



**Organization for Social Science Research in Eastern and Southern  
Africa  
Ethio-Latin Coffee Community of Practice Project**



**Proceeding of a webinar on:**

**Women, Coffee, and Climate: Women's Empowerment for Socio-ecological Resilience of Coffee Value-chain against Climate Change in Ethiopia**

**Research Insights and Sustainable Practices in Non Timber Forest Products in the Yayu Coffee Forest Biosphere Reserve**



የኢትዮጵያ  
ባሕር ዳር ስርዓት  
ETHIOPIAN  
COFFEE AND TEA AUTHORITY



**March 2024**

**Addis Ababa, Ethiopia**

## Introduction

The Women, Coffee and Climate project, implemented by the Spanish Cooperation Agency (AECID) Ethiopia in collaboration with partners from Ethiopia, Colombia, and Honduras, is aimed at empowering women in the coffee value chain amidst the challenges of climate change. Supported by the EU DeSIRA program, this project is being jointly executed with esteemed organizations such as the Ethiopian Coffee Tea Authority, Ethiopia Forestry Development, Ethiopian Institute of Agricultural Research/Jimma Agricultural Research Center, Ethiopian Women in Coffee (EWiC), and Organisation for Social Science Research in Eastern and Southern Africa (OSSREA), along with other partners such as TECNICAFE from Colombia and CONACAFE from Honduras.

As part of our efforts, OSSREA has organized a webinar held on 26<sup>th</sup> of March 2024, on the Zoom meeting platform.

This webinar aligns with our project's operational plan, which includes various activities aimed at fostering socio-ecological resilience and women's empowerment within the coffee value chain in the face of climate change.

Some of the expected outcomes from the webinar were:

- Enhanced understanding and appreciation of the biodiversity and cultural significance of the Yayu Coffee Forest Biosphere Reserve among participants.
- Increased knowledge about the socio-economic benefits and challenges associated with the sustainable utilization of NTFPs in the region.
- Strengthened connections among researchers, policymakers, local communities, and other stakeholders interested in the conservation and sustainable development of the Yayu Coffee Forest Biosphere Reserve.

Moreover, we extend our sincere gratitude to all the participants and stakeholders who contributed to the success of this webinar, as their valuable insights and active engagement played a crucial role in achieving its objectives.

## Welcome

The webinar commenced at 4:00 pm with a warm welcome from Dr. Wubalem Tadesse: Senior Research Ethiopian Forest Development (EFD). He expressed his gratitude to the participants from Ethiopia, Colombia, and Honduras to be there at the 11<sup>th</sup> webinar of the Etiolation Coffee Community Practice.

He highlighted that the webinar would be dealing with research insights and sustainable practices in non-timber forest products in the Yayu Coffee Forest Biosphere Reserve, which was in line with the project “Woman Coffee and Climate: Women's empowerment for socioeconomical resilience of coffee value chain against climate change in Ethiopia”.

He also indicated that the primary objectives of the webinar were: -

- To share the latest research findings on Ethnomycology and the significance of wild mushrooms within the Yayu Coffee biosphere Forests Reserve.
- To present a socio-economic assessment of Non-Timber Forest Products (NTFPs) in the Yayu Coffee Forest Biosphere Reserve, highlighting their impact on local communities.
- To increase awareness and understanding of Ethiopian Cardamom as an underutilized Non-Timber Forest Product in the Yayu Coffee Forest Biosphere Reserve.
- To foster a dialogue among stakeholders about the potential for sustainable utilization and conservation of NTFPs in the region.

He further highlighted on the webinar agenda indicating that it would have two sessions and three presentations. He further elaborated that the first presentation would be delivered by Dr. Tatak Dejene from Ethiopian Forestry Development on “Entomology and wild mushrooms in Yayu Coffee Forest Biosphere Reserve, Southwest Ethiopia”; a second presentation would be delivered by Dr. Yonas Yohanis from Ethiopian Forestry Development on “social economic assessment of non-timber forest products in Yayu Coffee Forest Biosphere Reserve”. He further indicated that after a brief discussion session, a third presentation would be made again by Dr. Yonas Yohanis on “Ethiopian cardamom the most underutilized non timber forest product in Yayu Coffee Forest Biosphere Reserve” that would be followed by another discussion session.

