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BEA
Bioeconomy Africa

the David & Lucile Packard FOUNDATION

# Ethiopia's PHE

# Spotlight

## Integrated Practical Success Stories and Challenges from the Field

Bio - Economy Africa

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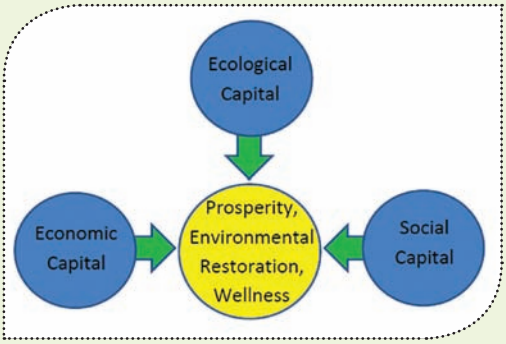
# Bioeconomy Africa




In 1995, one man's vision for a systematic and pragmatic community-based solution to the multi-faceted problems faced by the Ethiopian people was realized. On a small piece of degraded land in the hills of the Ethiopian capital city, Dr. Getachew Tikubet established his first sustainable agriculture and environmental restoration demonstration site which he dubbed the Integrated Bio-farming System (IBS). After some time he and his wife, Dr. Selamawit Asefa, found the need to form an administrative not-for profit organization which could link the goals of the IBS to beneficiaries through establishing strong relationships with international and national supporters. Bioeconomy Africa (BEA) was thus established in 2003 as a non-governmental not-for-profit organization to further the goals of Dr. Getachew and Dr. Selamawit's vision for the Integrated Bio-farming System.

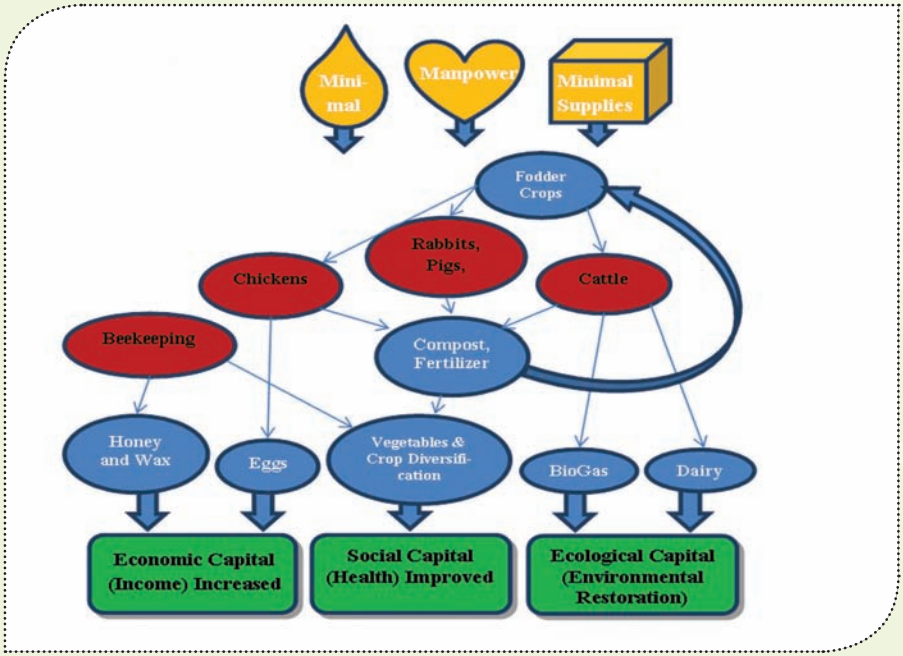
## Vision, mission, goals:

The mission of BEA is to improve wellness and livelihoods, restore the environment. It builds the practical problem-solving capacity of Ethiopians through demand-driven science-based technology education to enhance social, economic, and ecological capital. Bioeconomy Africa's approach integrates building capital in these three pillars to realize sustainable development for the Ethiopian population. Rural agriculturalists make up 84% of the Ethiopian population. The primary activity of the organization is, thus, the education of farmers through practical training at model farms, called "Bio-farms." This education is multi-disciplinary including practical and sustainable problem-solving technologies in agriculture, conservation and environmental restoration promotion, and promotion of the benefits and ways to address family planning and disease prevention. BEA calls their training package the "Integrated Bioeconomy System" (IBS). The IBS also creates a platform for coordinating efforts across disciplines. Scientists, environmentalists,

economists, health professionals, agriculturalists, students, and other community members all contribute to, and learn from, the development of the various components of the IBS. BEA's ultimate vision is to see the whole of Africa emerge as green, peaceful, prosperous and trading nations evolving through innovative knowledge-based economic measures.

