



**IFA Ethiopia Preliminary Findings
Dissemination and Policy Dialogue Workshop Report
September 14, 2014
Addis Ababa, Ethiopia**

The InnoFoodAfrica preliminary findings dissemination workshop was organized by OSSREA (Organisation for Social Science Research in Eastern and Southern Africa) in collaboration with AAU (Addis Ababa University), ARARI (Amhara Agricultural Research Institute) and GutsAgro PLC. It was held on Sept 14, 2022 in Addis Ababa, Ethiopia at Hilton Hotel in the presence of various stakeholders from government, CSOs, international organisations, Academia and media. The workshop was an opportunity to disseminate the preliminary research findings of the project in Ethiopia from the five thematic work packages of the project namely, WP1: Analysis of local value chains through consumer, market and business model studies; WP2: Improved Nutrition; WP3: Improved farming practices; WP4: Food processing and product innovation's WP5: Bio-based packaging. The event was formally opened by the project coordinator, Dr. Raija Lantto, from VTT Technical Research Center of Finland. She attended the session online and gave her opening remarks and also a brief introduction of the project to participants. Dr. Truphena Mukuna, the Executive Director of OSSREA, Dr Kaleab Baye from AAU, Dr. Waga Mazengia from ARARI and Mr. Engidu Legesse from GutsAgro PLC gave their welcoming remarks. The workshop was facilitated by Mr. Alemu Tesfaye, communication and Dissemination manager of InnoFoodAfrica project.

Dr Raija Lantto, PI of the InnoFoodAfrica project, started her presentation by highlighting the overall goal of the project, which is exploring the development and business potential of traditional African climate-smart crops for nutritionally balanced foods for African and European markets and for biomaterials for packaging applications. She stated that the consortium has 18 partners, 13 of them from Africa and 5 of them from EU. She then outlined the strategic objectives of the project: SO1 business and market opportunities for new foods and bio-materials by engaging VC actors and investigating new business models; SO2 adapts and implements country-specific dietary guidelines based on foods developed and diets for malnourished small children and overweight urban adults; SO3 diversifies and rationalizes crop agriculture for better production of African food; SO4 develops food ingredients and products which tackle malnutrition from two angles: nutrient deficiencies and obesity, taken into account both children (<1000 days) and adult consumer segments; SO5 reduces waste by improving post-harvesting and storage practices and by creating value from side streams via bio-based materials to replace plastic; SO6 supports establishment of a pan-African food R&D&I community via cooperation and creation of an open Innovation Platform to share innovations, maximize communication and

facilitate knowledge transfer. She then explained some of the achievements so far such as: Open on-line training sessions on consumer/sensory studies on innofoodafrica.eu helping to build capacity in African (and beyond) research institutes to support future developments of the food system and local food industries; Value chain and market survey in Ethiopia, Kenya, South Africa and Uganda leading to new market opportunities for the product prototypes developed; Food consumption survey helping to improve dietary habits fighting back malnutrition and obesity by locally sourced crops and food products; Smallholder farmers participating in FPRs on agricultural and post-harvest practices helping in developing materials and expertise for future replication of best practices and empowering smallholder farmers; 30 ingredient, 14 food prototypes, 28 ingredient and food technologies developed leading to new business opportunities (local, export) and increased availability of healthy foods; Side streams survey and database for manufacturing packaging biomaterials helping to create open access tool and updated information on potential biomass sources for African bio packaging industry; Map of stakeholders for network creation for Innovation Platform and Visibility of InnoFoodAfrica on diverse forums through efficient communication. The full text of the presentation is available [HERE](#).

