

# Agro-biodiversity in Ethiopia: a Case study of Community Seed Bank and Seed Producing Farmers

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## Abstract

The research is a case study based on experiences of Ethio-Organic Seed Action, an NGO, MARC supported farmers based seed multiplication, and Sasakawa Global 2000 supported farmers based hybrid maize seed production. The required data was generated using a questionnaire in 2010. The result shows that both approaches can contribute in ensuring seed security and better income to the farmers especially for farmers involved in hybrid maize seed production. However, the farmers based seed production forces farmers to take high risk of input use in case of climatic shocks. Community seed banks have shown considerable contribute both to Agro-biodiversity management and Seed security for farmers. Thus, it is important that these approaches are promoted widely for improved accessibility of seed at local level and also to sustain agro-biodiversity in the country.

## 1. Introduction

The 10<sup>th</sup> meeting of the Conference of the Parties (COP10) to the Convention on Biological Diversity (CBD) was held in Nagoya, Japan, from 18 to 29 October in the 2010 International Year of Biodiversity. Agro biodiversity is one of the elements in a larger whole Biodiversity; it is an important resource for agricultural productivity next to land and water in rural development (FAO 1996). Also, management of plant genetic resources, crop species, and variety, as Agro biodiversity are indispensable factor to solve the problem of world food security

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and agriculture development (FAO 2010).

In addition, indigenous crop and variety, wild spices as landraces have been brought to international attention in recent years as resources for sustainable rural and agriculture development in Africa. For example, International Symposium “Underutilized Plant Species for Food, Nutrition, Income, and Sustainable Development” was held in Arusha, Tanzania on 3-7 March 2008 (GFU 2008).

Furthermore, a conference on biodiversity held during the Forum for Agricultural Research in Africa (FARA) Science Week on July 2010 in Burkina Faso, culminated in the establishment of the FARA-led Agricultural Biodiversity Initiative for Africa (ABIA). ABIA will support the efforts of sub-regional organizations, national agricultural research systems, and partners on agricultural biodiversity research and development in Africa; it will build partnerships for action, seek resources, and commission research; and it will engage in policy intervention, advocacy and public awareness to promote proper management and sustainable use of genetic resources in Africa (Mahider 2010) Biodiversity International will be a technical partner with FARA in the technical implementation of ABIA.

On the other hand, seed aid has occurred in many country, particularly in sub-Saharan Africa, include wide range of donors, implementers (both government and nongovernmental organization-NGOs), and approaches. Also, in Ethiopia, a lot of project has been carried out and incurring significant costs (USD 500million for Ethiopia alone) since 1974 (Sperling *et al.*, 2007). At the rural area in Ethiopia, over 85% farmers rely on rainfall. Therefore, seed security is most important factor for food security, also lack of seed and high risk agriculture production are considered to be the top priority (Regassa 2006)

However, seed industry in Ethiopia was substantial monopolized by Seed Enterprise which mainly selling improved and hybrid varieties and has limitation for seed production. Therefore, it is difficult for formal seed sector to meet framers’ demand. There are serious needs for accessibility of demanded seed at local level, not only improved and

In this study, the author tries to clarify the importance of the role of organization to Agro biodiversity management by Farmers for Rural Development in Ethiopia through a case study of Community Seed Bank (CSB) which supported by NGO, and seed production by farmers. In addition, a questionnaire survey was conducted to investigate factors influencing farmers' crop variety, seed source, and strategy for seed security.

## **2. Statement of the Problem and Question**

In Ethiopia, over 80% farmers have no access to the improved seed.

Q.1. How is the seed security for farmer in the rural areas?

Farmers' interest might be high income and productivity. Therefore, local variety has replaced by hybrid and improved variety.

Q.2. Is it difficult to keep the Agro-Biodiversity by farmers through the community seed bank?

Some of Farmers started Hybrid seed production with some technology transfer by Government and SG2000.

Q.3. Is it possible to produce Hybrid variety Seed by farmers?

