

# Climate Smart Agriculture Research and Innovation Support for Dairy Value Chains in Eritrea

## Year 1 Draft Pilot Initiatives: Discussion Document

### 1. Preamble

Guidance in relation to the requirements of the DeSIRA program is set out clearly on the DeSIRA website<sup>1</sup>. The objective of the DeSIRA initiative is to contribute to climate-relevant, productive, and sustainable transformation of agriculture and food systems in low and middle-income countries. DeSIRA aims to put more science into development considering that the solutions to achieve the Sustainable Development Goals (SDG) are context specific.

- With such a perspective, research for innovation needs to combine fundamental research, participatory research, or action-research based on a plausible theory of change, to achieve desirable impacts at scale. This means that research must involve several activities delivered in partnership with other actors: knowledge production, design of methods, facilitation, capacity building, expertise, etc.
- To support innovation processes, there is a need to strengthen the capacity of researchers and research organizations to enable them to design, monitor and assess research designed to achieve impacts and address the urgent challenges. There is also a need to strengthen the capacity to innovate of a much larger group of actors: farmers, farmers' organizations, local communities, NGO, private sector, public sector
- The top-down transfer of knowledge and technology model is no longer valid to achieve the systemic changes needed to promote sustainable food systems in a context of rapid transitions. Because innovation is a complex process, including technical, organizational and institutional dimensions, and involving the mobilization of a wide range of actors (farmers, farmers' organizations, NGO, advisory services, private firms, etc.), public policies need to rely on multi-stakeholder approaches to produce new knowledge making use of scientific knowledge and local knowledge, mobilize resources, and synergize competencies.

### 2. Project Proposal

The project proposal submitted to the EU Delegation Office in Asmara was prepared against the background outlined above. The delivery of the project impacts depends upon achieving the following **outcomes**: (i) improved climate smart dairy farming production and productivity leading to enhanced supply of quality dairy products, improving household income and generating employment along an equitable value chain; (ii) enhanced organizational capacity and enterprise skills of dairy value chain actors with capacity to adopt/promote new technologies; (iii) enhanced service delivery and support of institutional actors on climate smart innovation, and knowledge management along the dairy value chain; (iv) increased access to information and knowledge on CSA practices, tools and approaches for the wider public.

---

<sup>1</sup> <https://europa.eu/capacity4dev/desira>

### 3. Project Implementation Planning (PIP)

The project implementation planning (PIP) process began on 4<sup>th</sup> February 2020. Details in relation to the PIP were discussed at a workshop held in the Ministry of Agriculture, Eritrea on 25<sup>th</sup> February 2020. Project co-applicants and local partners in Eritrea attended this workshop, as well as representatives from FAO and UNDP. In addition, representatives from MoA, Zobas and Sub-Zobas attended. The EU Delegation Office Officials in Asmara attended for part of the workshop.

A summary of the work completed<sup>2</sup> as part of PIP was shared with project partners and senior officials in the MoA as well as with the EU Delegation Office in Asmara. This work included the preparation of a number of situation analysis documents, as well as a number of implementation plans across key areas of the project. While the PIP planning process was at an advanced stage, it was not possible to complete it due to restrictions imposed by Covid\_19.

### 4. Project Suggestions as Part of PIP

A number of project suggestions evolved from the PIP process. These have been summarised in a document<sup>2</sup> shared with all project partners, Ministry officials and EU Delegation. The areas covered included:

- 4.1 Research at NARI
- 4.2 Extension service support
- 4.3 Development of dairy commodity platforms
- 4.4 Development of the forage value chain in Eritrea so as to meet the year-round forage requirements of smallholder dairy farmers
- 4.5 Establishment of a Training/Learning Centre & Knowledge Platform
- 4.6 Hamelmalo Agriculture College
- 4.7 Ministry of Agriculture services (AI service).

### 5. Some First Steps in Context of Covid\_19 Restrictions

It was agreed last February (meeting in Asmara) that the PIP document would focus on getting original application into a full implementation plan. The PIP process would allow for far more detailed planning in relation to the work program and how this work program would be managed. Work had started on a number of program areas (implementation plans) based on local analysis carried out in Eritrea. This work was interrupted due to Covid-19 restrictions.

Further to Zoom conference call (in September 2020) with all co-applicants and local partners in Eritrea, there was general agreement that we should try and get some areas of work started (pilot projects) recognising that the international team would not be able to travel to Eritrea in the short-to-medium term. It was also felt likely that there would be some restriction in relation travel etc

---

<sup>2</sup> Climate Smart Agriculture Research and Innovation Support for Dairy Value Chains in Eritrea - Summary Report on Progress with Project Implementation Plan

within Eritrea for local personnel. Some initial pilot projects which can be started now will help guide the completion of the PIP plan. These are considered further in Section 9.

