largely cereals (principally teff and sorghum) and vegetables, and keep cattle and sheep. As the PLW is drought-prone and the farmers traditionally employ only surface water and spate irrigation, the area is classified as chronically food insecure. Paradoxically, the annual run-off has led to a steadily increasing volume of unutilized ground water, resulting in the presently high water-table.

Household energy fuel is mainly sorghum residue. When not available (in the dry season), animal dung is often used.

There are no natural forests in the PLW. Vegetation on the mountain slopes consists mainly of bushes and shrubs. Acacia woodlands are found in some parts of the alluvial plain.

Fauna is limited mainly to the mountainous areas.

Cultural sites are principally churches, mosques and burial grounds, which will remain unaffected by the project. It is not considered likely that there are unregistered significant cultural sites in the PLW. In any case, so far as potential unregistered archaeological sites are concerned, areas to be newly ploughed are limited to the wetlands on the alluvial plain, which is of recent deposition.

Existing Environmental Issues
The principal environmental issues in the PLW are as follows:

- The steep slopes of the surrounding mountains have proved prone to degradation and loss of vegetation, particularly by goats. Remedial actions taken have focused mainly on land enclosure to enable re-vegetation, and basic soil conservation measures.

- Malaria and bilharzia have in recent years become increasingly common in the PLW, due largely to the increased extent of stagnant water in the wetlands, and to some extent to the increasing number of water-harvesting ponds.

- Expansion of the wetlands has been accompanied by the appearance of plants and toxins in the water both of which have proved injurious to livestock, with consequent reduction in milk yield and water quality.

- Although salinity has not typically been a problem in the PLW, due to recent evidence of salinity in areas presently used for cotton under irrigation, steps are being taken to investigate the problem and come up with suitable solutions.

- The presence of Congress Weed is proving to be an environmental problem in the PLW. The wereda agricultural office proposes to employ community mobilization to eradicate it.

- Geographically, Alamata is located in a lowlying area surrounded by range of mountains from the north and west of the wereda. This has mad it vulnerable to environmental problems related to flooding. Many fertile croplands are being covered by silt and the newly built roads and bridges are suffering the consequences of flood from the mountains. Appropriate watershed management activities will be essential in the neighbouring weredas in order to reduce these negative effects. This will require understandings among weredas within Tigray and Amhara region.

3. Environmental Effects and Public Concerns associated with Planned Initiatives

Table (i) sets out:
- Possible negative environmental impacts before the introduction of mitigating measures;
- Planned mitigating measures;
- Expected negative environmental impacts after implementation of mitigating measures.

Notes
• It should be noted new crop varieties will be limited to those produced and approved by government public bodies, notably the Ethiopian Seed Enterprise (ESE) and the Ethiopian Agricultural Research Organisation (EARO). No varieties involving any form of genetic engineering, or likely to introduce new environmental impacts, will be introduced.

• Expanded cultivation of vegetables will be accompanied by organic fertilizer and composting programmes, thus producing a positive environmental impact.

• Minor potential impacts of wetlands reclamation which are not sufficiently significant to be included in Table (i) are the loss of grass presently cut from the wetlands for ceremonies, and the cooling effect of the wetlands. However, the remaining wetlands will still provide sufficient grass for this limited purpose, and the loss of cooling effect is considered minor and not necessary to mitigate.

Public Concerns

The only known public concern in respect of the proposed initiatives concerns reclamation of the wetlands.

Project Phases

Table (i) relates to the operations phase of the project. There is no pre-construction phase, construction or closure phase. Accidents and malfunctions are covered within the Integrated Pesticide Management (IPM) Plan.

Table (i) incorporates both direct and indirect impacts.

Significance of Adverse Environmental Effects (after implementation of Mitigating Measures)

No significant adverse effects are likely.