Following that, he made brief introductory points about Dr. Tatak Dejene that he was a Senior Researcher at the Ethiopian Forestry Development. He added that he has a PhD in conservation and sustainable utilization of Forest systems specialization in my Mology from University of Valladolid, Spain; and two MSc degrees in Mycology and in General Forestry as well. With that, he graciously handed over the floor to Dr. Tatak Dejene.

After that Dr. Tatak Dejene commenced delivering his presentation by expressing his gratitude for the opportunity highlighting on the following points: -

- Mushrooms are important components of the forest ecosystems because they lay major ecological role in the forest ecosystems.
- For example, they are considered as decomposers because they decompose the organic materials in dead plant materials and animal and avail important elements into the forest soil so that they can play important role in the nutrient cycling of the forest ecosystems and the forest soil.
- They also form symbiotic association with higher plants in which both the planters and the mushrooms can be benefited i.e., they avail nutrients and water for the plants from the soil and they, in turn, use the carbohydrates prepared by the plants for their growth and survival. As a result, they get mutually benefited in the forest ecosystem.
- Apart from the ecological function, mushrooms also have socioeconomical importance because they can be used as a food source and medicine by human beings, especially, by the local people who are dependent on the forest resources for their livelihoods.
- Despite all these ecological and economic benefits, wild mushrooms are the most neglected non-timber forest products in Ethiopia. They are not even included in the biodiversity database of the country. As a result, their representation in literatures is also minimal.
- However, understanding of these resources with respect to the forest systems, their utilization, or benefits for the local people can be important because the rural communities have wealth of traditional knowledge related to valuable mushrooms, including edible, medicinal use, and ecology.
- Enhancing our understanding of the indigenous knowledge related to wild mushrooms would help not only to comprehend the dynamic relationship between humans and their environment, but also to easily identify, categorize, and utilize these resources effectively.

- Moreover, this understanding of the indigenous knowledge will also help to harmonize human activities with nature so that it promotes sustainable resource management and utilization as well as enhance the preservation of these resources for the future generation.
- The general objective of the study was - to evaluate the ethnomycological knowledge of the local community and to record the fungal diversity within the natural habitats of Yayu Coffee forest
- The specific objectives of the study were: -
  - to identify valuable while the mushroom species in Yayu coffee forests
  - to document the use value of wild mushrooms among the local communities in the study area
  - to evaluate the status of wild mushrooms and to identify their main threats in the study area.
- The study was conducted in the Yayu Coffee Forest Biosphere area and covered 6 woredas, namely the Algeesach. Bilonopha. Chora, Dorani, Hurumu, and Yayu.
- Data collection was conducted in two ways: -
  - The first one was Ethnomycological survey
    - It addressed 1189 houses in household interview
    - About 80% of the individuals involved in the survey were women.
    - Key informant interview with 20 elders
    - Focus group discussion of three groups of 8 to 10 individuals in each study site
  - The second one was wild mushroom survey from the forest and the study area that was conducted during the rainy season for a period of one year through establishing sampling plots of 50 meter by 2 meters of sporocarp sampling.
- The main findings of study from the mycological survey were: -
  - A total of 51 wild mushrooms were collected, among which 21 species were categorized as edible
  - The following most important wild mushroom species were identified i.e.,
    - *Macrolepiota* species as edible and most preferred one by the local community,

- Scleroderma species – with important mutual relationship between the plants and the fungus,
  - Tylopilus species which is characterized as a high biomass producer as well as edible species.
  - Different Saprophytic type of species such as Agaricus species which are edible and can be cultivated artificially using locally available materials
  - Different types of poisonous species like the Lepiota species.
- The main findings of study from the Ethnomycological survey were: -
  - Regarding the knowledge of the local community about wild mushroom
    - there were significant differences in the aggregate knowledge of mushrooms by the respondents
    - the majority could able to identify and label at least a minimum of five species
    - about 24% don't differentiate mushrooms.
    - and most importantly gender appeared to have a significant on mushroom knowledge that about 61% of women have the ability to identify and label mushroom as compared to the men
    - the local communities have an established a comprehensive taxonomy for specific species. For about 7 or 8 species, they have their own local taxonomy.
    - For example,
      - “Coommee” - Termitomyces sp.
      - “Uddaan Jaarsaa” – Calvatia sp.
      - “Dhuufuu Jaarsaa” – Lycoperdon sp.
      - “Tilaa Jaarsaa” – Macrolepiota sp.
      - “Dalachoo” – Agaricus sp.
      - “Kereroo” – Laetiporu sp.
      - “Hukkoo” – Psilosybe sp.
- The main findings regarding mushroom collection, habitats, and seasonal availability were:-
  - mushroom collection is not a common practice by the local community