After the presentation of Dr. Raija Lantto, the five work package presentations of the project were presented focusing on specifically the preliminary findings of the research conducted so far. Accordingly, the presentations were delivered as follows:

Presentation of WP1

Mr. Yazie Chanie from ARARI presented the findings of the research study of WP1 conducted in Ethiopia. The presentation covered the value chain analysis and market survey study of major crops focusing on Ethiopia. The study was conducted in four African countries with the same research tool (survey instrument). But the presentation looked into the main crops under study in Ethiopia, namely: Maize, Teff, Faba Bean and Orange-Fleshed Sweet Potatoes. The study areas covered were Banja and Jabitehina districts in the Amhara region of Ethiopia. The objective of the study specifically for Ethiopia is to develop resource-efficient, safe and sustainable food production VCs for Ethiopia by empowering small-holder farmers, processors, producers and consumers via co-creation process with Ethiopia and European experts, and catalyzing new local and international business and market opportunities in the cereal-pulse-root crop-fruit food and packaging VCs by engaging VC actors and investigating new business models. Data was collected from Farmers/producers, Wholesalers, Small-Scale Mills, and Policy Makers

The data collection methodology used was Semi structured interviews with the various stakeholders (farmers, assemblers, wholesalers, millers, processors, traders, extension workers and policy makers). The data collection covered topics such as: input supply, production, post-harvest handling, transportation, trade, information exchange and challenges involved in the value chains of maize, teff, faba bean and orange-fleshed sweet potatoes in Ethiopia. The study used value chain analysis techniques such as rapid market appraisal, value chain mapping and estimating cost and margins.

The presentation concludes by discussing the gaps, barriers, opportunities and recommendations. The major gaps in the maize value chain in Ethiopia are found to be:

- Climate change
- Erratic rainfall
- Farmers do not use recommended production packages
- High cost of land rent
- Increasing cost of fertilizer and improved seed
- Increasing cost of post-harvest technologies like PICS Bag
- Lack of knowledge by farmers
- Poor crop varieties

- Inadequate land plowing at the required frequency
- Insufficient market linkages
- Reduced use of short maturing maize varieties
- Less access to transportation
- Low crop productivity
- Inadequate supply of improved seeds and fertilizer
- No use of farm machinery like maize Sheller
- Non-use of compost natural fertilizer
- Poor crop rotation practice
- Use of low input by farmers

The major barriers are found to be:

- Lack of proper plot/farm selection by farmers for maize
- Lack of frequent land plow (low land plowing frequency)
- High input price
- Abolished use of compost fertilizer
- Complete removal of crop residue during/after harvest
- Price variability over time
- Reduced use of short maturing maize varieties during drought season
- Non-use of use of maize Sheller machine
- Low price of maize during peak harvest season
- Lack of timely input delivery
- Increasing cost of farm inputs (improved seeds and fertilizer)
- High labor and land rent costs
- Exorbitant cost of PICS Bag
- Lack of skill of farmers on maize production
- Decreasing maize productivity
- Climate and seasonal weather changes
- Shortage of farm land
- Insufficient market linkages

The opportunities in the Maize value chain in Ethiopia are:

- Availability of Development Agents (DAs) (agricultural experts) in the locality
- Existence of good price for maize produce
- Availability of labor
- Establishment of “Burrie Agro-industry” which is near to our area
- Maize is more productive (high yielder) than other crops in the locality
- Maize is short maturing than other crops
- Maize produce is useful for agro-industry raw material
- Multiple use of maize (for food and beverages and animal feed).

Accordingly, the researchers recommend the following points to promote and enhance the potential for strengthening the existing maize value chains for inclusive participation by all actors in Ethiopia:

- Application of low/non-chemical on maize production
- Cost of industrial goods and agricultural (farmers’) produces should be balanced
- Create market linkage
- Decrease cost of fertile and improved seeds
- Farmers should accept agricultural experts’ advice for their farming

- Farmers should use recommended maize production package
- Increase frequency of land plowing
- Provision of improved crop technologies/varieties
- Supply of improved maize varieties
- Supply PICS Bag at reasonable price
- Use of proper crop rotation

The researchers also recommend the following points to optimize governance structure among economic actors to enhance the bargaining position of maize value chain actors, and related distribution of value addition in Ethiopia

