

Farmer Innovations Identified Through Farmer Innovation Contest in Ethiopia

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1. Introduction

Innovation is crucial for sustained economic growth and competitiveness in the globalized world. In particular, innovation in agriculture is important to build resilience of farmers in the face of climate change. It would also lead to continued productivity growth and food security.

In the past, agricultural innovation was perceived to be developed only by the scientific community, such as scientists and researchers in universities and research institutes, which is referred as top-down innovations. However, innovation developed in one area might not be applicable due to context specific geographical and agro ecological variations. Scientists could not also develop innovation for all areas.

As a result, recently, there is recognition of farmers' capacity to innovate and a lot of attention is given to farmer innovations. Farmer innovations are also thought to complement the scientific community innovations and are less costly since they are developed from locally available materials and farmers' indigenous knowledge.

However, due to less attention from governmental and non-governmental organization or limited institutional environment, the potential of farmer innovations could not be utilized. This led to underutilization of a crucial potential for development and change in the agricultural sector.

Hence, there is a need to revitalize farmers' innovativeness and make their innovations functional. Innovative farmers need to be recognized, supported and promoted as well as their innovations need to be scaled-up.

Farmer innovation contest is one way of promoting and recognizing the innovations of farmers. The contest is considered to motivate the innovator and others for more innovations. It also mitigates innovation secrecy and enables identification of scalable innovations.

To this end, farmer innovation contest was conducted in Ethiopia from November 7, 2016 to December 16, 2016 in three districts of Arsi Zone, Oromia regional government, namely: Hetosa, Lode Hetosa and Digeluna Tijo. The contest was funded by German government Federal Ministry for Economic Cooperation and Development and implemented by the Centre for Development Research (ZEF) of the University of Bonn under their Program of Accompanying Research for Agricultural Innovation (PARI). The contest was implemented in Ethiopia in partnership with Ethiopian Development Research Institute (EDRI). The remaining sections of the report present the process/methodology/ of innovation contest, results of the contest, and description of selected innovations.

The report is organized as follows: section two presents project and organizational summary; section three

describes evaluation results of the innovation applications; and section four presents description of the winner innovations. The full list, scores and ranks of all innovations in the three districts and in their respective category are presented in appendix 1.

2. Project and organizational summary

Program of Accompanying Research for Agricultural Innovation (PARI) is a program of Centre for Development Research (ZEF) of University of Bonn. It is implemented in 12 African countries and India in collaboration with local partners. In Ethiopia, it is implemented in collaboration with Ethiopian Development Research Institute.

The following are the goals of PARI.

Main Goal

- Contribute to sustainable agricultural growth and food security in Africa

Sub Goals

- Support and enhance investments in the Agricultural Innovation Centers (AICs) through research in cooperation with applications
- Promote and support the scaling of proven innovations in the agri-food sector in Africa in collaboration and partnership with all relevant actors

- Contribute to the development of the agri-food sector in Africa through the identification, assessments, and generation of innovations

The Ethiopian national partner, Ethiopian Development Research Institute (EDRI), is a government institution that conducts rigorous economic research to provide high-quality economic policy and development analysis for decision makers in both the state and non-state sectors. The institute has four centers, namely

- Macro-economic and trade research center
- Agriculture and rural development research center
- Micro and sectoral development research center
- Environment and climate research center

3. Evaluation result of the innovation applications

3.1. Prescreening

Farmer innovation contest was opened from November 7 to December 16, 2016. Before opening the contest, detailed training on the concept of farmer innovation and procedure of farmer innovation contest were given to scouters (development agents) in order to get the right applications. In addition, to avoid scouters bias in selecting the farmer innovations, radio announcement about the innovation contest were done for a month in two local languages (Oromiffa 20 days and Amharic 20 days). By the end of the application period, a total of 153 innovation applications were submitted from the three districts.

Consequently, prescreening of innovation applications was done for about one week from December 19 – 24, 2016 using the following criteria: whether the innovation has some value addition or is unique from common practice and technology developed by the scientific community; whether the innovation is within the food value chain; and whether the innovation was developed without being assisted by external body such as extension agents or scientists. See Table 1 for detail.

Table 1: Number of innovations per district and category (prescreening)

Item	Number of innovations			
	Hetosa	Lode Hetosa	Digeluna Tijo	Sub-total
Female	6	0	0	6
Male	22	21	12	55
Youth	10	8	1	19
Total	38	29	13	80

Out of 80 prescreened innovation, five innovations were dropped during further screening procedure. The prescreening was done in Iteya town, a central location for all the target Woredas/districts.