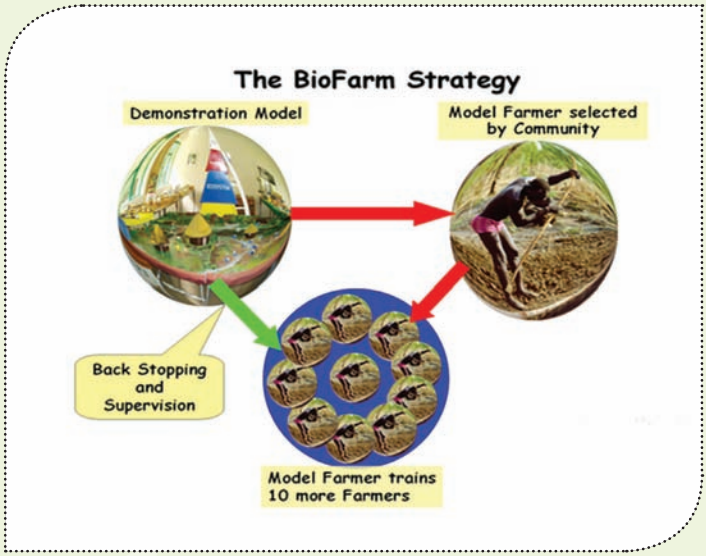
# The Integrated Bioeconomy System (IBS)

The IBS is an environmentally sustainable, economically feasible, simple and pro-poor holistic farming and environmental health improvement system. Its key concept is to recycle as much energy as possible in ecologically friendly ways and to optimize agricultural outputs while minimizing external inputs such as pesticides and chemical fertilizers. The inputs for the farm include a minimal supply of water, simple organic farming supplies and manpower. The outputs, as seen in the blue circles in the figure above, far outweigh the inputs (yellow circles). These outputs then transform into the real impacts in building capital for individuals, families, and communities.



# The Bioeconomy Strategy

Demonstration farms utilizing the components of the IBS have been strategically placed around Ethiopia to best reach the rural agricultural population. Farmers are recruited by the local government and agricultural administration. Over a two week intensive training they are taught all of the components of the Integrated Bio-farming System using both theory in a workshop setting and practical hands-on training (80%) on the demonstration farm.




BEA works with specialized trainers from the Ministry of Health and the Ministry of Agriculture and Rural Development to provide integrated training in family planning, environmental conservation, sanitation, and disease prevention. After graduation, the farmers are considered "model farmers" and apply what they have learned on their own farms. Model farmers are expected to spread their knowledge by training ten more farmers on the IBS strategies in their neighboring areas. In addition the model farmers are expected to adopt at least 10 technologies of what they have learnt. Model farmers who have adopted more than 16 technologies and trained 100 or more farmers are recognized as "master farmers." This cascades the knowledge gained to a much wider population in an efficient and community-driven manner. Follow up visits to farms with onsite feedback is practiced as a way to monitor the long-term achievements of the program. Refresher trainings are also offered.

# Components of the Integrated Bioeconomy System:

## Waste Management and Alternative Energy

In the IBS, all animal wastes are utilized in a closed system. The waste from cattle is diverted into simple biogas digesters. This biogas can then be used as a pollutant-free cooking or lighting fuel. After initial investment, this free and available source of power reduces the cost necessary for impoverished families. It also has a positive effect on the health and wellness of women by reducing the amount of smoke inhaled over cook fires and eliminating the laborious task of fuel wood collection. In addition, the use of solar power for cooking is also demonstrated.

*Mek'ele bio-farm workshop demonstrating solar and beekeeping*

*Asela bio-farm composting*

Agricultural waste and other animal manures are also composted and used as a nutrient-rich organic fertilizer, increasing the productivity of the farm. This reduces the need for purchasing fertilizers, which are often costly and full of chemicals. The pollutant-free fertilizer also keeps communities' food and waterways safe and clean. The removal and management of wastes reduces insect pests and disease vectors.

## Water Harvesting and Management

Water security is one of the major barriers affecting agriculturalists in Ethiopia. IBS promotes localized options for water harvesting and irrigation. Irrigation is taught using diverted water from nearby sources as well as manmade water points. These include wells with simple pulley systems, water pumps and lined ponds. Simple and affordable drip irrigation systems are taught. Plastic bottles are also used (shown in

picture) to prevent soil waterlogging and the waste valuable water. Large water storage containers are linked to pierced hoses to line larger crop beds. Rain water harvesting also utilizes water that falls on farm buildings.

*Hand dug well and hand pump and plastic bottle drip irrigation at Asosa bio-farm*

**Terracing and Erosion Control**

Due to population pressures in much of Ethiopia's mountainous highlands, farmers have been forced to plough higher up steep slopes. Deforestation for fuel and farm expansion has removed valuable natural soil and water control mechanisms. These factors have led to enormous soil erosion countrywide. IBS introduces methods such as terracing, strategic trench digging and bag gardening to hold agricultural soil in place during rains. Various tree species have also been introduced for their natural ability to secure the soil through strong root systems.

**Integrated Pest Management**

Through a need assessment in Asosa, BEA found that tsetse flies have caused economic disaster for farmers when they strike their cattle. A simple tsetse fly trap has since been introduced. In addition, to prevent the necessity for pesticides and chemical fertilizers, natural organic solutions such as crushed Neem trees and Pyrethrum flowers are promoted. These alternatives prevent the negative effects of chemicals on the environment and health of the community, allow the farmer to save on costly pesticides and help ensure food security through the control of dangerous pests.