**BOX1 Ethio-Organic Seed Action Project (EOSA)**

Organized support to In-situ conservation in Ethiopia started in 1988 following several years of ex-situ maintenance of landraces with a farmer-based program implemented by the Seeds of Survival Program / Ethiopia and Institute of Biodiversity Conservation and Research Institute. Building on this, the UN Global Environment Facility launched a \$2.5 million program in 1994 focusing on indigenous crop varieties maintained by farmers in dynamic agro-ecosystems. The program ran until 2002 and included institutional strengthening; community-based activities; and identifying incentives for in-situ landrace conservation. One of the greatest achievements of the program was that it brought all relevant sectors together.

The Ethio-Organic Seed Action Program (EOSA) was formed as a result of this earlier work. It is an NGO promoting integrated conservation, use and management of agro-biodiversity. With a guiding principle of "conservation through use", the program works with community groups, government, researchers, other NGOs and industry to promote greater integration, and especially the integration of producers with the market. The program works at local, regional, national levels.

The case study focused on EOSA's work with farmers around "Ejere", 105 km from the capital, Addis Ababa, which aims to help develop mechanisms to support small-scale farmers' ability to manage their resources-base; community-based seed networks; building linkages between farmers and industry through local markets; and the promotion of organic agriculture.

It appears that the project has been successful at promoting agro-biodiversity conservation and increasing the diversity of durum wheat and other crops in the program areas. The multiplication of the durum wheat was started in 1995 by the GEF project with only 4 spikes of durum wheat (400 gm. seed). EOSA has a vision to consider other indigenous crops in the future of its program of promoting organic products. The EOSA focus on organic production methods has also increased on-farm biodiversity through the promotion of Integrated Pest Management (IPM) instead of pesticides. It has also managed to develop market orientated mechanisms 'which support and encourage small-scale farmers' efforts in managing their natural diversity and on-farm resource-base.

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*[http://www.africanfarmdiversity.net/Case\\_Study\\_EOSA.html](http://www.africanfarmdiversity.net/Case_Study_EOSA.html)*

### **3. Research Methodology**

#### **3.1 Study areas**

The study areas were identified based on the intervention areas of the case organizations. Thus, for MARC farmers based seed multiplication, two sites namely Adama FRG site nearby the research center and Kacheama, which is 11 km from the district MoA office. For Ethiopia Organic Seed Action (EOSA), the sites were (i) Ejere CSB, Oromiya, East Shewa, Lume, Ejere, 230 HHs (F:24) and (ii) Cheffe CSB, Oromiya, East Shewa, Gimbichu, Cheffe Donsa, 564 HHs (F:69). Similarly, for Sasagawa Grobal 2000 (SG2000), the sites selected were (iii) Bure, “Marwelad West Goshama for hybrid maize seed grower’s farmer and (ii) “Wogedad” West Goshama for wheat and hot pepper seed grower farmers in Amhara Region.

#### **3.2 Data analysis**

The study used secondary and primary data. Primary data were generated by individual interviews from selected target farmers using a questionnaire in Oromiya and Amhara Regions. The collected data was synthesized using qualitative and quantitative descriptive statistics.

#### **3.3 Contents of Interview for Farmers**

- Part 1. Household information
- Part2. About crop diversity (variety, area, production, price, consumption, seed amount)
- Part3. How to obtain seed (self seed, free form RC./Bought from SE/ MoA, price of seeds)
- Part4. About change before and after (income: sell to market, input: seed/fertilizer/labor)
- Part5. How to access to modern technology information
- MoA (FTC/DAs), research center, NGO, cooperative

### 3.4. Field work

Field work was conducted from 6<sup>th</sup> March 2010 to 22<sup>nd</sup> March 2010 and 7<sup>th</sup> June 2010 to 30<sup>th</sup> June 2010 for 6 weeks. There were 3 survey sites and each site had 6 farmers for questionnaires (total 36 farmers).

Table1: Research sites and the number of respondents, gender, and average of year

Organization	Region	Zone	Woreda	Kebele	No of respondents
Far from MARC	Oromia	East Shewa	Adama	Kachama	M: 6, F: 0 (Ave 42.2 years)
Near MARC (FRG)	Oromia	East Shewa	Adama	MARC	M: 3, F: 3 (Ave 37.6 years)
EOSA Ejere CSB	Oromia	East Shewa	Lume	Ejere	M: 4, F: 2 (Ave 53.8 years)
EOSA Chefe CSB	Oromia	East Shewa	Gimbichie	Chefe Donsa	M: 5, F: 1 (Ave 48.0 year)
SG2000 Maize	Amhara	West Goshama	Bure	Marwelad	M: 5, F: 1 (Ave 47.0 years)
SG2000 Wheat Pepper	Amhara	West Goshama	Bure	Wogedad	M: 6, F: 0 (Ave 32.2 years)