- about 52% have information on the medicinal and food value, but they don't use it right now
- very few participated in the collection for food and medicine and purposes.
- Even though, knowledge about the habitats of wild mushrooms differ from district to district, it was found that the local communities have located the following 5 different ecological habitats as the main growing areas for wild mushroom and that they are found abundantly - natural forest, home garden, agricultural land plantation forest, and grazing land.
- Regarding the seasonal availability of wild mushroom, they would be available abundantly during the major rainy season that ranges from June to September. Likewise, the peak season that wild mushrooms would be found abundantly is in July during which the rain fall is the highest.
- Exceptional to that, the porous species has a characteristic of reverse phenology in which it is only available during dry seasons growing on live tree.
- Regarding the status and potential threats to wild mushrooms in the area, majority of the local community i.e. participants from five of the six study areas, except for the Donari district, perceived it was decreasing.
- Among the different reasons for the degradation of wild mushrooms in area, deforestation took the priority as the practice has been increasing from time to time in the surroundings for the purpose of agriculture, settlement, fire, and over grazing.
- Implication and the conclusion: -
  - Education and awareness creation program - to promote responsible mushroom consumption and address the misconception and the negative perception related to wild mushrooms.
  - Sustainable collection - training program should be developed to enhance the value of wild mushroom through sustainable collection methods, especially, in areas like natural forest grazing lands and home gardens.
  - Conservation efforts - sustainable forest management is crucial for preserving wild mushrooms and the associated ethnomycological knowledge. Therefore, efforts to counteract deforestation and other threats are essential.

- Biodiversity conservation – promoting biodiversity conservation through product diversification can help protect both known and unknown wild mushroom species.
- Cultivation - majority of the mushroom species found are Saprophytic. Therefore, providing cultivation trainings for the local communities so that they can produce mushroom artificially would be helpful in income generation as well as conservation.

Following that, the moderator Dr. Wubalem expressed his appreciation to De. Tatek for the nice presentation. With that he made brief introductory points about the second presenter, Dr. Yonas Yohanis, indicating that he was Senior Researcher at Ethiopian Forestry Development Forest Products Innovation Research and Training Center and he has a PhD degree in Forest Ecology.

Thereupon, he graciously handed over the floor to Dr. Yonas to deliver presentation on the socioeconomic assessment of non-timber forest products in Yayu coffee forest biosphere reserve.

Therewith, Dr. Yonas commenced his presentation highlighting on the following points: -

- The title of the study was “Socio-economic assessment of major forest non-timber products in the Yayu coffee forest biosphere.
- Ethiopia has widely differing agor-ecological zones commonly classified into Highlands, which are areas above 1500 meters above sea level, and Lowlands which are below 1500 meters above sea level.
- These diverse physiographic features have contributed to various ecosystem formation which fit our country among the top 25 richest countries in the world.
- For example, about 6500 to 7000 plant species are estimated to exist in Ethiopia, of which the 12% of them are endemic.
- Among the different forest ecosystem found in the country, the southwestern part contains about 56% of the forest cover.
- Among the five biosphere reserves of the country recognized by UNESCO, four are found in the Southeastern part of the country.
- Among the four biosphere reserves, the Yayu coffee forest biosphere reserve which was established in 2010 is by far the largest in terms of area coverage.
- The Yayu coffee forest biosphere reserve includes the Eastern Afromontane Biodiversity Hotspot, important bird, and the last remaining Afromontane cloud and rain forests fragments that contains the wild coffee Arabic gene pool.
- Ethiopia is the only country that contain wild coffee gene pool.
- The biosphere has a total area coverage of 167,021 hectare; an altitude that ranges between 1140 up to 2562 meter above sea level; annual temperature varying between 12.7 - 26.1°C; and the mean hour precipitation of around 2100mm (from 1400 – 3000mm).
- The biosphere gets rainfall throughout the year except at the end of January and in November.
- The biosphere is classified into three management zones: -



