Highlights
CIAT in Africa

CGIAR, national partners and farmers collaborate to test forages in Ethiopia

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About 80 percent of Ethiopia's 67 million people live in the highlands at altitudes of more than 1500 metres above sea level (masl). Population pressure in the highlands has pushed farmers onto lands with fragile soils and steep slopes. This is causing land degradation and declining agricultural productivity. Mount Yerer watershed is no exception. Its altitude ranges from 1,800 masl to 3,200 masl, covering an area of about 6,000 ha. The main cereal crop cultivated at the lower altitude is teff, with wheat and barley at higher altitudes. Many households have livestock: local cattle, horses, sheep or goats. Oxen are used for ploughing the heavy soil and sometimes cows are kept for milk. Most of the community members are poor, while women are among the poorest with less access to health, education and other services. Smallholder dairy production with local or improved cattle can raise income of the poor and especially women, but these dairy animals need adequate feed.

Mrs. Tewabech Worku with her experimental pigeon pea and Napier grass, Mekanna village, Ethiopia.

The Mount Yerer forage project

In response to a request from the community, the Soil and Water Conservation Department of the Ethiopian Institute of Agricultural Research (EIAR] initiated a collaborative project with the Bureau of Agriculture, the International Livestock Research Institute (ILRI), and CIAT. This partnership combined strengths in research on integrated natural resource management (INRM) from EIAR, livestock research from ILRI, participatory research approaches from CIAT, and in-depth knowledge of the area and its people by the Bureau. The project aimed to introduce improved forage technologies that would provide more and better quality feed for cattle, while conserving or improving natural resources. Although researchers had developed a variety of forage options for highland areas in the past, farmers in the project area were generally unaware of these options and the benefits of growing forages.

Farmer participatory research approach

Project partner organisations held meetings in April 2003 with the committee members of two Peasant Associations (large formal administrative organisations), Yerer Selassie and Gende Gorba, representing a total of 600 and 1200 households, respectively. The discussions centred on the livestock feeding problems experienced by farmers identified during a PRA conducted by EIAR in 2002. Interested farmers were invited to visit a nearby ILRI station, Debre Zeit, to view forages and to participate in a workshop to plan on-farm research of their own. The farmer committees selected 58 of their farmers, (including 10 women farmers) from a total of six villages in the area to participate.

ILRI provided seeds of adapted forages and stem cuttings of Napier grass, which is best propagated vegetatively. In order to enhance establishment of trees on the farmers land tree seedlings were produced on-station and 2 month old trees of Leucaena, Calliandra and Tagasaste were distributed to farmers. Farmers began their on-farm forage research in June 2003 by planting the different forage

Forage name	*germination/ survival*	*establishment*	*yield/ biomass*
Lablab	8.7	8.6	8.2
Vetch	8.3	8.6	8.3
Napier	8.9	8.9	8.4
Sesbania	6.4	5.8	4.2
Pigeon pea	7.5	7.6	6.0
Neonotonia	5.9	5.9	4.8
Vetiver	7.4	5.9	5.0
Setaria	7.9	7.2	5.9
Macrotyloma	5.9	5.9	4.8
Tagasaste	6.9	4.8	3.6
Leucena pallida	5.2	3.7	2.8
L. diversifolia	5.7	5.7	5.3
Calliandra	5.2	4.4	3.9

Table 1: Mean scores of germination, establishment and yield of forage species rated by 58 farmers in Mt. Yerer watershed, 2003. 10=highest, 1=lowest. Germplasm accession numbers omitted.

species in the places that they had identified during the planning workshops. In October, technicians and scientists of EIAR, ILRI and Bureau of Agriculture facilitated the process of farmers' evaluation of the forages, using criteria commonly selected by farmers in on-farm forage evaluation studies elsewhere. The criteria for the first evaluation phase were: (1) germination and survival, (2) establishment in the early growth phase, (3) forage yield or biomass, and (4) overall farmer preference. The facilitators designed an evaluation matrix, and the farmers evaluated the different forage species against the four criteria. Farmers made their judgements for different forage species by scoring species using a range between 1 (lowest) and 10 (highest). Overall preference for species was ranked differently; a rank of 1 meant 'the best', and a rank of 2 meant 'second best', etc. Feedback and planning meetings with the farmers in the two farmers groups were held in December 2003, and some follow up field visits in 2004. Farmers continued to evaluate their forages using additional and self selected criteria.

Research results

Participatory evaluation yielded some interesting results. The first season's evaluation showed that six out of the thirteen species were performing relatively well and were preferred by farmers. These were Napier grass, lablab, vetch, pigeon pea, setaria and vetiver grass. The species that scored highest for germination, survival, establishment, and early biomass production were lablab, vetch, and Napier grass (Table 1). Farmers continued to evaluate the forages and assessed the relative palatability of the different forage species by feeding their animals. Napier grass, vetch and lablab were the most palatable species. Another criterion suggested by farmers was ability of the plant to produce seeds or planting materials. Napier and setaria grass ranked high for this, and by the end of the season most farmers had produced vegetative planting materials of these species. Farmers also identified pigeon pea as being particularly useful because of its dual purpose of providing food for people and feed for animals. Preference for Napier grass was also influenced by its reputation for having a high feed value.

In terms of planning for the next season, many farmers suggested that they would plant vetch and lablab in the fields furthest away from their home compounds because there would be more space in these areas. They would protect these areas from browsing damage by animals during the growing season. Farmers produced vegetative planting materials of setaria and vetiver and seeds of lablab. As a follow up activity for the 2004 rainy season, they were provided with additional cuttings of Napier grass, and seeds of vetch and pigeon pea. Vetch was widely cultivated as a forage crop in 2004. Farmers either harvested it to feed to their cattle directly, or made hay for feeding in times of shortage. Pigeon pea was also popular and was often intercropped with maize, and harvested for human consumption, with crop residues being fed to cattle. Additional Napier grass was planted within the compounds in 2004. Women valued this grass, as they used it as cut and carry feed for calves and milking animals. Using planted grass reduced the time and labour needed to collect grass from around the farm.

Future research plans

Initial results from the on-farm research are encouraging with qualitative and quantitative data collected on farmers' preferences. There has already been some adoption and new farmers' initiatives on forage innovation. Farmers have developed their preferred forage technologies to meet their own needs. EIAR, the Bureau of Agriculture, ILRI and CIAT are anxious to build on their achievements. An important factor for sustainability of forage innovation systems is the availability of seeds. The Bureau of Agriculture is now scaling out the Mount Yerer experiences and enhancing forage seed systems.

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