## Dairy Production

IBS promotes dairy cows for both their biogas production value and their highly productive dairy capabilities. One dairy cow can contribute fourty liters of milk per day. Access to fresh wholesome milk products is a great benefit to the health of the community.

*Dairy cows with biogas trench at Gurara Women's bio-farm*

## Apiculture

Beekeeping is a longstanding tradition in Ethiopia. The IBS promotes both traditional and modern beehive designs. Polyurethane beehives have been found to be more air tight, allowing the bees to regulate the temperature inside the hive and produce higher yields of honey. Bees also contribute to the productivity of crops through pollination.

*Improved beehives above and traditional beehive at the bottom*

## Aquaculture

In some water sufficient sites, ponds for raising fish and ducks create sources of protein, including duck eggs. Duckweed has also been introduced for its water reclamation potential. Duckweed is a water plant that can harvest excess nitrates from contaminated (both sewage and grey) water and convert these pollutants into protein-rich agricultural feed.

## Population and Health Components

The IBS training includes family planning, sanitation, and disease prevention as part of the integrated approach. A health professional recruited from government health clinics near bio-farm sites provides the family planning and sanitation portion of the training. Family planning is taught through a comedic drama educating farmers on the consequences of having many children as it relates to their economic and health status as well as environmental resource depletion. Gender issues, HIV/AIDS and malaria prevention and sanitation such as latrine construction, hand washing, and water boiling are all addressed by the health professional during the training program. In addition, farmers are educated on the health and environmental benefits of each method and product as they are promoted in the agricultural training.

## Bioeconomy Africa's Projects

Bioeconomy Africa has implemented the Integrated Bioeconomy System in demonstration sites and projects in Addis Ababa, Asosa, Asela, Keto, Gibe, Sebeta, and Mek'ele as shown on the map. Future sites at Gambela and Dire Dawa are currently under development. In addition, IBS projects in Addis Ababa include the Gurara Women's Development and Trade Cooperative, Bella Youth Group and the Kechene Orphanage Farm. The strategic placements are meant to benefit the entire population living in diverse ecologies around the country. Some of the sites will be outlined below.


*Ethiopia with Bioeconomy Africa's current and future sites*

## Gurara Women's Development and Trade Cooperative

The Gurara Women's Development and Trade Cooperative is an association made up of disadvantaged women in Yeka sub-city of Addis

Ababa. The women organized themselves as a group in 1995. The kebele administration (government community level administration) linked them to Bioeconomy Africa and the Gurara Women's Development and Trade Association was established by BEA in 2007. The Embassy of Japan has provided considerable economic support for the Cooperative.

*Poultry farming at Gurara Women's Collective bio-farm*

PHE Ethiopia Consortium also assisted in advocating for a $10,000 grant from the Barr Foundation for the ongoing support of the women's program. The area has long been inhabited by families with little opportunity for increasing their health and economic status. Bioeconomy's founder, Dr. Getachew, comes from this disadvantaged area and was very interested to use IBS to assist his own community. The women in the Gurara Cooperative are widows, servants, unemployed, beggars, or engage in dangerous income generating activities such as fuel wood gathering. Female fuel wood carriers gather wood and leaves in the forests of the mountain above the kebele (community). They carry large 35 kilogram bundles on their backs an average distance of 12 kilometers to sell them for 5-6 birr (USD $0.20) per bundle. Their heavy loads and low income incur significant health impacts on the women and they are often the victims of violence when they are in the forests.

Four hundred women received the full training at the Addis demonstration bio-farm. Two hundred and forty of those were trained to apply their new skills on their home plots, while 160 developed their own community farm on land gifted them by the kebele. BEA provided the setup materials for the farm and supported them to establish a restaurant. Ongoing technical support and marketing assistance for the products is also given. The farm includes dairy, poultry, composting, drip irrigation, biogas for tea/coffee for the workers of the farm, beekeeping, tree farming and diversified crop production. The farm products are sold to the women at reduced prices and used in the cooperative's nearby restaurant. The income generated from the businesses go into a joint account to pay for expenses and an agreed upon portion is divided equally amongst members at holiday times. The women say their lives have been greatly improved through

involvement with the group. Their health has improved, they eat better, they can care for their families, and most of all they feel empowered as human beings in their community. The Gurara Women's Cooperative aims to expand the business to introduce more income-generating activities and to increase the income and shares available for its members.