The prescreening committee was led by the project coordinator at EDRI and comprises of four local facilitators and one additional staff from EDRI: Adane Bulo (Research Assistant-EDRI); Mustefa Hussen (Agronomist- Arsi Zone); Ketema Girma (Extension team leader-Hetosa district); Abu Amana (Extension team leader-Lode Hetosa district) Hailue (agriculturalist –Lude Hitosa) and Andualem Moges (Extension team leader-Digeluna Tijo district).

After the prescreening, translation of all the innovation application forms from Amharic to English was done from December 26-30, 2016. Finally, 75 innovations were qualified for detail evaluation by the evaluation committee.

3.2. Detail evaluation of prescreened innovations

Initially, panel of experts who serve to evaluate prescreened innovations was constituted by EDRI. The following personalities were member of the evaluation committee who represented with their personal professional capacity and experiences in agricultural innovation systems research and development. These were:

1. Dr. Tigabu Degu
2. Dr Million Gebreyes
3. Dr Samson Eshetu,
4. Mr. Adane Bulu
5. Mr.Zelalem Lema;
6. Ms. Amleset Haile
7. Mr. Mustefa Hussen
8. Mr. Ketema Girma
9. Mr. Abu Amana
10. Mr. Andualem Moges

The evaluation of the innovations was conducted for a period of one week (January 9-16, 2017). Half day training was given by the project coordinator, Dr. Tigabu Degu on January 9th 2017 for the evaluation committee on purpose, process and methodology to be followed. The evaluation team had brainstormed and deliberated on the concept of innovation, criteria to be used, score for each criteria and eventually, process of evaluating all innovations against the set criteria for three days.

After the team has deliberated thoroughly on the criteria to be used, six criteria were finally selected with their respective weight (Table 2).

Table 2: Criteria used for evaluation of farmer innovations

S.no.	Criteria	Weight allocate
1.	Originality/uniqueness	35%
2.	Economic potential	20%
3.	Easy to practice	15%
4.	Affordability	10%
5.	Gender sensitiveness	10%
6.	Environmental friendly	10%

The evaluation committee was splitted into two groups to evaluate all innovations. Mean weight of the two groups was used to rank innovations. In due course of this evaluation, few innovations, which do not meet the set criteria were dropped by the two groups.

Eventually, the committee has selected five top scored innovations from each category (male, female and youth) to be verified in the field. Then, the evaluation committee went to the field to verify and crosscheck the selected innovations. Table 3 shows number of innovations selected by district and category at the end of the evaluation.

Table 3: Number of innovations per district and category (post evaluation)

Category	Innovation			
	Hetosa	Lode Hetosa	Digeluna Tijo	Sub-total
Female	5	0	0	5
Male	16	9	10	35
Youth	6	1	2	9
Total	27	10	12	49

Note: See Table A in the appendix for a full list of all innovations in the three districts

and their scores and ranking in their respective category.

4. Description of winner innovations

Innovation #1 Female: Jointly owned family saving box



Name of innovator: Meseret Dinku
Age: 36
District: Hetosa

Description of the innovation

In a family where members generate income from different sources and does not have access to formal bank in a nearby location, it is pertinent to have means of saving money other than banking system. Meseret Dinku's family is one such family and they used to practice saving in one box for the past many years. But it did not show them clearly who is contributing most. As a result, the mother (the innovator Meseret Dinku) brought up the idea of

saving in one box that is partitioned to the number of family members who are eligible to save (in this case four).

They ordered a carpenter to prepare a saving box made of wood with four partitions. The box is locked all round only leaving 4 small size openings for each member to put money in.

Before starting saving, everyone has to endorse the idea of saving which makes it more participatory. Then, each family member saves his/her money in the respective partition every day or when available. They keep the box inside a drawer to keep it safe from rats and termites. The box is opened every three months in the presence of all family saving members; and each member counts and receives his/her own saved money. In the past, the children used their saving for income generating activities and the parents used it for social contribution such as Idir and marriage.



Benefits

- Encourages all family members to save together in different compartments of a single box creating the feeling of togetherness

- Improves saving culture and reduce unwanted expenses
- Encourages/motivates peaceful competition among members
- Increases collective decision
- Saves cost of buying four boxes
- Enables parents to control their children in terms of money management

Innovation #2 Female: Calcium supplement for livestock



Name of innovator: Shallo Alemu Mamo
Age: 35
District: Hetosa

Description of the innovation

The innovator, Shallo Alemu Mamo, has crossed breed cattle which she rears using a cut and carry production system. The cattle often suffer from calcium deficiency which is expensive to treat using modern veterinary medicine. She used her innovation to treat her cattle.