## 6. Teagasc Review of Submission made by Project Manager (PM)

The team in Eritrea submitted a document to the Project Co-ordinator listing priority areas for Year 1 of project. This document was forwarded to project co-applicants on 09/10/2020 for comment/input. This response from Teagasc also reflects feedback received from a number of international team members. This feedback suggests that the team should aim to further develop plans on a number of pilot initiatives (as suggested at Zoom conference) and then to consider what resources are needed to deliver on the pilot initiatives selected.

**In light of this general consideration, following is a response to the proposal from the PM for further discussion at the PMC meeting on 1<sup>st</sup> December.**

### 6.1 Priority 1 Strengthening AI service

The PM suggested delivering on a number of initiatives in relation to strengthening the AI service.

#### 6.1.1 Procure and install liquid nitrogen plant in Zoba Anseba

Currently, liquid nitrogen is produced within the campus of the Central Laboratory and provided to various sites from this base. Based on previous discussions, it was indicated that the Ministry of Agriculture had already started the process of procuring (from another funding source) an additional liquid N plant as a back-up to the current plant in Asmara. There is a certain amount of expertise required in relation to the operation and management of a liquid nitrogen facility, and in the case of Eritrea (small country), there is a strong case to be made for concentrating this expertise and resources at one site. The level of AI use is also very low at this time.

**Suggested Action:** Defer this initiative for now pending further discussion.

#### 6.1.2 Training of AI technicians

Training is one area which could be carried out to a limited extent now depending on the constraints applied locally and the requirement (if any) to source a trainer from abroad. There must be some experienced AI technicians who could provide this training locally. (See Section 9 below in relation to capacity in relation to suggestions as to how capacity building could start now). The suggestion is made in the document that this training should be given to new technicians based in Dairy Associations and MoA. This training will need to be extended to private service providers if these are not covered under the Dairy Associations.

**Suggested Action:** Consider under plan outlined in Section 9.

#### 6.1.3 Procure spare parts for existing Liquid Nitrogen plant and connect it to installed solar panel.

It would be useful if liquid N plant expert from Ethiopia (who visited Asmara in 2019) could be asked along with local liquid N personnel to prepare a list of what is required to keep existing system going.

Linking this unit to a solar panel may not be a priority, especially if cost is high. When the plan for spare parts procurement is forwarded to Project Co-ordinator, this element of procurement could be considered. The cost suggested (€30k) seems remarkably high?

**Suggested Action:** Submit business case so procurement can be authorised.

#### 6.1.4 Procurement of AI materials

The procurement amount proposed seems high recognising that there are so few AI technicians working in the field and so few inseminations. A business case is needed. Is this equipment for the existing service or is it proposed in terms of supporting a private AI service? The procurement amount requested (€25K) seems high taking cognisance of the ongoing scale of service.

**Suggested Action:** Submit a business case in context of setting up a pilot private AI service.

## 6.2 Oestrus synchronization and mass insemination

The use of large-scale insemination of local breeds with improved breeds is a relatively fast way to address the great shortage of F1 cattle.

### 6.2.1 Mass insemination of native cattle

This is an area of work which could be tried on a pilot area within one region (probably Dehub). Based on the results of pilot project, the application of this technique could be extended to other areas. Community buy-in will be needed and there will also be a need to erect cattle handling facilities to facilitate this work program. The location of these facilities will need local agreement. An assessment has to be made as to whether there is enough expertise locally to implement this pilot initiative or whether expertise needs to be sourced abroad (probably Ethiopia), especially for the pilot project. Since this is an area of work which could be initiated now, it is important that a detailed plan is prepared addressing issues like: (i) location; (ii) community discussion; (iii) farmers who may be interested; (iv) materials needed; (v) expertise needed; (vi) cattle handling facilities required; (vii) detailed budget etc.

**Suggested Action:** Prepare a business case addressing issues outlined above and giving detailed budget ASAP so this pilot initiative can start. Suggest it be confined to one location initially.