- The core area - where no one is allowed to do anything in the area except for monitoring and research purpose.
- The buffer zone – connects the transition and the core areas. The local community are allowed to cultivate coffees and extract different kinds of non-timber forest products in this area.
- Transition area – which constitutes the largest part (about 70%) of the biosphere. This is the area where other land use activities such as settlements, cultural practices, grazing lands, wetland, and other activities are allowed and carried out.
- The total population size of the area is estimated at about 154,300; and agriculture is the main socio-economic activity practiced by the community.
- The community is strongly connected with the biosphere; and to economically sustain themselves, they obtain diverse products and services from the biosphere. Yet, how these households interact with the biosphere reserve are insufficiently understood.
- The non-timber forest products harvested from the biosphere have been traded both locally and internationally for centuries. If properly utilized, they can be used for a wide range of industrial application, hence, can provide alternative and sustainable livelihoods.
- Methods of data collection – primary and secondary data were collected to synthesize the findings.
- Primary data was collected in the form of socio-economic survey using key informant interview, focus group discussion, and household survey.
- Data was collected between May and June 2023.
- Three kebeles, which are the lowest administrative units in Ethiopia, from each of the 6 districts, i.e. a total of 18 kebeles, were included in the socio-economic survey.
- Secondary data was collected from grey documents from government offices and non-governmental organizations, published reports by different scholars, scientists and different institutions, and different kinds of developmental interventions carried out by non-governmental organizations working in the biosphere area.

With regard to the primary findings, the socially established gender role with regards to collection of the different non-timber forest products found in the biosphere.

it is almost our male dominated activities with regard to non-timber forest products collection except for the firewood collection which is mainly done by women.

This is because of their primary concern is collecting their of their families,

whereas in the case of wild fruits is mainly collected by the youngsters.

- Annual income from different non-timber forest products for the local community was largest from coffee, followed by spices, honey, and firewood.
- Regarding the proportion of women households that earn cash-income from non-timber forest products, except for one of the six study districts, women in all the five districts reported that they have generated some amount of money by collecting and selling non-timber forest products.
- Regarding the perception of both men and women participants about value addition on non-timber forest products, majority of the respondents, except for Dolly district communities, did not have the required knowledge.

- Regarding the perception of the respondents on factors that contribute to the decline of non-timber forest products in the biosphere, even though, the identified factors vary from district to district that it was deforestation in Hurumu and Algesacha districts, poor management in Bilonopa district, over harvesting in Yayu and Hurumu districts, and agricultural expansion in Yayu and Dorani districts.
  - Therefore, whenever one wants to make an intervention, it has to be relevant as per the context of the area.
  - A brief overview about the different kinds of major non-timber forest products
1. Coffee
    - The biosphere is considered the genetic origin of Arabica coffee, and the communities depend greatly on coffee cultivation.
    - Some government reports indicated that more than 70% of the population depend financially on these commodities, either directly or indirectly in the production, processing, marketing, etc.
    - It is usually cultivated in the form of either wild coffee, or garden coffee, or semi forest system.
    - In the area, annual production sometimes exceeds 30,000 tons.
    - With regard to collection of coffee, both male and female equally participate. However, sorting and drying of coffee are mainly women's responsibility.
    - With regard to marketing, in the past, it was largely dominated by women because the market was locally limited; but currently, both men and women are involved.
  - Challenges related to utilizing the commodities
    - Deforestation - particularly conversion of forest to farmland is one of the major serious challenges on coffee production.
      - It is mainly due to increased population size and demand for different needs
      - A JIS based report indicated that over the past 30 years 60% of the forest was lost, which in turn led to loss of wild population and local land races.
    - Lack of improved production – the community uses an obsolete and extremely traditional technology, hence, is not getting adequate benefits.
    - Coffee diseases and climate change.
    - Market - especially in times of surplus production.
2. Spices
    - the family Zingiberaceae are commercially important in the Yayu Coffee forest
    - the three genes - Aframomum, Zingiber, and Curcuma are very much well known in the area.
    - Usually, the fruits and underground stem are commercial products.
    - As compared to other non-timber forest products, spice as the second important source of income for the communities in the area.
    - Regarding the place where these plants are cultivated, Cardamom are mainly harvested from the wild, whereas Turmeric and Ginger are harvested mainly from the garden and semi-forested ecosystem.
    - Regarding the role of gender, women are a key players in Turmeric and Ginger production.
    - Challenges
      - deforestation,