**Bella Youth Group**

*Bella Youths at their farm site*

Similar to the Gurara Women's Cooperative, the Bella Youth Group is a group of resource poor individuals who approached the kebele administration to improve their economic situation together. The 35 members are ages 20 to 35 and eight of them are women. Many of them work in informal day labor which pays little and negatively affects their health. In 2010 they were granted a piece of land in the hills of Addis Ababa and BEA started assisting them. They received IBS training, supplies and technical support for the establishment of their own bio-farm. With additional support from the French Embassy and a loan from the kebele, the group received farm materials and 13 dairy cows. A BEA agricultural expert continued to support them on the farm on a daily basis for the first two years. The farm includes diversified vegetables, dairy, composting, and is in the process of developing beekeeping, biogas, and a 3,000 chicken poultry house. Products are sold to the community at a small shop on the farm. Once their initial loans are paid back through the selling of their products, the youth plan to open a larger shop and establish a dairy processing company, a honey processing company, and a small kitchen for providing farm meals to the French Embassy. The Bella Project with Bioeconomy Africa has increased the skills, investments, income-earning capacity, environmental awareness, and nutrition status for this group of disadvantaged youth. In addition, the youth learned about reproductive health and family planning options. According to the assessment made, majority of the youth group (85%) are using condoms and contraceptives for prevention of HIV/AIDS and unwanted pregnancy.

## Kechene Orphanage

The project at Kechene Orphanage was started in 2010 in a nearby kebele of Addis Ababa. The orphanage includes schooling and housing for 400 orphans from the surrounding area. The Addis Ababa Women's Affairs office, with funding from the Italian Embassy, requested assistance from BEA in developing a farm to provide healthy subsistence for the orphans. BEA provided training to orphanage staff, technical support and start up materials for the development of a bio-farm at the orphanage. The farm includes dairy cows, poultry, vegetables, and a biogas system currently used for preparing tea/coffee. Having the farm on their own property provides an outlet for educating the youth and provides nutritious, affordable and safe food for the residents. This site is a perfect example of integrating health and environmental interventions in a meaningful way for the benefit of these 400 orphans.

## Sebeta School for the Blind and Demonstration Farm

The Bio-farm at Sebeta School for the Blind was established in 2009 to provide a sustainable source of food for the residents of the school as well as create a demonstration farm for nearby farmers. Sebeta is located 30 kilometers outside the Addis city limits. Products of the farm are managed by a committee of school staff and are either sold or used to feed the students. Some partially-blind students have expressed interest in the farm and work their own seed beds with the support of BEA farm employees. One staff member commented that the farm "gives knowledge, provides income generation, preserves the natural habitat, and creates awareness about eco-farming using compost and natural methods."

*Model farmer: Mamoush on his improved farm in Sebeta*

*Model farmer Asagadech at her home with a granddaughter*

Mamoush is a model farmer who was trained on the Sebeta farm one year ago. He has applied many of the techniques on his own farm and now produces three crops instead of one annual crop, tripling his income and restoring the soil through diversification. He switched to natural methods of fertilizing, reducing his costs by utilizing compost and natural pesticides such as crushed Neem. With his increased income he now has 3 horses that he rents out, cows and 40 chickens. Mamoush hopes to create a biogas system to provide lighting and cooking fuel for his home but he says the start-up cost and technical expertise is too great for him to do without more support from BEA. He commented that he "used to take his children to the clinic often but now they are healthier from eating a better diet." His wife also benefited from the family planning awareness training that he got and shared with her.

Asagadech is another model farmer who was selected to be trained at Sebeta to help her address the challenges she faced as a widow in providing for her family. Her farm is small but she says she has learned how to use the space to grow a variety of vegetables. She also has apiculture, cows, and chickens on her household farm. She is grateful to BEA for helping her to increase her income for her family and helping them to have a more diverse diet.

**Asosa**

Asosa is the small capital town located in the remote western Benishangul-Gumuz Region of Ethiopia, 660 kilometers from Addis Ababa. The ecological zone is hot, wet lowland with 991 millimeters of rainfall per year. This environment is ideal for many nutritious crops but is very prone to dangerous pests. The bio-farm established less than two years ago, yet already boasts nearly all of the components of IBS. A large biogas system is being built to utilize not only cow dung but a human toilet will also be diverted into the digester for added fuel potential and educational benefit. During a needs assessment, BEA found that tsetse flies were killing farmers' cattle and causing great economic and health consequences. BEA responded with the development of a tsetse fly trap which is given to every farmer trained at Asosa. The farmers are told

*Tsetse fly trap*

*Asosa bio-farm with bamboo irrigation and bag farming for erosion control*

*Asosa Model farmers: Araba, Milesa, Babakir, and Araba's husband*

to bring the caught flies back to the bio-farm to track how the traps are reducing numbers. A second trap is given where excess flies are found through this adaptive management system. The farm also includes the use of local materials such as bamboo for small scale drip irrigation systems and all farm buildings. Five hundred farmers from within Asosa woreda (district) were trained two seasons ago, half of which were given training in Addis Ababa due to the farm's new status. Last season 50 more were trained. Ten to 20 percent were women. Sixty Development Agents (DAs), or government agricultural development workers, were also included in the first batch to help spread IBS through the DA's ongoing training with community farmers. Araba Abdulwahid was trained in the first batch of Asosa farmers who were sent to Addis. Before the training her family was living hand-to-mouth. She had land but never knew how to cultivate it. Araba is an elder woman with five children and a supportive husband. She became a very successful model farmer and entrepreneur after the training. She now grows a variety crops such as cabbage, beets, carrots, papaya, and pineapple. Her farm also boasts animals such as oxen, goats, donkeys and chickens. With her increased income she has opened a café and is saving to open a formal shop for selling her products. Araba has shared the benefits of her training through teaching IBS techniques to ten of her neighbors, five of whom were also struggling women. During the training she says she was taught about the importance of using treated bed nets to prevent malaria and with her increased income she has purchased nets for her family. She says "the training has changed the way my family lives. My children are all healthier now that their farm is successful." Some challenges that Araba faces include the lack of access to water on her farm and the economic and technical difficulties in setting up a biogas system.