## 6.3 Design national cattle identification and database system

The design of a National Cattle Identification and Database System is a major undertaking (as the Irish experience shows) and certainly cannot be done for a budget of €10K. There is also the question as to whether this initiative as described is outside the scope of this project. Such an initiative would probably need an input from an international consultant with expertise in this area. There is also the question as to the extent systems developed in other countries could be applied directly in Eritrea, thus saving time and effort. Since MoA is planning (separate from this project) the establishment of a National Cattle Breeding Station, maybe this task should be considered under that plan. There may be scope for the inclusion of small-scale data capture systems as part of this project which could eventually dovetail into the national system when available.

**Suggested Action:** There is probably a need for key Eritrean staff to visit other countries so as to get a better understanding of what is involved in the establishment of a national cattle identification and database system.

#### 6.4 Rehabilitation of Anseba milk collection centre

The rehabilitation of the Anseba milk collection centre represents a very significant cost (€50,000) as proposed. No detailed plan in support of this level of investment is available at this time. The challenges facing dairy production in the Anseba region are great as outlined in the evaluation of the region carried out by local extension service. A greater understanding of why the facility based in sub-zone Keren stopped in 2004 is needed. The facility in the context of the dairy value chain in the region needs to be fully analysed before any investment is made in this facility. There are two other milk processing facilities in the region: (i) milk processing facility at HAC which currently has no milk supply and (ii) milk processing facilities at Hagaz College which are operating at under capacity. One option to be investigated as part of value chain analysis in the region is to consider if the current facility could be used as a milk collection centre and the milk then transported to Hagaz College or HAC for further processing?

**Suggested Action:** Need for further analysis of options in the region.

#### 6.5 Support to value chain development in Maekel and Debub

The type of support required is not given in proposal. The suggestion is that a pilot initiative should be focused in one region initially (probably Debub). Some initial work could begin in value chain work in Zoba Debub. The type of support required could be considered as part of this work.

**Suggested Action:** Focus in one region as part of pilot initiative which we could start now and start planning this pilot initiative building on the value chain implementation plan (draft) circulated earlier. The budget required will evolve from this exercise. (Stephen Onakuse to comment further on this).

## 7. Planned activities for Hamelmalo Agriculture College

A number of initiatives are suggested, but no budget. Professor Woldeamlak also shared these requirements with Professor Jim Kinsella (UCD) as well as with the PM.

### 7.1 Strengthening dairy research facilities

The suggestion is that 25 native and locally adapted dairy cattle be procured. A detailed plan is required as to how these animals will be managed. It is accepted that the dairy research facilities at HAC need to be upgraded. Some first steps include: (i) sort out management issue (including labour) in relation to the farm operations; (ii) Get improved forages (appropriate to the area) established on the dairy unit land area; (iii) develop a management plan for forages and animals; (iv) train local staff in dairy management skills etc. The knowledge on how to manage dairy stock in systems of production based on forage is available in NARI and can be transferred to HAC.

**Suggested Action:** Defer the procurement of animals for HAC until the above issues are addressed. The process of addressing these issues can be considered as a pilot scale project which can start now.

### 7.2 Strengthen nutrition laboratories

A business case needs to be made in relation to laboratory requirements. Is it equipment that is needed or skills on how to use the equipment already in the laboratory?

**Suggested Action:** Prepare a business case to include budget re what is required to make nutrition laboratory operational.

### 7.3 Provision of MSc training

The suggestion is made that this initiative should start in the second half of 2021. This is probably too late. Training can begin on a pilot scale. This is discussed in Section 5.

**Suggested Action:** Start pilot- scale initiatives as recommended by UCD and HAC.

### 7.4 Curriculum

As above, work in this area can now begin on a pilot scale.

**Suggested Action:** Start implementing pilot- scale initiatives as recommended by UCD and HAC.

## 8. Planned activities and budget for NARI

The work of the livestock division of NARI was part of the pilot dairy project funded by VITA and supported by Teagasc. Some key technologies in relation to milk production from forage were developed at NARI. These can now be scaled up as part of the DeSIRA project.

Some key challenges were identified for the livestock division of NARI as part of the review of NARI carried out earlier this year. The main constraint is the number of graduate staff available in the livestock division and the level of training of these staff. A key element of support for NARI (livestock division) will be on capacity building of the livestock division staff. This will have a big impact on the program of NARI in the short –to- medium- term, as graduate training (MSc level) can take up to two years.

### 8.1 Dairy farm systems research

The demo farm at NARI is already established. This unit will need to be strengthened, as it will be an important component of the project going forward. Implementation of the research program as outlined will be challenging in the early years, as staff complete M.Sc. programmes. Some elements of it might be component research carried out as part of MSc degree training.