- land tradition degradation,
  - competitors, particularly wild animals like monkeys compete for Cardamom.
  - Proximity - particularly for women
  - Securing primary resources - is a challenge particularly for women as they have extra responsibility in taking care of their houses, fetching water, preparing food, collecting firewood, etc.
  - marketing - in times of high production.
  - the production and processing technologies are outdated or obsolete
  - Climate change – resulting irregularities in rainfall pattern has impact on the fruiting and flowering phenology of the plants.
3. Honey
- Because of the diverse physiographic feature that the biosphere has, it sustained diverse and unique flowering plants, that, in turn, enable for large number of big colonies to sustain in the area.
  - honey production, is a long-established practice in the area
  - usually honey is produced either in the home garden or semi-forest system; and it is a main source of food and at the same time, source of income by selling in the local market as well as in big cities.
  - Overwhelmingly, majority of the community in the area use traditional beehives, thus, the productivity is very low compared to that of a modern beehive, i.e. 5-6 kg vs 20 kg per year.
  - With regard to the gender role, men are the main actors because they need to climb on trees to install the beehives.
  - Major challenges
    - Distraction of resource base.
    - Lack of modern beekeeping method – not even transitional type of beehive, which is in between the traditional and the modern beehive, which was introduced in to the country in 1978, has the benefits of being managed by women, easily constructed using the local materials, as well as easy to remove the compass so to inspect whether the colonies are established or not and whether the honey is already to get harvested or not.
    - Lack of beekeeping knowledge.
    - Shortage of trained human power
    - Pests and predators
    - Inadequate research works in beekeeping technology
4. Mushrooms
- The biosphere, because of the existence of diverse plant species in the area and, thus, rich soil in organic matter together with a climate with mild temperature and relative humidity, is suitable for the proliferation of different kinds of mushrooms.
  - Therefore, the area has diverse types of mushrooms which can be cultivated either in a home garden, wild, or semi-forest system. If properly really used, it can serve as a source of nutrition and income.
  - Coffee Ganaderma, which is one of the most treasured and the best type of mushrooms used by Chinese, is found in the biosphere together with other diverse group of plants which are not yet explored thoroughly. For example, in 2004, a Brazilian scientist has found a natural decaffeinated Arabica coffee species.

- Ganoderma coffee is useful in treating various ailments such as lowering the cholesterol level for diabetes patients and for lower urinary tract diseases. It is also considered safe by the United States drug and Food Administration.
- However, the utilization of these neglected resources for income generation for the local communities, and even foreign currencies for the country has not yet happened.
- Major challenges
  - deforestation and forest degradation.
  - low level of research - less emphasis given to this sectors
  - competitors - particularly wild animals
  - Lack of training in mushroom cultivation.
  - lack of promotion
  - lack of market facilities,
  - climate change - irregularities in the rainfall pattern affecting the fruiting of the different mushrooms
- 5. Medicinal and wild plants
  - The area has diverse and unique flowering planters found in the home garden, in the wild, or as semi-forest system.
  - A recent study showed the existence of more than 70 medicinal plants in the area
  - In terms of their contribution, herbs are by far the largest utilized, followed by trees, shrubs, and climbers.
  - They are mainly used for the treatment of both human and animal ailments.
  - A recent study showed the existence of more than 90 wild and semi-domesticated edible plants in one district in the area
  - With regard to the most abundant genera, Moraceae and Rutaceae are by far the most abundant followed by Poaceae, Fabaaceae, and Solanaceae
  - Collecting of wild edible plants are mainly carried out during other activities and in search of traditional medicines
  - Major challenges
    - Deforestation and forest degradation
    - over grazing and culture expansion,
    - lack of sufficient scientific knowledge, particularly, on their nutritional and antinutritional properties
    - Competitors, particularly wild animals
    - lack of post harvesting, processing, preparation, and storage facilities
    - no formal market
  - Conclusion and recommendation
    - The biosphere has rich resources for diverse non-timber forest products.
    - These values are expected to increase because of the shift to greater market demand for non-timber forest products not only in domestically but also internationally.
    - However, degradation, overuse, and the associated ecological impacts and the lack of management and market integration are some of the challenges that need focus.
    - Therefore, integrating the non-timber forest products into forest research and developing effective cultivation, harvesting, and processing methods is very fundamental for their sustainable use as well as the health of the biosphere.