Milesa Casai is another model farmer trained this past July. He increased his income through diversification and the use of composting and natural fertilizers. Like most farmers, Milesa had taken the government's agricultural training prior to learning on the bio-farm. "The agricultural training was taught in a classroom with only theory, but on the bio-farm, we learned how to farm using natural and practical methods. The bio-farm training is better for some of us who don't read and write because we can't understand what they are writing on the chalkboard." In the short time since Milesa's training he has already taught 30 neighboring farmers how to create a composting system. He also noted that the family planning aspect of BEA training's taught him to think of the economic results of having many children and is supportive of his wife's use of contraceptives.

Babakir Esmile was trained with Araba in Addis two seasons ago. He is happy that his farm is now successful and helping his family to be healthier. In addition to the same elements as the others, he now uses shelf gardening and a soil conservation system (strategic ditches) to protect against erosion. He now has animals, which are housed in a separate building than his family. He noted that the tsetse fly is a problem for his cattle and that his trap has decreased the number of flies, but he needs more to eradicate them. Based on the knowledge from the training and his increased income his house now has a separate room for cooking and a separate clean toilet facility. He is the proud father of three children and after the family planning training he says he is satisfied with this number. "My family enjoys better living conditions now. Before we only ate shiro (bean paste) twice per day but we enjoy many different foods after my farm improved."

**Asela**

The model bio-farm at Asela was one of the first IBS demonstration sites and was established seven years ago. Asela is located in the Oromia region about 175 kilometers south of Addis Ababa in a mild sub-tropical highland area. Average rainfall is around 1300 millimeters per year, creating a fertile environment. All aspects of IBS are demonstrated including a full animal and composting systems. Pigs eat rabbit dung and agricultural waste and in turn create fertilizer which is free from gas and can be used directly on plants. Cows, ducks and chickens also add to the sustainable fertilizing cycle on the farm. One unique aspect of the site is an eco-park recreation area developed by BEA on a nearby lake which is diverted to irrigate the farm.

*Asela Eco-park Recreation Area, bio-farm pig and newly planted reforestation along the lake*

*Aklilu, Kuraz, and Minda model farmers at Asela bio-farm*

They also introduced coffee growing on the farm,which was previously thought to be a poor crop for the area. Trainings for new beneficiaries as well as refresher courses take place every few months. Though this farm has its own water source, staff say beneficiaries are trained on alternative methods for irrigation if they live in water scarce areas. Before the farm was developed, the area was known to be degraded, dirty, and dangerous to travel through according to local farmers. Now the area has been completely rehabilitated as a green and safe area for the community to recreate.

Minda Augichew is a model farmer who has focused on beekeeping and has diversified his farm. After he received IBS training he transitioned from traditional to modern hives. Where his old hives produced 15 kilograms of honey, his new ones produce around 50 kilograms. His main challenge is in marketing and processing his honey; however, he plans to continue to work with BEA on this. Minda reported that he understands the importance of family planning as a way to manage his resources and conserve the environment and is happy with his two children. During his training he learned how to build a pit toilet and the importance of hand washing. He says his children always wash their hands now. "Now that I use no chemicals on my farm, the environment is cleaner and safer for my children." Minda's farm was also selected as a model farm for the government agricultural training where he had the opportunity to train 200 farmers on his methods.

Aklilu Bekele was trained on the bio-farm two years ago. He reports he is now using compost instead of buying fertilizer and grows five or

six vegetables instead of one annual crop. Before improving his farm his family only ate maize and due to poor health they had to visit the clinic often. "My family is better off now. I can provide better clothes and food, my house is improved, and my children can get an education because of my increased income."

Kuraz Negussie is a female model farmer also trained two years ago. Her improved farm has sheep, hens, cattle and a banana plantation in addition to her diversified vegetables. Kuraz reports that the main change is that her family is now economically secure. She has even sent her eldest child to medical school in Addis Ababa. Accessing health care was a problem before due to the cost but she learned more about health in the IBS training and now goes to clinics to get more education and preventive care for her family.