- Farmers should organize themselves, produce and supply their produce for agro-industries
- Farmers should produce maize in “cluster” base/from and bring to market in collective action
- Farmers should produce quality product by use of maize Sheller
- Farmers should store their produce using PICS Bag to protect from insect damage
- Fertilizer Factory in Ethiopia should be established
- Use of mechanization for farming

The other recommendation regarding the role of government in maize markets and value chains development in Ethiopia are:

- Arrange experience sharing for farmers
- Capacity building/training on maize production and marketing
- Cost of industrial goods is costly than agricultural produce; Cost of industrial goods and agricultural (farmers’) produces should be balanced
- Create market linkage with Agro-industries like Burrie Agro-Industry, traders and investors
- Decrease cost of inputs (improved seeds and fertilizer)
- Farmers should get strong support and follow up from agricultural experts
- Government should regulate market price of goods
- Make mechanization available for pre- and post-harvest activities of maize
- Provide high yielding improved crop varieties
- Supply of improved plow and maize Sheller machines
- The government should provide current market information

The full text of the presentation can be accessed from [HERE](#).

Presentation of WP2

Dr. Kaleab Baye from AAU presented the preliminary findings of the study under WP2 covering all the project countries, namely Ethiopia, Kenya, South Africa and Uganda. He started his presentation by citing evidence from the Global Burden of Disease (GBD) report: “Poor quality diets and diet related conditions represent the largest set of risk factors for the global burden of disease – greater than unsafe sex, alcohol, drug and tobacco use combined”. Evidence shows that 60% of the world population cannot afford healthy diet and this calls for a shift/transformation of food systems to improve diet. The objective of WP2 is to contribute to improving African diets to prevent all forms of malnutrition (under nutrition of infants and overweight/obesity of adults and adolescent) with specific objectives of: Identification of drivers of undernutrition and overweight/obesity; Develop locally feasible food-based dietary guidelines and nutritional recommendations; Formulate an implementation plan for applying recommendations. The approach is categorised into three. Diagnostics: Understanding the state and drivers of malnutrition (review/secondary analyses), Characterizing dietary patterns and identifying nutrient gaps (consumption surveys); Solutions: Developing diet models (linear modeling), Developing/contextualizing food-based nutritional recommendations and Supporting implementation:

Food-based dietary recommendations (developed/adapted), Generating BCC materials, Knowledge toolbox for communication and capacity building.

The presentation concludes by discussing the summary and way forward of the study being conducted under WP2. Hence the findings show that:

- Diets are monotonous and suboptimal
- Very low proportion of the urban community meets the nutrition recommendations from the Ethiopian FBDG (2022). Which suggests possible operational challenge in implementing the FBDG without contextualization or increased support of consumers.

The detailed approaches of the study, conclusions and recommendations can be accessed from the presentation [HERE](#).

Presentation of WP3

Dr Stoddard from University of Helsinki presented the preliminary findings of WP3 in Ethiopia. The presentation covered the work done in farmer participatory research (FPR) in Ethiopia. The presentation started with the fact that Ethiopia depends on imports for 25% of its wheat and the fact that mean yields have increased 30 – 50% in the cereals over the last 10 years but not as fast in the grain legumes. Then it discusses the research sites namely, Banja (Highland, >2500 m amsl), Jabitehnan (Midland, ~1800 m amsl) and the establishment of farmer research groups, 30 per site. The problems identified were discussed raising issues such as: highland soils are acid: need better adapted faba bean, Highland climate is cool: need better adapted maize, Shortage of quality seed for sowing and Access to inputs: nutrients, control of pests, diseases and weeds. The presentation further discusses the activities conducted such as Training on improved farming practices: 60 farmers & 13 extension workers trained based on the IFA crops faba bean, teff, maize, sweet potato; Farmers participatory trials implemented at Banja highland district: Faba bean, teff and highland maize and Jabitehnan midland district: OFSP & midland maize and discusses “Mother” trials and “Baby” trials implemented. Results of the FPR1 and FPR2 implementation were further discussed and conclusions drawn were presented.