- Research and development is needed to ensure that the long term sustainability of these resources and their cultural values, and to realize their economic potentials.
- A combination of effort based on efficient communication, collaboration, networking, knowledge management, and information sharing among all stakeholders are very critical in order to get benefit from the treasure in the biosphere.

Following that the moderator Dr. Wubalem, expressed his appreciation to Dr. Yonas for the excellent presentation. With that, announced that it was time for discussion session. Along that, he read two questions forwarded from the participants to Dr. Tatek on the presence of any plan to establish a permanent plot to collect wild edible mushroom yield in the study area; and whether the local community use the mushrooms as a food.

After that, Dr. Tatek responded to the first question clarifying that the existing knowledge about the biodiversity aspects of wild mushroom was minimal in the country, their representation in the literature was negligible, as well as they are not even included in the biodiversity database of the country.

He further elaborated that the study was conducted as a survey in the forests by establishing not-permanent plots to fill that knowledge gap so that it would be possible to say something about the diversity of wild mushrooms in the forest.

He also indicated that there was a plan to establish permanent plot to conduct a survey for consecutive two to three years to develop adequate knowledge about the biodiversity of wild mushrooms in the forest.

Likewise, he addressed the second question highlighting that very few members of the local community use wild mushrooms for household consumptions.

After that, the moderator read two more additional questions forwarded to Dr. Tatek from participants on why the names given for mushroom could not be considered as a threat as they were discouraging its conservation and management; and on the application of indigenous knowledge system to maximize mushroom conservation in the future.

Following that, Dr. Tatek entertained the first question affirming that the names given associated with some of the species were discouraging words. He further elaborated by demonstrating an example that the name given for the *Calvatia* species by the local communities as “Buufaan Jaarsaa” definitely has a negative association with the speech, which by itself would be discouraging the utilization by the local community.

He added that the team had planned to implement an initiative targeted at correcting such kinds of discouraging attitudes through awareness creation activities and trainings for the community about the importance and benefits of utilizing mushroom.

After that, another participant (Dr. Abera Tesfaye) posed a question on if there was a comparative result of mushrooms along PFMCs and biosphere reserves because it would be very important to upraise the management issue for mushroom production as there were lots of PFMCs in the southwestern forest, where the biosphere there is found.

Accordingly, Dr. Tatek responded to the question indicating that one of the possible ways for effective conservation and development of the forest by the local community would be through enhancing the benefits that the local community can reap from the forest resources.

He added that, with that regard, mushrooms could play important role by providing alternative and additional income for the local community to support their livelihood from the collection of wild mushrooms during rainy seasons or by cultivating them artificially in the PSM or in the biosphere area.

Following that the moderator once again read another question forwarded from one of the participants on how to collaborate those findings with the other four biosphere reserves as they are interlinked with each other.

In response to that Dr. Yonas affirmed that the four biospheres were interlinked in various ways and that requires a combination of efforts based on efficient communication, not only among the four biospheres which are administered by four different regions but also within the same biosphere.

He further demonstrated an example that in Yayu biosphere alone, various organizations such as the Nabu, Ethiopian Forest and Wild Coffee Forum, and the government have been implementing different kinds of development interventions on the same land to achieve common purposes, but without communication and collaboration among each other.

He indicated on the importance establishing relevant platforms that would serve a purpose of networking, knowledge management, information sharing among the different actors. He added that the government, especially, the sections that are responsible to manage the biosphere should take the lead in establishing the coordination platforms.

He also suggested that once the coordination and collaboration system was realized within regional structures, it would be feasible to establish a collaboration structure among the four biospheres, perhaps, under the lead of a federal responsible body.

Following that, the moderator, Dr. Wubalem, strengthened Dr. Yonas's reflection on the importance of collaboration among stakeholders indicating that the project, around the final stage of its implementation, would organize a national level workshop in which all major stakeholders would be invited and get aware on all the major outputs and findings of the project.

With that he invited Dr. Yonas to deliver the next and the last presentation on Ethiopian Cardamom: the most Underutilized Non-Timber Forest Product in Yayu Coffee Forest Biosphere Reserve.