The innovation is a feed prepared from locally available feed materials but most important is the chicken manure.

Preparation

Mix

- 1 kilogram of chicken manure
- Dried injera (*Dirkosh*)
- 1/8 kilogram of oilseed cake
- *Teff* hay
- Grass hay
- Wheat barn
- Salt
- Water

Then, feed the cattle twice a day, morning and evening. The result could be seen in a month time.

Benefits

- Solves calcium shortage problem of cattle
- Improves their physical condition
- Increases their milk production



Innovation #3 Female: Chicken treatment for Newcastle disease



Name of innovator: Meseret Wirgi
Age: 37
District: Hetosa

Description of the innovation

Mesret Wirgi rears chicken as a side living means next to her husband farming activity. Her chickens were used to get sick and die from Newcastle disease.

To protect and cure her chickens, she started to experiment with locally available plant materials and come up with this innovation. This innovation was motivated to reduce cost of medicine to treat chicken disease. After she started to use this medicine, the death of her chicken significantly reduced. The chicken medicine is used both for protection and curing chickens from the disease. It can serve as a vaccine for new born chickens.

Preparation

- Dry one big cup of hygnia abyssinica (*Koso*) in the sun light
- Grind small cup of neem leaf and mix it with hygnia abyssinica
- The mixture will be kept for one day
- The next day, the top part of the mix is removed and the medicine will be given for the chicken by dressing with injera.

For new born chickens, it has to be given after 7 days they are hatched and for 3 consecutive days. She also gives her chickens this medicine as a protection from disease even though the chickens are not sick. A mixture of one big cup of hygnia abyssinica and one small cup of neem leaf is enough for 3 days for about 25 chickens.

Benefits

- Healthy chickens
- Increases production
- Reduces production costs

Innovation #1 Male: Biogas-slurry application as pesticide



Name of Innovator: Beyene Tadesse Lenjiso
Age: 39
District: Hetosa

Description of the innovation

Beyene Tadesse Lenjiso is a model farmer in his area. He tries different agricultural technologies and experiment by himself for new things. He is well known by his compost and biogas preparation. He even sells compost to other farmers and NGOs. The motivation for this innovation is to reduce cost of pesticides, increasing production and getting healthy agriculture produce through organic farming.

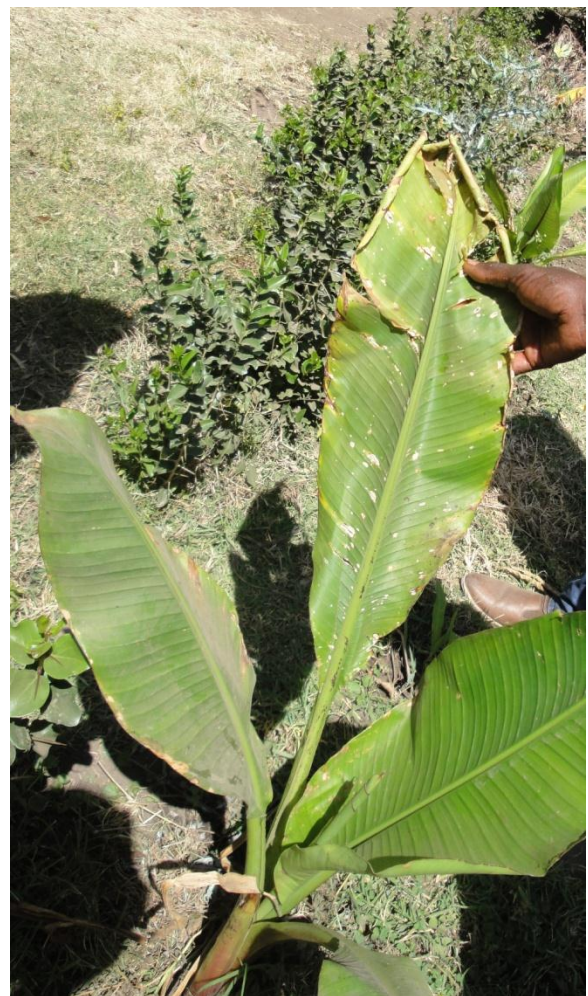
Preparation

- Prepare biogas-slurry and water
- Dilute the slurry with water
- Add the solution in to sprayer
- Spray the mixture on crops or vegetables which have pests
- Spray again after a month on the same crops or vegetables