**Mek'ele**

*Mek'ele model farmer Gebre Kiros Belay*

Mek'ele is the capital city of Tigray Region in the far north of Ethiopia, 750 kilometers from Addis Ababa. Tigray's environment is characterized by rocky, arid, high plains encircled by a chain of mountains. Tigray suffers from significant water shortages in drought years and has on average just 650 millimeters rainfall per year. The Mek'ele bio-farm was one of the first demonstration farms, established in 2003. At the site, BEA teaches farmers how to create water storage and ponds from natural springs as well as build wells with hand pumps. Drip irrigation systems are taught to conserve water. Before the training many farmers rely solely on intermittent rainfall for irrigation. The research center at the site demonstrates honey processing, biogas digesters, solar energy design and other components of the Integrated Bio-farm System. Trainings happen about five times per year and the rest of the time follow-up is done on farms randomly selected by the Mek'ele BEA staff. As part of BEA's goals to advocate for gender equity, one hundred women from a women's community association called Marta Group were also trained on solar power and irrigation at the bio-farm. The bio-farm manager states that 90% of farms they check are successfully applying some of the methods from IBS, primarily the diversification of crops. These successful farmers are rewarded with

vegetable seeds provided by BEA. Gebre Kiros Belay has become a very successful model farmer; he was trained four years ago. His farm had no house, no animals and he was only growing about four quintiles of wheat and teff (Ethiopian staple grain). He now has cattle, oxen, donkeys, chickens, two water pumps, beekeeping, dairy and is growing 12 quintiles per hectare of teff, wheat, and barley. Gebre Kiros's reported income has gone from 3,000 birr to 35,000 birr per year (USD $176 to $2,058). With his increased income, he has built a two story house. BEA supported Gebre Kiros to develop a biogas system which provides all of his cooking fuel. He has trained eight farmers on his own farm about biogas, irrigation, and diversification. When asked about the family planning portion of the training, he said he heard it but chose to have nine children because he "only has one brother and needs to contribute more." As one of the first model farmers trained by BEA, Gebre Kiros was selected to visit Switzerland for an ecofarming training alongside other BEA staff last summer. "My life has changed from the knowledge gained from Bioeconomy. Before it was difficult to provide food and healthcare but now it is not a problem to care for my family."

**Ghibe Valley (Tolay)**

In 2007 BEA, in partnership with the Oromiya Regional State, conducted IBS training for 1500 farmers from Ghibe valley, Tolay area from 25 food insecure woredas of the region. The proposed project area was practicing rain fed agriculture, producing cereals, pulses, maize, fruit and several other crop productions and also raised animals. However, due to intensive soil erosion and insufficient soil fertility they were unable to produce crop or animal feed in this area.


*Handing of certificates for trained of farmers in IBS*

Moisture stress during the peak growing season is the major constraint. The products generated from these areas were unable to feed the increasing population of the surrounding people and has also affected the livelihood of the farmers. In order to alleviate these problems after a thorough discussion with the Oromiya regional state and the concerned regional offices, BEA conducted the capacity development and technology training for these farmers on IBS for three consecutive sessions. After the training the farmers received regular follow up from BEA for one year. This follow up showed significant change on the thinking in agriculture from traditional to ecologically sound means, 2-3 folds increase in production, 25% of the area was rehabilitated through planting 50,000 trees. The awareness creation on family planning during the training by health professionals encouraged the farmers to request the regional health bureau to construct additional health posts in the area. To ensure the sustainability of the IBS training, the DA also received the training with farmers and two workshops were conducted before the project phase out period.

**Keto**

Keto is found in the Ghibe valley. The area is disease infested area is faced with many diseases such as animal Trypanosomiasis in addition to land degradation has reduced soil fertility. The main challenge is the death of animals which is significant part of agriculture in Ethiopia. Based on the demand of the farmers, BEA, in partnership with the Nile initiative and ICIPE conducted the IBS training with a focus on community based tsetse control. The farmers during the training had a complete package on how to make the traps with locally made materials, how to set the traps and when and where to deploy the traps. After

*Training of farmers*

*Tsetse fly traps*

the disease was controlled, the animals became healthy and the number of animals increased. A training on natural resource management and ecological farming within the IBS framework was also conducted for 1500 farmers in that area. Follow up was conducted for one year after the training which showed tremendous improvement in the livelihood of the farmers the income generated using IBS from their farm activities, farmers improved their houses, they constructed a community school for their children and women were empowered on family planning.

**Bioeconomy Africa's Results and Achievements in Ethiopia**

| Bio-farm | No. of Years at site | Total No. of trainings | No. of men trained | No. of women trained | Total No. trained | Farmers receiving follow up |
|---|---|---|---|---|---|---|
| Addis Ababa | 11 | 500 | 5,000 | 2,330 | 7,350 | 10% |
| Asela | 8 | 10 | 500 | 143 | 643 | 10% |
| Mekele | 5 | 20 | 1,000 | 420 | 1,420 | 10% |
| Assosa | 3 | 10 | 500 | 136 | 636 | 10% |
| Sebeta | 2 | 2 | 100 | 58 | 158 | 10% |
| Keto | 3 | 10 | 1500 | 480 | 1980 | 10% |
| Gibe | 5 | 10 | 1500 | 520 | 2020 | 10% |

- Six model demonstration bio-farms established in different ecosystems of Ethiopia addressing unique problems of each zone (arid, wetland, highland, and lowland).