After that Dr. Yonas once again expressed his gratitude for the opportunity and commenced to delivering his presentation addressing the following points: -

- Cultivating high value non-timber forest products is widespread strategy, which is used as source of income by a majority of the rural communities
- Yayu forest biosphere reserve is rich in various types of non-timber forest products among which are spices
- Spices are aromatic plants that are used mainly for imparting flavor, aroma, and pungency.
- Among the diverse spice plants grown in the biosphere, Cardamom, or “Korerima” in Amharic, is high value non-timber forest product.
- It is used as a flavoring agent and as a drug in traditional medicine practices in Ethiopia as well as in different parts of the world. The most significant component of cardamom, as a spice, is its volatile oil.
- The term cardamom refers to three genera –
  - Amomum, which is mainly found in Asia and Australia. It is sometimes called the big cardamom or the black cardamom.
  - Elettaria, is one of the most widely expensive and sold spices in the international market. It is mainly grown in Sri Lanka, Asia, Malaysia, Indonesia, and India.
  - Aframomum - is sometimes called false cardamom and mainly grows as the name indicates in Africa and Madagascar.
- In 2010, globally, the import of cardamom was above 25,000 metric tons which incurred more than 300 million USD.
- In 2021, internationally, the leading exporting countries were Guatemala, followed by India and the United Arab Emirates.
- Even though, the United Arab Emirates do not have an ecosystem to grow cardamom, it imported the raw cardamom from Guatemala and India and, then, process and export it.
- Among African countries, Tanzania is a leading exporter country. Whereas Ethiopia is the 27th globally and second exporter from Africa.
- Saudi Arabia, by far is the largest consumer country of cardamom where it is widely used to prepare a special kind of coffee known as Arabic Qahawa or Arabic coffee, which is a mixture of cardamom seed powder with that of coffee at a varying ratio between 30 to 70 to 50:50. The Arabic Qahawa is also common among the other Gulf nations such as the United Arab Emirates and Qatar.
- And Guatemala is the leading cardamom supplier country to Saudi Arabia.
- Overall, in 2001, Guatemala has generated more than 411 million USD from cardamom export.
- Similarly, Tanzania, in 2022, incurred about 1.7 million by exporting a whole cardamom without any value addition.
- Cardamom is referred to as 3G (Guatemala’s Green Gold).

- Cardamom (Korerima) is mainly grown in parts of its wild range in the rainforests, mainly in the Southwest part of the country. But, it is also grows outside this range in Tanna, Bale, Harar, and the southern parts of the country.
- The seeds of Aframomum grown in Ethiopia have less pungent and milder and sweeter flavor. However, the country neither properly promoted this typical interesting feature of the cardamom nor utilized the geographical advantage it has to the middle east.
- Ethiopian cardamom collection and cultivation are important for local economies. For example, in Yayu coffee forest biosphere area, 1kg of cardamom is sold at around 240 Ethiopian birr. In addition, the economic returns (yields per ha) were much higher than food cereals.
- Unfortunately, a review of indigenous production practices showed a decreasing trend; and Korerima is the most underutilized treasure of non-timber forest product.
- Korerima (*Aframomum corrorima*)
  - Brief description
    - It belongs to the ginger family Zingiberaceae and it is native to Ethiopia as well as Tanzania.
    - It is a herbaceous plant i.e., it belongs to a grass family, but it is perennial that it can live for more than one year.
    - It can reach 1-2 2 meters in height and has elongated and pointed leaves like bamboo leaf.
    - Its flowers are very much attractive for bees and, therefore, cross pollination is mainly mediated by the activity of bees who act as pollinators.
    - The natural seed dispersal is done by animals such as monkeys.
    - Its fruits are indehiscent, i.e., it does not open to release its seeds, fleshy, and shiny-green when immature turning into bright red.
    - It grows in warm moist environment and likes some shade.
  - Uses
    - It is one of the basic food items in the Ethiopian diet and hence extensively used in the Ethiopian cuisine.
    - The most significant component of cardamom is the volatile, which is camphory, sweet, and aromatic spicy.
    - The seeds are mainly used to flavor all kinds of sauces by Ethiopian woman,
    - It is also used in Ethiopia to flavor coffee, tea, and a special kind of bread; as well as it is one of the recipe for Nitir Kibe (Spiced butter), Kitfo (a traditional Ethiopian food of raw minced meat and hot cherry pepper), and Shirowot (puree of Chick pink flour).
    - It is also used as a medicine to treat both human and animal ailments. It is used as a herbal medicine in which its seeds are used as a tonic, carminative, and laxative agents.
    - Furthermore, it can also serve as an important source for biological soil conservation.
  - Fruits maturity and collection