- At the end, we get crop or vegetable produce free from diseases

Benefits

- Protects crops and vegetables from pests. E.g. rust, aphids (*kishikish*)
- Reduces cost of production
- Enables to obtain produce free from chemicals



Innovation #2 Male: Locally made winnowing machine



Name of innovator: Bedada Abera Alemu
Age: 36
District: Hitosa

Description of the innovation

The innovation that Bedada Abera Alemu developed is a machine that separate residues/bran straw/ and other add mix in grains such as Teff, wheat, barely etc. The common practice is implemented using plate and by exposing the threshed produces to the wind. This practice has drawbacks since some produce will be blown by wind and it cannot be performed when it is raining and where there is no wind. The crop quality is also compromised as the grains are falling on the ground and probably mixed with other particles.

Materials required to make the machine are ventilator, wood, metal board, bolts, mesh wire, wire, welding machine, chain and gears.

To make the material, he graves and welds the equipments as necessary to fit in to the design of the machine. He uses bolts to fix some equipment.

Once the different parts are assembled, he inserts threshed produce through inlet in the upper part of the tool.

The machine has handle made from bicycle chain and gears which helps to move the whole system. When the handle rotates, it makes the ventilator and the sorter to move and work making the tool to be able to separate grains from bran/straw. The small particles of bran are left in the lower sieve while the bigger once are kept in the above sieve

At the same time, while the handle rotates in the process, the cleaned grains are moved to the outlet and can be collected using storage can in the outside part of the outlet.

Benefits

- Can be used even in the remote rural areas since it is operated mechanically by human labor and does not require electricity
- Helps farmers to easily sort out their grains without requiring big space for winnowing like that of the traditional one
- Can work without wind and also during the rainy season which is difficult for the traditional winnowing practice to be applied
- Improves quality of grains winnowed and minimize blowing of grains by wind
- Separates huge amount of grains in short period of time and also saves labor
- Can be applied for different crops including Teff, an advantage from other modern technologies
- Reduces transportation time and energy from winnowing field to home since the machine is used in the periphery of the household

Innovation #3 Male: Ox driven seed and fertilizer row planter



Name of innovator: Legesse Mulugeta
Age: 54
District: Hetosa

Description of the innovation

The innovation of Legesse Mulugeta is seed and fertilizer row planter with eight openings (four for wheat seed and four for fertilizer) and that covers four rows at a time reducing the labor required from twelve in traditional practice to one.

Before, three farmers were required to row plant one line using one can. One person plough, the second person spray wheat seed, and the third person spray fertilizer. The idea to develop the innovation comes after he saw his son's innovation which is seed and fertilizer row seeder made from plastic can and that can row plant one row with two labors. He significantly improved his son's innovation.

Unlike the traditional tool, the unique future of this row planter is, it is carried by draft animals instead of human labor. The oxen would pull the implement and

the farmer would regulate the flow of seed and fertilizer using a controller at the end of the handler. The row planter has two storages, one for seed and the other for fertilizer. It can open the soil, put the seeds and fertilizer and cover the seeds with soil. It has also a wheel that will be used when driving the tool to the field and home.

Materials required to make this tool are plumber, straight woods, steel, wire, water plastic and needle.

Benefits

- Decreases labor required
- Reduces cost
- Saves time
- Can spray seed and fertilizer at the same time
- Enables to plough large land size within a short time
- Saves seed and fertilizer wastage



Innovation #1 Youth: Eight-rows planter for different crops mixed with fertilizer and fixed on a plough or a tractor



Name of innovator: Adane Alemu Timkete
Age: 27
District: Hetosa

Description of the innovation

This innovation is a row planter of seed and fertilizer that can plant eight rows at one time and which can be used by fixing it on plough or tractor. It can be used for any type of crops since the openings can be manually made to fit the size of different crops seeds.

The innovator, Adane Alemu Timkete, modified his first innovation of three rows seeder. The tool is made from locally available materials (wood, iron sheet and plastic can) with a manual control to fit the size of different crops.

When the gear at the back side and in the middle of the tool opens, eight

openings underneath the tool open and pass seeds and fertilizer to the parts that make rows on the ground. For this to happen, the ox or tractor should pull the tool to the front. There is also additional part on the backside of the tool that serves two functions; to cover back the hole with soil and level the field.

According to the estimation of the innovator, this tool can cover 1.5 hectares of wheat farm land per day while the traditional practice of raw planting by hand will require 24 people and eight pairs of oxen to finish the same size of land per day.