4. Mitigation Measures

Technically and economically feasible mitigation measures are set out in Table (i).
Table (i)  Matrix of Mitigating Measures and Likely Impacts after taking Mitigating Measures into account

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<td>Likely Impacts before Mitigating Measures</td>
<td>(i) Reduction in the extent of waterlogging will have a positive impact on human and animal health.</td>
<td>(i) Extensive use of irrigation may result in salinisation and consequent soil encrustation.</td>
<td>(i) Uncontrolled or careless use of agrochemicals may pollute the groundwater, resulting in health hazards for human and animal life, and may pose a hazard for bees.</td>
<td>(i) The reduction in the availability of sorghum residue for household energy may cause a significant increase in the use of animal dung or fuelwood, with subsequent loss of dung for fertilizer, and deforestation.</td>
<td>(i) Uncontrolled or careless use of livestock veterinary drugs or chemicals may pollute the groundwater, resulting in health hazards for human and animal life.</td>
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<td>(ii) It is theoretically possible that there would be a loss of rare flora or fauna using wetlands as a habitat</td>
<td>(ii) Extensive use of irrigation may result in depletion of ground water</td>
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<td>(iii) Public Concern: There is a fear among some farmers that disturbing the wetlands may cause an eruption of water into the valley.</td>
<td>(iii) Shallow wells and water harvesting ponds may pose a hazard to human and animal life, especially children.</td>
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<td>Mitigating Measures</td>
<td>(ii) A section of the wetlands will be retained for study by the University of Mekelle.</td>
<td>(i) As drip and sprinkler irrigation will be widely used, this is not expected to be a major issue. However, in areas where it may be a problem, measures will be implemented including balanced surface water use, choice of salinity-tolerant crops, and spate irrigation for flushing as appropriate.</td>
<td>(i) An Integrated Pesticide Management (IPM) plan covering use of a combination of natural methods and agrochemicals will be drawn up and implemented, covering acquisition, application, accidents, storage and disposal of agrochemicals. In addition, the location of use will take into account proximity to PAs dependent on apiculture.</td>
<td>(i) The likely depletion of household energy supply will be determined by the wereda agricultural office, which is engaged in a parallel programme to propagate the use of energy-saving stoves. New fuelwood and multipurpose crops will be introduced, to provide additional household energy sources to the extent that proves necessary.</td>
<td>(i) A Drugs and Chemicals Management plan will be drawn up and implemented, covering acquisition, application, accidents, storage and disposal of livestock veterinary drugs and chemicals.</td>
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<td>(iii) As the concern apparently arose from misunderstanding of advice from researchers from the University at Mekelle, the wereda agricultural office is seeking clarification from the University in order to allay the concerns.</td>
<td>(iii) It is intended that there should be water-table reduction, to reduce extent of waterlogged land. Water-table levels will be monitored by wereda agric. office.</td>
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<td>(iii) The project will recommend for shallow wells: cover or protection, and designs enabling anyone who falls in to climb out. For ponds: protection, and safer designs.</td>
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<td>Likely Impacts (after mitigating measures)</td>
<td>After implementation of mitigating measures, no adverse environmental impacts are expected.</td>
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5. Cumulative or Interactive Environmental Effects

The following potential long-term cumulative effects could be postulated:

5.1 Reduction in Water-Table

Unparalleled success of the cotton and sesame-growing programme, resulting in uncontrolled growth in boreholes beyond the presently planned IPMS interventions, leading to a significant reduction in the water-table. Since the high water-table is agreed to be an environmental hazard, its reduction is a positive objective by both IPMS and the wereda agricultural office. Nonetheless, the wereda agricultural office will closely monitor the water-table and will control any further establishment of boreholes so as to avoid an undesirable reduction in ground-water levels.

5.2 Ratio of Cash:Food Crop Production

If the cultivation of cash crops becomes so popular that cash crops come to displace food crops to a significant extent, this could produce an imbalance that might lead to food shortages within, or outside, the PLW. However, the wereda Agriculture Office and the Regional Food Security Bureau have planning systems to address such a trend before it becomes a problem.

5.3 Loss of Species Diversity

Uncontrolled adoption throughout the PLW and beyond of a newly introduced crop species could lead to a situation whereby the genetic base of the crop concerned is unduly narrowed. This could mean, for example, that in the event of an outbreak of disease, there is no alternative strain available. It is thus recommended that the regional or wereda agricultural office should monitor production rates of new crop varieties, and should liaise with the Biodiversity Institute to ensure that the gene banks contain alternative varieties.