- In the wild state, they start bearing two years after emergence, but when it is domesticated, the fruits maturity may take three to five years because environmental shocks as it is grown outside its natural environment.
- The capsules mature and ready for harvesting at 10 to 15 days interval over an extended period of 6 to 8 months.
- In the wild states, its fruits could be collected throughout the year.
- In Yayu coffee forest biosphere harvesting mainly occur between October and February, because the period is one of the peak seasons of coffee collection and, as a result, people also collect Korerima parallely in the forest when they come across with it.
- Korerima harvesters, who purposely go to the forest to collect it, usually woke up to 3 hours to access the wild fruits.
- It is ideal to harvest Cardomom when they are physiologically mature.
- Pre and post harvest handling
  - They have to be homogeneous in color for the specific stage, free from insects or physical damage, otherwise, the quality will be deteriorated. Especially if it is infected by insects. It might affect the healthy ones.
  - Fruits that are fully matured have a dark green colored rind and black colored seeds.
  - The pods are picked when they are ripe.
  - Harvesting at an over-ripe stage leads to loss of the green coloring in the rind. Coloring is one of the best quality indicators at the international market, and cardamom having dark green skin is desired.
  - There is absence of quality-based pricing in the local market. Korerima harvesters, who are the casual workers, usually collect fruits irrespective of their physiological stage and simply supply whatever they found in the forest. But local traders and domestic harvesters supply dry or semi-dry ones.
  - Sun drying of the fruits on raised beds are the scientifically recommended methods.
  - However drying methods practiced in Yayu biosphere involves spreading the fruits on mats, clothes, plastic sheets, and sacks which are left in the sun.
  - Due to this, they are vulnerable to soil, dust, and moisture that affect the quality of the fruits.
  - Frequent turning of the capsule is required for uniform drying.
  - Cloudy weather and frequent rain in Yayu coffee forest biosphere is one of the challenges for the community during drying.
  - Once it is dry, the cured capsule can be stored in double-lined polythene bags even for more than a year.
- Challenges of Cardamom production
  - Production system and collection of Korarima are in the wild forest as it is not really widely domesticated.
  - As a result, collectors are expected to compete with wild animals and among themselves.
  - Collectors have to walk a long distance to get access to the fruits.

- Collectors, especially casual workers, pickup fruits regardless of the maturity stage.
- One of the major changes in the production stage is disease, pest damage, and climate change, particularly irregularities in the rainfall pattern have its own impact in flowering and fruiting.
- At processing stage, drying technique is one of the major challenge.
- At the post harvesting stage, the processing practices are extremely traditional that quality is compromised.
- Lack of proper post-harvest handling practices is also another critical challenge.
- Problem of marketing system in use.
- Little investment by the public sector unlike coffee.
- Women participation in cardamom production
  - Women participation is mainly limited to curing and segregating, and they are also involved in management practices
  - The most critical challenges for women participation in cardamom production is household responsibility, inaccessibility, physical safety concerns, access to formal or distance markets.
- Way forward
  - This treasure is not properly exploited and developed.
  - The lack of support does not provide an enabling environment for the sustainable use of cardamom production in Yayu coffee forest biosphere reserve.
  - Despite all these challenges, local communities and rural households, including women, have some benefits by collecting Korarima from Yayu coffee forest biosphere reserve.
  - Domestication and commercialization could offer realistic solutions to benefit the communities, particularly women.
  - If supported, women are willing to engage in domestication, but no corresponding programs have been initiated either by the government or other organizations.
  - It is important to work on agricultural awareness, technical skills, and adoption of women friendly agricultural production system.
  - Work on value chains.
  - Public and private sector organization should facilitate effective intervention program to provide technical and financial support.

After that, the moderator expressed his gratitude to the presenter, Dr. Yonas, for the inspiring presentation about Korarima.

With that, indicating that it was time to close the webinar, he made a closing (conclusion) remark with a warm gratitude to the participants for their presence and active participation, to the presenters for the nice presentations, and to OSSREA for facilitating and hosting the webinar.

The webinar adjourned at 5:32 pm, marking the conclusion of the session.