Benefits

- Increases production since it enables seed and fertilizer to be applied properly
- Saves labor
- Saves time
- Reduces cost of production



Innovation #2 Youth: Supering and using queen excluder on traditional bee hive



Name of innovator: Gobe Nemo

Age: 30

District: Hetosa

Description of the innovation

The innovator, Gobe Nemo, used queen excluder in the traditional bee hive, like the modern bee hive, which resulted in improved quality as well as quantity of honey production. In addition, he made an extension hive on the side of the main hive to increase production of honey and to make harvesting easy.

Although, Gobe Nemo knew the importance of modern bee hives over the traditional one, he could not afford to buy it. He got the idea of supering and using queen excluder from modern hives and adapted it with locally available materials. Gobe claims to harvest 20-30 kilograms of honey from the traditional hive with queen excluder. In the future, he has a plan to manufacture the bee hive in abundance and distribute it to other farmers.

Materials used to develop this innovation are woods, dung, ash and locally made queen excluder from plastic can.

Preparation

- Prepare bee hive from wood unlike the traditional hive which is made from dung
- Cover the outer and inner part of the wood by the mixture of dung and ash
- Make holes in the queen excluder that allows worker bees to pass and the queen bee to retain. But, Gobe Nemo does it with trial and error as he does not have material to make holes that fits the size of the workers.
- Place queen excluder, which is made out of plastic material (used oil can), inside the hive at one third of the length of the hive to have enough space for the worker bees to make honey
- Place the bee hive on a bed like structure at the backyard instead of being hanged on tree for ease of management
- Adjust and fix another hive on the side of the main hive to increase production and ease harvesting

Benefits

- Improves quality of honey
- Increases quantity of honey production with a single colony
- Improves harvesting (honey extraction)
- Controls swarming of bees
- Easy management of hives
- Sustains bee colony even after harvesting, by harvesting one hive after the other
- Reduces production cost from buying modern bee hives

Innovation #3 Youth: A traditional ard plough with three diggers



Name of innovator: Bedo Tariku
Age: 35
District: Hetosa

Description of the innovation

This innovation is a farm tool for ploughing which is different from the traditional wooden plough since it has three diggers. Bedo Tariku's innovation is unique since it uses extra diggers on the traditional plough. It shortens the time required to plough large field from a day to hours. It is especially conducive for black soil to till and level wide space.

Preparation

- Add two sides on the ard plough
- Add two ploughshares, Side-wings (ears) and beam.

Benefits

- Decreases the number of draft animals required from 6 to 2
- Decreases cost of production
- Covers a wide space in short time



Innovation #1 Male: Irrigation developed on gorge river



Name of innovator: Kefiyalew Buzuwork
Age: 40
District: Lode Hetosa

Description of the innovation

Before, Kefiyalew Buzuwork did not have farm land and his family was in poverty. When he got land which is under a gorge with difficult topography from the village administration, he started to plan how he could irrigate and make use of his land. He diverted the river from over 200 meters and led the water through rock by excavating canal in the rock. Some of the rock canal excavation was made on over 5 meters height. This work took him over four years to complete. Now, he is successfully irrigating a field which was very much depleted.

Kefiyalew also constructed terrace to keep the soil that comes through runoff and improved the fertility of the soil. By doing this, he is able to produce without

being dependent on rainfall and able to increase his family income. With this work, he got also social recognition and he is advising others on irrigation. However, the work was tiring and he was in short of money to hire labor. He also did not get support from the community since no one believed that it is possible to irrigate the area. They were even calling him 'mad'

Preparation

- Decide the diversion point; this requires a trial and error testing of different leveling points.
- Cannel construction; this also requires to experiment with different levels until we get good leveling.
- Land preparation for irrigation; the land will be leveled and controlled in order to create seed beds and control irrigation

Benefits

- Increases production
- enables to produce twice or more per year
- permits efficient and sustainable use of water and soil



water bottle. Sowing Teff in rows using this tool uses more time and exhaustive.

In order to solve this problem, Adam Aman thought over it and developed this easy and time saving tool.

Preparation

- cut off three liter oil can below one third distance from the top
- Make five holes under the bottom of the can with size fitted to allow Teff to drop
- Fit comfortable handle on the can to make carrying easy
- Cover the can with wheat sack by making more extension down the seeder for wind protection.