## 4. Result and Analysis

### 4.1 How farmers obtain seeds

There was no seed exchange among the farmers at the MARC and SG2000 sites (Table 2). If farmers were thinking “We don’t need to exchange anymore because of everyone has same varieties and crops.” They might had already lost their crop/ variety diversity which lead to more Agro-biodiversity on their field.

On the other hand, Community Seed Banks (EOSA) is keeping

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traditional style how to obtain seed, but farmers have more choices for seed source (Table 2). In other words, farmers can choose and plant the seed, whichever improved variety and local variety, which they want to plant on their own field every year.

Table2: Farmers' seed source (How farmers obtain seeds)

	Self Seed	Excha Nge	MoA /RC.	Market	Input Shop	ESE /ASE	Union Coop.	C.S.B.	F.R.G.
Farfrom MARC	⊙	⊙	△	x	x	x	x	x	x
Near MARC	△	x	⊙	○	○	x	x	x	⊙
CSB Ejere	⊙	○	○	△	x	x	x	⊙	x
CBS Cheffe	⊙	○	○	△	x	x	△	⊙	x
SG2000 (hybrid maize)	○	x	x	△	x	⊙	x	x	x
SG2000 (Wheat, hot pepper)	○	x	x	△	x	⊙	○	x	x

⊙= Very often    ○= Often    △= only Few    x = No

### 4.2 Agro-biodiversity and seed production

The perceived number of crops and varieties grown by farmers showed the positive contribution of Community Seed Banks (EOSA) in managing Agro-biodiversity at the community level in Ethiopia.

Near MARC (3.7) < SG2000 (4.2, 5.4) < Far from MARC (6.0) < EOSA C.S.B. (10.0)

\*It shows perceived average number of crops or varieties grown by 36 farmers.

### 4.3 Seed production and Income

In Near MARC site and SG2000 site were included free seed from MARC from Amhara Seed Enterprise. Free seed was not included but in CSB seed purchase were only 828 Birr and 933Birr (Table 3). It shows that farmers don't need to buy seed since CSB usually contribute to local seed security for farmers.

Balance chart shows not significant difference among Cheffe CSB (20,422 Birr) and SG2000 Hybrid Maize and seed grower's farmer (25,735 Birr). It means that if we conduct more large scale survey or questioner it might show no difference in farmers' income balance between CSB (low input low income scenario) and SG2000 Hybrid Maize (high input high income scenario).

Table 3: Chart of Farmer's average income, seed purchase, input, and balance

Farmer	Average income	Seed purchase	Input (fertilizer, labor )	Balance (Birr)
Far from MARC	6,045	1,767	4,568	—290
Near MARC*	56,479	2,100	15,957	38,422
CSB Ejere	14,597	<b>828</b>	5,958	7,811
CBS Cheffe	27,831	<b>933</b>	6,476	<b>20,422</b>
SG2000* Maize hybrid	38,040	834	11,471	<b>25,735</b>
SG2000*Wheat, pepper	62,467	485	7,977	54,004

*\*Near MARC and SG2000 (from Amhara Seed Enterprise);*

*Free seeds included*

## 5. Conclusion and Discussion

In this study, it was shown that farmers obtain seed for their own field through informal seed sector in such a way that seed exchange among farmers and which are available as local seed sources.

Also, it was shown that some farmers can manage seed hybrid and improved seed production, and this will enable farmers to obtain high



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income, but also they have to take a risk of high input. (e.g. climate change shocks). Therefore, it was suggested that when researcher and extension workers introduce new technology for seed management, especially for hybrid and improved seed, they should aware importance of Agro biodiversity management aspect. It is one of the key points to take an integrated and balanced approach for agriculture development.

In a contrasting situation, the Community Seed Bank can contribute both to Agro-biodiversity management and seed security for farmers. In the short term, seed security for every farmer, and in the mid-long term, sustainable Agro-biodiversity management as local resources in the Rural Development should be the focus in Ethiopia.

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