The presentation concludes by discussing the conclusion of the study conducted under WP3:

- With the right cultivars, yields can increase up to 2.7 times
- Appropriate use of inputs can increase this further
- Community investment is a vital first step
- Training and communication are important parts of the package

The full text of the presentation of the work package can be accessed from [HERE](#).

Presentation of WP4

Dr Paulos from Addis Ababa University presented findings of food processing and product innovation work under WP4. He started by discussing what improving diets means in terms of; Quantity: adequate energy intake for healthy growth; Diversity: a variety of food groups providing varying levels and types of nutrients; Quality: contains needed macro-and micro-nutrients without unhealthy additives, trans-fats, added-sugar; Safety: microbial/chemically safe to consume. He then discussed about the selected IFA crops namely; Orange Fleshed Sweet Potato, Banana, Amaranth Leaf, Sorghum, Cowpea, Fava Bean, Finger Millet, Teff and Bambara Groundnut. The aim of WP4 under the InnoFoodAfrica project is to develop safe and nutrient-dense cereal-pulse-root crop-based food ingredients and food products to tackle malnutrition in both children and adults. The partners under WP4 are expected to develop new

food ingredients from the IFA crops using various technological innovations. Hence, development of fermented flours by UH, PURATOS, AAU and UP; Banana and amaranth flour using technologies such as solar drying, oven drying, microwave drying, infrared drying by MAK and NOFIMA; development of protein rich ingredients using technologies such as dry fractionation, wet precipitation by VTT, UP, MAK; development of fat replacers by UP, PUR; OFSP flour by using technologies such as MW, oven, solar dryer by UP, DELPH, and NOFIMA; flours from Grain Hydro-thermal /Germination treatment by IA/INRA, PUR, AAU, VTT; and development of low GI ingredients by UP, MAK, DELPH. A number of food prototypes have been developed: Expanded sorghum snack, Expanded finger millet/cowpea snack, Quick cooking Bambara and sorghum rice, Semi-cooked Samp, Canned pre-cooked samp, Finger Millet/Bambara flour porridge, Teff/banana flour porridge, Instant finger millet/banana/cowpea/OFSP porridge flour, Cowpea crackers, Sorghum crackers, Composite sourdough bread, Yeast and sourdough fermented breads, Fermented Tef bread, Sorghum pasta enriched with phenolic, Fermented Teff + germinated fava pasta, Cowpea + Amaranth leaves pasta, Cowpea pasta.

Dr. Paulos went on discussing about the activities conducted by AAU and GutsAgro Plc in the development of new food products especially from Teff. He discussed the characteristics of the food prototypes in detail. He concluded by discussing the way forward for the novel food product innovation and development.

The presentation concludes by discussing the food prototypes that are under development and their benefits.

- bread, pasta, porridge food prototypes have been developed and this is believed to improve nutritional quality of food by:
- addition of food groups like legumes in otherwise cereal-based food
- incorporation of wholegrain (e.g. tef)
- improved crude protein, crude fiber, minerals (iron and zinc), low anti-nutrient level, high mineral bioavailability
- increased crude protein, crude fiber, improved minerals bioavailability, reduced anti-nutrients, low glycemic index

The full text of the presentation can be accessed from [HERE](#).