Benefits

- Makes row planting easier
- enables to plant five rows at a time
- Comfortable to carry
- Covered with protective cover to protect the seeds from blowing by wind

Innovation #2 Male: Teff raw seeder



Name of innovator: Adam Aman
 Age: 50
 District: Lode Hetosa

Description of the innovation

Basically, there is no tool to plant Teff in row. But, extension agents make effort to plant Teff in row by inserting inner part of pen (the ink tube) inside mineral



storage of crops for over a year with minimal damage. The innovation is also organic way of pesticide control with little side effect for human.

Preparation

- Grinded pepper
- Mix it with spices such as *Zikakibe, Tikur Azimud*, ginger and garlic
- Again, mix the mixture with cattle dung and water
- Plaster the mixture on the wall of the storage
- Wait until the storage is dried
- Bring the crop to be stored and add it to the storage by mixing with a few peppers which are not grinded
- Cover the storage

Note: The pepper is not roasted as one would do for the edible pepper. This helps to maintain the pungent potential of the pepper.

Benefits

- Reduces cost of chemical
- Enables to obtain chemical free crop
- Good market price
- Extends storage time

Innovation #3 Male: Weevil control in storage using peeper

Name of innovator: Ashenafi Teklab Tessema
Age: 50
District: Lode Hetosa

Description of the innovation

Wheat is mostly produced in the area. But, weevil is a common and serious problem during crop storage. It also contributes to a huge post harvest loss.

Currently, many wheat farmers in the area are using inorganic pesticides. However, these pesticides are claimed by farmers as less effective and dangerous for human health.

The innovator, Ashenafi Teklab Tessema, uses pepper to control weevil in crop storage. This innovation enables

avocado tree drops its leaves and fruits almost by half when it starts bearing after three years.

Chala has experimented with different solutions and he found the *koso* solution as the most effective one. According to him, his innovation enables to decrease falling of fruits and flowers in fruit trees at early stage from 50% to 25%.

Innovation #1 Youth: *Koso* solution to treat avocado tree and to make it not to drop its flowers and fruits



Name of innovator: Chala Wolde Medhin
Age: 33
District: Lode Hetosa

Description of the innovation

Chala Wolde Medhin has a land near to a gorge. He plant different types of fruits including avocado. However, his

Preparation

- Grind the *Koso*
- Mix it with water and store for three days
- Dig hole around the stem of the fruit tree
- Mix the *koso* solution with compost and apply it around the stem by putting it in the hole dug
- Cover with soil and crop residues
- Water the plant without the water being in direct contact with the stem

Benefits

- Increases production and productivity
- Saves chemical expense
- Enables to produce healthy fruits



False banana (*Enset*) is one of the staple foods in Ethiopia, particularly in the south and southwest part of the country. Mostly, women prepare *enset* dough by scraping and chopping the *enset* stem and root. This is a hard job and takes longer time. Even if *enset* is not commonly grown in the area, Eshetu Dida has *enset* at his backyard.

His innovation is *enset* scraper and chopping tool which is useful to scrape and chop *enset* in a fast and in a short period of time. It used to take him two days to prepare the dough from one stem of *enset*. But, now, he can prepare dough from 6-10 *enset* stem in one day.

The tool has three components; one is used for grinding the root part /*amicho*/; the second one is used for fining; and the third one is adjusted on the other part of spade and is used for grinding. The spade part is used to transfer *amicho* from the chopping area to the storage.

Innovation #1 Male: Enset scraper and chopping tool



Name of innovator: Eshetu Dida
Age: 48
District: Digeluna Tijo

Description of the innovation

Benefits

- Scraps and chops *enset* quickly
- Decreases the labor cost
- Increases the quality of *enset* product



Name of innovator: Alemu Eshetu
Age: 46
District: Digeluna Tijo

Description of the innovation

In beekeeping, one of the challenges is to adapt queen of a colony in a new hive. Alemu Eshetu's innovation is a product useful to keep the queen bee in a temporary compartment sealed with wire for the queen bee not to escape until she adapts the beehive

The cage, which will be hanged inside the hive, has a small compartment covered with wire where the queen bee is trapped temporarily. The queen bee cannot pass through the wire. The worker bees will feed the queen bee through the wire. After 15 days, the queen bee will adapt living in the new hive and the wire will be removed and the queen bee will continue mating and laying eggs.

Innovation #2 Male: Temporary cage to adapt/domesticate/ queen bee

Benefits

- Unlike the traditional practice of cutting the wings of the queen bee in order to hinder from escaping, this cage protects the queen from harm that might happen from such practice.
- Protects the queen bee of a new colony from escaping the beehive
- Saves cost to buy the queen cage



Innovation #3 Male: Forecasting and detecting wheat rust occurrence by

sawing avena fatuna around wheat farm



Name of innovator: Deme Daba
Age: 60
District: Digeluna Tijo

Description of the innovation

In the past, there was no rust disease in the area. Now, it is a common problem for wheat farmers.