### 8.2 Evaluation of a range of forage crops to meet nutrition

Unlikely that this work can proceed as outlined in the short-to-medium term for the reasons outlined in Section 8.1 above.

**Suggested Action:** Review what elements of this program can be incorporated into MSc training.

### 8.3 Strategies for conserving forage for dry season period in Eritrea

Unlikely that this work can proceed as outlined in the short-to-medium term for the reasons outlined in Sections 8.1 and 8.2 above.

**Suggested Action:** Review what elements of this program can be incorporated into MSc training

### 8.4 Strengthening animal nutrition laboratory

The request now is for €75,350 of additional funding for the animal nutrition laboratory. A business case is required to justify such a high level of investment. This business case will need to address issues re type of analysis required, staffing levels required and staff training, existing equipment on site and output from same, how it will benefit project objectives as well as a breakdown of costs. An assessment of the local requirements at NARI for laboratory capacity relative to the central analytical laboratory capacity in Asmara could form part of this assessment. The laboratory facility at the Central Laboratory in Asmara has the capacity to carry out feed analysis, as well as laboratory analysis associated with animal health.

**Suggested Action:** Prepare a detailed business case in context of project requirements reflecting on the issues outlined above.

### 8.5 Management practices in relation to animal health and welfare

The same issues arise here as outlined in section 8.4 above. The budget request (€55,350) is high. No business case is presented in relation to this request relative to the requirement of the project.

**Suggested Action:** Prepare a detailed business case in context of project requirements reflecting on the issues outlined in 8.4 above.

### 8.6 Cattle breeding program

No project plan or budget is available at this time. A member of NARI staff has just commenced an M.Sc. in animal breeding at Nairobi University as part of the capacity building under DeSIRA. A new program in animal breeding can build on this initiative (first step training in animal breeding).

**Suggested Action:** Project to support the training program for NARI staff member at Nairobi University on animal breeding.

## 9. Pilot project initiatives which could be considered now.

The working document<sup>3</sup> (draft implementation plan) set out a general plan as to what could be achieved in relation to capacity building and knowledge management to address the objectives of the project.

---

<sup>3</sup> Capacity Building and Knowledge Management (draft implementation document)

It was agreed (project co-applicants & Eritrean partners) during Zoom conference call last September that a start can be made on a number of initiatives now despite the constraints imposed by Covid\_19. The submission by the PM (Section 8) is a first step in this process. What we have to do collectively is to ensure that the initiatives undertaken are fully aligned with the objectives of the DeSIRA project and that they help guide the completion of the PIP Plan.

### 9.1 FAO DeSIRA project work in progress

The work is mentioned here because some of the output from FAO work in Eritrea can inform work to be done as part of current work program. Some relevant reports include

1. Report of Scoping Study – Developing Capacity in Agriculture Innovation Systems Project: Scaling up the Tropical Agriculture Platform Framework, In Eritrea
2. Developing Capacity in Agricultural Innovation Systems in Eritrea: Scaling up the Tropical Agricultural Platform (TAP) framework – Inception workshop report.

New work planned by FAO will involve a training needs assessment of key stakeholders. These are likely to include HAC, NARI and MoA (Extension). The results of this analysis to be carried out by FAO will inform work within our current project. The results of this analysis are likely to be available by the end of the year (2020).

### 9.2 Pilot project initiatives at Hamelmalo Agriculture College

The Dean of Hamelmalo Agricultural College (HAC) in consultation with the PM, has outlined some initial first steps which should be taken at HAC in relation to infrastructure and farm research facilities. These have been discussed in Section 3.1 above in relation to suggested timeline for delivery.

The UCD team (Jim Kinsella & Monica Gorman) has been in communication for some time with Professor Woldeamlak re the two key areas identified in the draft implementation plan for HAC. These include:

1. Curriculum development
2. Reactivation of the Master's degree program

**Suggested Action:** It is important to continue to further explore what options can be progressed at this time:

1. Explore what can be done remotely(UCD & HAC) to progress curriculum development work
2. Aim to deliver the 'Curriculum on extension' and 'Training Manuals on Extension' as proposed.
3. MSc training is more difficult to move forward, as it is likely to depend on a window of opportunity opening up which allows mobility both ways. There may be an opportunity to explore if an MSc program could be initiated for junior research staff at NARI. Since the research component (crop and animal science) of this training is likely to be based at NARI, research staff at LUKE and Teagasc will need to be involved in these discussions.
4. Start the process of upgrading research facility at HAC (dairy unit). When the issues outlined in Section 3.1 above have been addressed, a procurement plan for additional livestock can be considered.