- More than 50,000 smallholder farmers trained on sustainable farming techniques and healthy choices to promote livelihoods, wellness and environmental conservation.

- More than 30,000 farmers enhanced the productivity of their farms through practicing IBS techniques.

- Increased productivity resulted in improved livelihoods for more than 30,000 rural farming families and pastoralists. (Average of $1100-1700

USD/year post-IBS training)

- More than 11,910 poor and marginalized women received training on IBS and gained control over resources.

- More than 1,000 biogas digesters were provided to farmers in Ethiopia and other African partner countries.

- Enhanced capacity for farmers to sustainably adapt to local environmental challenges specific to their ecological zone.

- Adaptive management system installed for tsetse fly control resulting in extensive reduction in tsetse fly and trypanosomiasis incidence.

- Ongoing technical assistance provided to trained smallholders and women and youth groups.

- Standardized curriculum for the farmers' academies in Ethiopia developed.

- Three national awards received in recognition of environmental activities from federal, regional and city administrations.

- Partnerships established to expand IBS into other African countries.

- Two model demonstration bio-farms and 35 IBS villages expanding sustainable techniques across Africa (DRC, Côted'Ivoire and Mozambique).

## Challenges and Gaps

- Adapting the IBS components to be affordable and accessible for all participants, especially biogas, solar, irrigation systems and honey processing.

- Adapting the IBS to address each bio-farm's specific and diverse ecology needs.

- Establishing a system for follow up support for farmers living in rural areas.

- Strengthening the integration of family planning and health aspects

within the framework of the IBS.

- Strengthening monitoring and especially evaluation for providing evidence of the long-term benefits and results of the programs.

- Training hard-to-reach rural populations living well outside the seven bio-farm sites.

- Making more training possible through additional support from international partners.

## Lessons Learned

- Successful community programs need to be owned and driven by the community. Communication and partnering with communities in which BEA works is of great importance.

- The integrated approach is more inclusive of the many players and challenges affecting a community compared to the silver bullet approach, and therefore, has a much higher possibility for sustainability.

## The way forward

As part of Bioeconomy Africa's vision to see the whole of Africa emerge as green, peaceful, prosperous and trading nations through innovative knowledge-based economies, BEA has scaled out their model to other countries around Sub-Saharan Africa. They are currently developing an Integrated Bioeconomy System in the Democratic Republic of Congo as well as Mozambique and Côted'Ivoire. In the future, operational research and development will be the key to developing new and innovative technologies and systems to address the diverse challenges of African ecologies and communities.

**PHE Ethiopia:** Can you please introduce yourself?

**Dr.Getachew:** My name is Getachew Tikubet. I am trained in Ecological Science and prior to focusing on BEA, I worked in research and development for the last 25 years. I am the cofounder of Bioeconomy Africa and am currently working as the Operational Director of Bioeconomy Africa and the Integrated Bio-farming Center.

**PHE Ethiopia:** Please tell us briefly about Bioeconomy Africa. When was it was established and what were the objectives?

**Dr.Getachew:** Bioeconomy Africa (BEA), previously Bioeconomy Association, is a non-governmental, transnational, non-profit organization legally established in Ethiopia in 2003. Its inception was inspired by the mission to answer integrated environmental, social and economic problems in Africa through improving livelihoods and restoring the environment. Furthermore, BEA aspired to promote and replicate its health improvement packages and climate change adaption and mitigation concepts and initiatives by creating and demonstrating a pragmatic, science-based and interactive capacity building system to develop integrated social, economic and ecological capital. To accomplish this, BEA developed the Integrated Bioeconomy System (IBS) to promote Africa evolving by means of innovative technology and knowledge-based approaches towards the goal of evolving as green, peaceful and prosperous.

**PHE Ethiopia:** How is BEA approaching the integration approach practically?

**Dr.Getachew:** The Integrated Bioeconomy System was built to promote economic, social and ecological capital. We have to check whether these three components are integrated before we start our projects. The social

capital includes education, health, gender and governance. Economic capital includes income generation training. And we address ecological capital through many ways including promoting agricultural systems to increase soil fertility and conserve biodiversity. We provide a package of training that confirms the social, economic and environment components are well integrated according to each community's needs. During the integrated training we provide beneficiaries with a farm kit, manuals, seed money, and family planning information with help of health extension workers. Integrating these three pillars addresses the same goals of population, health, and environment using our model.

**PHE Ethiopia:** What sets BEA's model apart from other agricultural trainings such as the government training provided to all rural farmers?

**Dr.Getachew:** Bioeconomy Africa's model is different from many agricultural trainings because it is demand driven based on community need assessments. It is based on practical hands-on models rather than classroom only learning. It integrates the three major pillars of human development dimension: social, economic and ecological capital and it utilizes adaptive management- managing with constant feedback and adjustment.

**PHE Ethiopia:** How is BEA linking their goals in sustainable agriculture and environmental restoration to health and population issues for its beneficiaries?