Deme Daba used to go to his relatives in Shewa. In Shewa, they eat the seed of avena fatuna. In 1994, when Deme went there, he brought with him avena fatuna seeds with him to grow it and use it for livestock feed as it is not customary for people to eat it in his area.

He planted avena fatuna around and inside wheat field. He saw a red color (symptom of rust) on his hand when he touched avena fatuna. He does not know symptom of rust at that time and he asked a development agent (DA) about what is the reason that he saw red color from this plant leaves. The DA told him as it is the symptom of rust. From this, he thought to use avena fatuna to forecast rust occurrence by sawing it inside and around the wheat field. .



First, he will plant avena fatuna. After a month he planted this plant, he will check for presence of rust symptom. Then after, he will check every four days. If he sees the symptom, he will buy a

chemical for his crop and apply the chemical to save his wheat from damage due to rust. Other famers also took up his idea and used the technique to forecast wheat rust occurrence.

Benefits

- Enables to forecast wheat rust occurrence and to take precautions
- Solves household economy shock due to rust occurrence
- Increases production

Innovation #1 Youth: Incubator made from locally available materials

Name of innovator: Andualem Assefa

Age: 21

District: Digeluna Tijo

Description of the innovation

Andualem Assefa wanted to open a poultry farm using low cost innovations of his own. Traditionally, farmers only produce few eggs and chickens at household level. He is well aware of this problem of the poultry sector and he wanted to develop an incubator.

This incubator uses electricity or charcoal to warm the water and give heat for the eggs. The incubator has a pump at the bottom that is operated by

foot in order to pump air and burn the charcoal and warm the water. There is also a thermometer that is kept on the door of the incubator to monitor the temperature. Andualem also has other innovations, such as beehive, butter extractor, and ideas of innovations that are at design phase.

Benefits

- Costs less as compared to modern incubator
- Can produce around 100 chickens within 21 days
- Increases production
- Can be used in remote rural areas where there is no electricity



Innovation #2 Youth: Milk churner



Name of innovator: Abdulkarim Korso
Age: 18
District: Digeluna Tijo

Description of the innovation

The family of Abdulkarim Korso has cows that give milk. Traditionally, milk is churned manually using pottery. He thought to make this milk churner after he saw the challenge of churning using traditional method and time it takes for his mother using pottery.

This milk churner is developed from local materials including plastic can, wood, metal sheet, dynamo and cables.

It has socket. When connected to electricity or battery, it starts turning the plastic can to churn the milk.

The churner use electricity or battery as a power source and have tire to make it easily move from one place to another place.

Benefits

- Saves labor and time
- Less costly and affordable for farmers to buy it as compared to the modern churner



Appendix

Table A: List of all innovations in the three districts and their scores in their respective category

District: Hetosa									
Each innovation is evaluated using the scale: 1 = Very Low 2 = Low 3 = Average 4 = High 5 = Very High									
Criteria		Originality / innovative ness	Economic potential	Ease to practice	Afford ability	Gender responsive ness	Environme ntal friendly	Weighted sum	R a n k
Weight		0.35	0.2	0.15	0.1	0.1	0.1		
S.No	Name of innovation								
Female category									
1.	Jointly owned family saving box	4	4.5	4.5	4.5	3.5	4	4.175	1
2.	Calcium supplement for livestock	3.5	3.5	3.5	3.5	4.5	4	3.65	2
3.	Chicken treatment for Newcastle disease	3.5	3.5	3.5	3	3.5	3.5	3.45	3
4.	Chicken medicine for Newcastel disease	3	3.5	3.5	3	4	3.5	3.325	4
5.	Medicine to protect rust (<i>wag</i>) in tomato and garlic	2.5	3.5	3.5	3	3.5	4.5	3.2	5
Male category									
6.	Biogas residue (biogas-slurry) application as pesticide	3.5	5	4	3.5	3.5	4	3.925	1
7.	Locally made winnowing machine	3.5	5	3	3.5	3.5	3.5	3.725	2
8.	Ox driven seed and fertilizer row planter	3.5	4	3.5	4	4	3.5	3.7	3
9.	Hoeing farm tool operated by human labor	3	3.5	3.5	3	3.5	3	3.225	4
10	Wheat and fertilizer row seeder	2.5	3.5	3.5	4	4	3	3.2	5
11	Farm tool that excavates compost from ground to the cart	3.5	2.5	2.5	2	3	3	2.9	6
12	Mouse trapper to protect crops destruction on the farm land	2.5	2	3	3	3	3	2.625	7
13	Medicine for camel disease in livestock	2	3	3	3	2.5	2.5	2.55	8
14	A medicine to protect or cure camel disease of livestock.	1	3.5	3	3.5	3	3	2.45	9