5. Start the process of developing the business case in relation to the animal nutrition laboratory at HAC.

### 9.3 Pilot project initiatives at NARI

NARI has a key role to play in support of the dairy industry in Eritrea. Considerable progress has already been made in relation to the development of dairy production systems based on forage. There is a requirement now for this technology to be transferred out to the wider community of farmers.

Various strategies were discussed over the years in Eritrea as to how best this could be achieved and what structures within NARI might facilitate the translation of knowledge and adoption of knowledge along the value chain. Following a visit to Ireland by Minister Arefaine, one of the options he proposed to Teagasc was to provide suggestion re how a mini Teagasc (a focus on research, extension and education) could be anchored around NARI. This approach is subject to ongoing review with MoA. Another more short-term approach might be to formalise current initiatives (dairy pilot project) into an innovation support unit anchored at NARI.

Suggestions from NARI submitted via the PM are discussed in Section 4 above.

**Suggested Action:** It is important to continue to further explore what options can be progressed at this time. As indicated in Section 4, options selected now will need to be guided by requirements for training for research staff in the Livestock Division and what research can be done in context of this requirement.

1. Start graduate training program. On recommendation of Minister Arefaine, Mr Ermias Kiflay has started an MSc program at Nairobi University in animal breeding. This training is supported by the project.
2. Prepare a needs analysis in relation to other staff in the livestock division and start planning re how this training can be provided
3. Establish an innovation support unit within NARI and integrate the work of the current dairy program into this unit.

### 9.4 AI service

In the preparation of the DeSIRA project, two areas of support were envisaged for the AI service:

1. Some infrastructure support in relation to (i) importation of appropriate genetics (AI straws); (ii) facilities for the storage of AI straws; (iii) upgrade of liquid nitrogen plant in Asmara including backup plant; (iv) some AI equipment; (v) facilities for the distribution of AI straws around the country (to AI technicians, farmers etc.).
2. Support for the private sector (including the supply of necessary equipment) in relation to providing service to farmers. This will form a key part of the support, as the level of AI usage on-farm needs to increase significantly and a seven -day a week service is required. It is likely that AI technicians (private operators) could combine this service with some veterinary services so as to make it commercially viable.

It is considered that the establishment of an additional AI station in a new location is not a priority at this time (Section 6.1.1). A key priority is to increase the demand for AI service. One of the elements of this task is to improve the way service is delivered. A private service operated by the private sector is likely to help in this regard. In the Eritrean context, a service based on AI only is unlikely to be sustainable (small herd size). It will need to be combined with veterinary service. Veterinary diploma graduates from HAC have the qualifications to do both. There are a number of good examples of an effective private AI service in East Africa (Kenya, Tanzania, and Ethiopia). We can draw on this experience in relation to Eritrea.

**Suggested Actions:**

1. Proceed immediately with the procurement of 2,000 AI straws as recommended by the PM.
2. Start the process (prepare a business case) of establishing a private AI service on a pilot basis in two locations.
  - a. Centred on the dairy processing unit managed by Gaim Tekie (Gaishanashim). Discussions held with Gaim have already moved this process along.
  - b. In Debub region centred on NARI catchment area. One option is to pilot new initiative around Mebratum (NARI), as he currently provides an AI service as part of the ongoing pilot dairy project.

### 9.5 Strategy to increase the availability of F1 Cattle

There is a need for a faster way to increase the availability of F1 (improved genetics) dairy cattle for distribution to small holder farmers using the model tested as part of the dairy pilot project. A technique based on 'mass' insemination of local cattle within community areas was successfully implemented in Ethiopia. It is recommended to proceed with an initiative in this regard as suggested in Section 6.2.1 above.

**Suggested Actions:** Proceed to prepare the business case to proceed with a pilot scale initiative in Debub area having considered the issues discussed in Section 6.2.1 above.

### 9.6 Capacity building

FAO has initiated a process where they are going to do a training needs analysis across a number of the pillars of innovation support in Eritrea (MoA Extension, NARI, HAC and maybe private sector). Based on the outcome of this analysis, it may be possible to start some training programs where the skills to deliver the training are within country.

**Suggested Actions:** Review outcome of FAO training needs analysis and assess if some training programs can be delivered using local training support services.

### 9.7 Value chain initiatives

Further discussion is required with Dr Stephen Onakuse, Teagasc and local partners as to what approach needs to be taken in relation to initiating some work on the dairy and forage value chains.

**Suggested Actions:** Initiate discussion as to how best to proceed.