**Dr.Getachew:** BEA works to build the farmers' knowledge of the importance of small family size as it relates to their resources and the environment. Our farmers traditionally prefer large families as social security during old age. Through our integrated training we are working to change the deep rooted attitude of the farmers. After the training some farmers have decided to limit their children and we have seen some signs that the acceptance of family planning services has increased in our intervention areas. We have also learned that often when the income of the farmers improved, the health of the families and the likelihood of the farmers to use family planning services also improved.

**PHE Ethiopia:** How are your programs mitigating climate change?

**Dr.Getachew:** Our training improves the capacity of farmers to practice the following mechanisms to mitigate climate change: application of renewable heat and power (biogas), recycling and composting of organic

waste, improving land management to improve soil carbon storage, restoring degraded lands, and reducing deforestation.

**PHE Ethiopia:** How many beneficiaries do your programs in Ethiopia reach, both directly and indirectly?

**Dr.Getachew:** We have worked with 50,000 farmers directly. After training, we instill a responsibility for the new model farmers to spread their knowledge to 10 neighboring farmers, hence reaching 500,000 to date indirectly.

**PHE Ethiopia:** How does Bioeconomy Africa address gender equity through its programs?

**Dr.Getachew:** In our program, out of the overall beneficiaries, at least 30% of those selected for training are disadvantaged women.

**PHE Ethiopia:** Do you plan to scale-up to reach the wider population of Ethiopia? If so, briefly describe how?

**Dr.Getachew:** Yes, we have a plan to scale-up and to reach a wider population of Ethiopia through the establishment of more demonstration sites, giving access to more farmers throughout the country. More financial support is needed for this expansion plan; however, many more farmers could be reached through more accessible sites.

**PHE Ethiopia:** Who are some of the key partnerships that BEA has in implementing the integrated approach across sectors?

**Dr.Getachew:** We are working with a number of organizations but the key partners currently are: the Ethiopian Government (including the agricultural, health, and education sectors), African Union (AU), UNDP and IFAD.

**PHE Ethiopia:** How are you providing evidence for the efficacy of the integrated PHE approach in your programs? How do you evaluate the results of the trainings and programs?

**Dr.Getachew:** We have a standard monitoring and evaluation system to help improve our programs. We collect evidence-based information through questionnaires before and after each training, focus group discussions with trainees and we produce technical reports. A review

of our project sites is conducted every year as well. Generally, our backstopping and monitoring system records how the projects are doing regularly. We do impact assessments to see the social, economic and ecological changes due to the intervention. With additional support we hope to create a strong electronic database system in the future.

**PHE Ethiopia:** How are you adapting the trainings in the integrated bio-farm system to improve the programs for added benefits to participants?

**Dr.Getachew:** As a trend we always do community gap assessments before establishing a farm in a new site.

**PHE Ethiopia:** How is BEA contributing to the national and international goals in development set by the Millennium Development Goals (MDGs) and the Growth and Transformation Plan (GTP)?

**Dr.Getachew:** Bioeconomy Africa's strategy has taken a holistic approach to addressing the problems of agriculturists who make up the majority of the Ethiopian population. These problems and goals often mimic those of the MDGs and the GTP. Through the integrated approaches of IBS some examples of issues we address include: eradication of extreme poverty and hunger, provision of universal primary education, promotion of gender equality and the empowerment of women, reduction of HIV/AIDS, malaria and other diseases, promotion of environmental sustainability and promotion of global partnerships for development.

**PHE Ethiopia:** Describe your relationship with PHE Ethiopia Consortium. How has this partnership helped BEA and what can they do to improve?

**Dr.Getachew:** We collaborate with PHE Ethiopia on points such as: conducting educational and advocacy programs together, broadening and strengthening institutions' PHE knowledge together and promotion of programs. PHE has also assisted us in the mobilization of funds to support our joint mission. To actualize all of this in a sustainable manner, I believe we have to develop a joint strategic plan.

# About this Spotlight

Population, health, and environment (PHE) interventions in Ethiopia are a holistic, participatory development approach whereby issues are addressed in an integrated manner for improved livelihoods and sustainable well-being of people and ecosystems. The PHE Ethiopia Consortium's mission is to "enhance and promote the integration of population, health and environment (PHE) at various levels for sustainable development." We have been striving to fulfill this mission and to provide coordination and capacity building to our members since our creation in 2008. To promote this mission our organization has taken on the responsibility to enhance cooperation and networking between government and international agencies, NGOs, and our member organizations. By creating in-depth "Spotlights" on successful members, we hope to build capacity, increase PHE resources for members, facilitate experience sharing, and organize advocacy and training opportunities to strengthen awareness and utilization of the integrated PHE approach in Ethiopia. One of PHE Ethiopia Consortium's member organizations improving the lives of the Ethiopian people through the PHE integrated approach is Bioeconomy Africa (BEA). PHE Ethiopia has partnered with BEA to provide awareness and capacity building and technical support to scale up and strengthen their linked activities. By creating and disseminating this Spotlight on Bioeconomy Africa we hope to support them in promoting successful PHE programs and share their lessons learned with the wider PHE community.

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