15	Destroying bush weed (<i>Sekoru Eshoh</i>) using the mixture of human urine or katikala residue	2	2.5	2	2	3	3.5	2.35	10
16	Ox insurance association	1	3	3	3	2.5	3	2.25	11
17	Sama (<i>Dobi</i>) leaf to protect rats	1	2.5	3	3	3	3	2.2	12
18	Medicine for Black Leg disease (<i>Fure</i>) disease	1	3	2	2.5	3	3	2.1	13
19	A medicine for Anthrax disease	1.5	2	2.5	3	2.5	2	2.05	14
20	Harrowing and wheat hoeing farm tool	1	3	2	2	3	2.5	2	15
21	Curing Anthrax (<i>Abasenga</i>) disease using locally available plant materials	1	2	2	2.5	2.5	2	1.75	16
Youth category									
22	Eight-rows planter for different crops mixed with fertilizer and fixed on a plough or a tractor	4	4.5	3	3.5	4.5	4	3.95	1
23	Supering and using queen excluder on traditional bee hive	3.5	4	4.5	4.5	3	3.5	3.8	2
24	A traditional ard plough with three diggers	3.5	3.5	3	3.5	3.5	3.5	3.425	3
25	A medicine that cure Black Leg disease	2	2	2.5	3	3	3	2.375	4
26	A medicine to cure livestock that have choking problem	1	3.5	2.5	2.5	2.5	2.5	2.175	5
27	Improved BBM that enables to make wide level while farming	1	2.5	2	2.5	3	3	2	6
District: Lode Hetosa									
Male category									
28	Irrigation developed on gorge river	4	4.5	2.5	3	3	5	3.775	1
29	Teff row seeder	3.5	4.5	3.5	3.5	4	3.5	3.75	2
30	Weevil control in storage using peeper	3.5	4.5	3.5	3.5	3	4	3.7	3
31	Curing domestic animals wart (<i>kintarot</i>)	1	2.5	3	3	3	3.5	2.25	4
32	Using holot plant root to solve horse tphyzutit lefeleisis (<i>biche</i>) problem	1.5	1.5	2.5	2.5	3	3.5	2.1	5
33	Curing urinating problem in animals	1	2.5	2.5	3	2.5	3	2.075	6

34	Aloe vera (ret) and <i>milas gulgul</i> cures black leg disease	1	2	2.5	2.5	3	3	1.975	7
35	Sowing different crops on the same plot at same season	1	2.5	2.5	3	2	2.5	1.975	8
36	A medicine for curing black leg disease and made from plant materials	1	1.5	2.5	3	3	3	1.925	9
Youth category									
37	Koso solution to treat avocado tree and to make it not to drop its flowers and fruits	3.5	4	3.5	3.5	3	4	3.6	1
District: Digeluna Tijo									
Male category									
38	Enset scraper and chopping tool	5	4.5	2.5	3	5	3.5	4.175	1
39	Temporary cage to adapt/domesticate/queen bee	4	4	3.5	4	4	4	3.925	2
40	Forecasting and detecting wheat rust occurrence by sawing <i>avena fatuna</i> around wheat farm	3.5	4	4	4	4	3.5	3.775	3
41	Hoeing tool for raw planted crops	3.5	4.5	2	3.5	3.5	4.5	3.575	4
42	Medicine of hemorrhoid (<i>kintarot</i>)	3.5	3.5	4	4	2.5	3.5	3.525	5
43	Controlling rats	3	3.5	4	4	4	3.5	3.5	6
44	Harrowing farm tool	3	4	3.5	4	4	3	3.475	7
45	Queen excluder	3	4	2.5	4	4	4	3.425	8
46	Farm tool that turn the soil back after ploughing in rows	2	3.5	3.5	4	4.5	3.5	3.125	9
47	Improving the fertility of soil by constructing bio gas from locally available materials	2	3	3	3.5	4.5	4	2.95	10
Youth category									
48	Incubator made from locally available materials	3.5	3.5	3	3	4.5	4.5	3.575	1
49	Milk churner	3	3.5	3	3.5	4.5	3.5	3.35	2