5.4 Urban Zero-Grazing

Although the Project is not promoting zero-grazing in high-density urban areas, the zero-grazing being promoted (which by reducing grazing and often livestock numbers is generally environmentally beneficial) in the less dense area may eventually lead to uncontrolled adoption of zero-grazing in high-density urban areas, with resultant health hazards, noise and smell pollution. To avoid this happening, 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. On the other hand, the wereda OoARD is expected to develop alternatives to some of these problems through biogas production and proper dumping of wastes and other mitigating measures to reduce environmental impacts.
6. Effects of the Environment on the Project

6.1 Rising Water Table

The most likely effect of the environment on the project would be a rising water-table, which would continue to have an increasingly detrimental impact on human and animal heath and a reduction in cultivatable land. However, since the wetlands reclamation project, together with expanded use of irrigation particularly for cotton, will help to reduce the water-table, this impact is not expected to occur.

6.2 Drought

Extended periods of drought would reduce the availability of surface water for irrigation of the small-scale cultivation of fruit and vegetables. However, the encouragement of individual shallow wells is designed to offset such eventualities.

6.3 Flood and change of course by seasonal rivers

Majority of Alamata is situated in the lowlands where flood water deposits a huge amount of silt from the surrounding mountains. As a result, fertile soils in the bottomlands of Alamata are being silted, affecting productivity of many farmlands. Although Alamata uses a lot of the flood water as a source of spate irrigation, when the intensity of the floods increase the floods make river courses to change and hence make a significant amount of farmlands out of production. The wereda is surrounded by many weredas, especially to the west and north of the wereda by both Tigray and Amhara. It is expected that these regions will enhance the watershed management schemes in their respective weredas so that flood water affecting Alamata is substantially reduced.

7. Nature of Public Participation

There has been extensive public participation in the design of the IPMS interventions in this PLW, including a two-day workshop on 15-16 February, 2005. In addition, a number of training sessions for farmers and Development Agents (DAs) and visits to various areas for training purposes have been conducted since the launching of the project. The public concern expressed about possible eruption of the wetlands has been addressed (see Table (i)).

Issues and discussion points provided in public participation workshops were passed on to the IPMS Environmental Consultant by the Wereda ERD Office staff and IPMS staff in the joint session referred to in Section 10 below.

8. Follow-up Program
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 agricultural office, with support from IPMS as required.

9. Relevant Matters

In the project design workshops, it was agreed by the community and the wereda agricultural office that there are no viable alternative means for conducting the project, other than by supporting the Wereda Agricultural Office and the Development Agents (DAs).

There are no transboundary effects anticipated.

10. Sources for the Screening Report

The sources of information used for this Screening Report are as follows:

- The environmental overviews in the IPMS Project Implementation Report, March, 2005,
- The IPMS Environmental Framework,
- Alamata Pilot Learning Wereda Diagnosis Program Design, 23.6.05,
- Addressing Irrigation Needs of Alamata Farmers: Options and Scope (Draft), Prasad and Makombe, July, 2005,
- Consultations with IPMS Project Director and Addis Ababa-based experts including Dr Kahsay Berhe.
- Joint PLW environmental reconnaissance by IPMS Environmental Consultant Ian Campbell and Dr Gebreyohannes Berhane (IPMS RDO),
- Consultation with Addis Ababa-based CIDA Environmental Officer, Ato Tamene Tiruneh,
- Consultation with:
  - Abraham Gebrehiwott (IPMS RDA),
  - Ato Hailemriam, Amha (Head, Environmental Protection, Natural Resources Management (NRM) Dept, Office of Agriculture and Rural Development),
  - Ato Negus Esmael, Tigray BoARD, Head Department, Forestry
  - Ato Ashenafi (Environment and Land Administrator, NRM Dept),
  - Ato Heluf (Forester, NRM Dept),
  - W/rt Terhas (Forester, NRM Dept),
  - Wereda ARD Office trainee in Animal Science,
  - Wereda ARD Office trainee in Livestock Forage and Breeding.

All of the environmental issues, likely impacts and recommended mitigating measures presented in this Screening Report were discussed, contributed to and agreed with the Wereda ARD Office NRM staff as listed above, in a group working session on site.
11. Comments/Recommendations

Comments and recommendations to the extent appropriate have been included in Section 9 above.

12. Additional Supporting Documents

None.