Presentation of WP5

Dr. Janne Kernan from VTT Technical Research Center of Finland presented findings of the bio-based packaging development, a work being performed in the four African countries under WP5. He started by presenting the objectives of the work package such as: Valorization of African agriculture side streams in manufacturing of bio based packages, Development of new value chains and income source for local farmers, Possibility to use existing processing machinery designed for conventional plastics, Packaging materials with sufficient properties to increase shelf-life of food production and decreases amount of food waste, Finding sustainable alternatives for Petroleum-based plastics, which are banned in many African countries, Development of bio based, biodegradable and micro-plastic free packaging solutions. He then went on discussing the work of WP5 in InnoFoodAfrica project focusing on converting low-value agricultural side streams into higher value products such as the use of harvest residue side streams of faba bean as a filler in bio-based and biodegradable polymer matrix and demonstrating the processability and properties of side stream reinforced polymeric material which can be used as a packaging material. The presentation touched on topics regarding materials such as bio-based and biodegradable polymers, composite processing, film extrusion and injection moulding. He concludes by confirming that African crop side streams can be used as reinforcement in bio-based and biodegradable polymer composites and possibility of using existing processing machinery designed for

conventional plastics (both injection molding and extrusion). Finally, he outlined the conclusions from the work done so far. African crop side streams can be used as reinforcement in bio-based and biodegradable polymer composites and the possibility to use existing processing machinery designed for conventional plastics (both injection molding and extrusion). The evidence shows that:

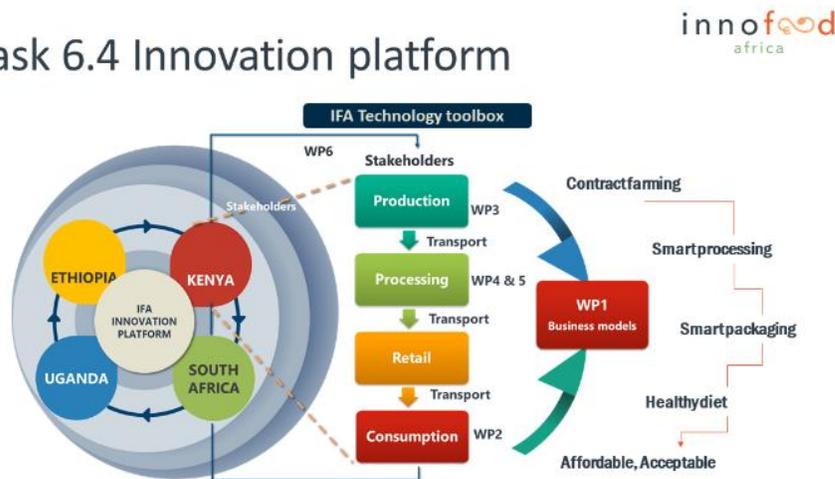
- The developed biocomposites are sustainable substituents for petroleum-based plastics
- Reduced need of plastic product import and creation of export products, can be replaced in part by our sidestream-containing solutions and even create export products from them
- Food loss averted: Improved shelf-life provided by better packaging will help to avoid food loss, reducing e.g., need for food import
- Developed materials are process able with same machinery as fossil-based plastics
- Local people benefit from new value chains such as:
 - Farmers and processors will have a new income stream from side streams
 - They become more resilient, as the local crops are climate smart choices and durable ones.

The full text of the presentation can be accessed from [HERE](#).

Presentation of WP6 – Innovation Platform

Dr. Henry Ndegwa from University of Helsinki presented the IFA innovation platform. He started by discussing the objective of the platform. The innovation platform is a virtual platform which will be used to deliver the project results to the African/European stakeholders. It will help as a communication platform to facilitate technology transfer. The platform will make it easy to find partners that can provide various solutions proposed in the project. It will serve as a knowledge data center including relevant databases based on the project information. Furthermore, the innovation platform will serve as a marketing channel. It will be used as contact point for African/European stakeholders and InnofoodAfrica partners.

Task 6.4 Innovation platform



The continuity of the Innovation platform will be ensured through by looking for funding & resources to continue the work beyond InnofoodAfrica project including seeking for public funding to maintain the activities. The delivery of existing data will also help to secure funding for the platform. The platform will be a place to initiate new development work jointly with the stakeholders. The full text of the presentation can be accessed from [HERE](#).

Highlights of Discussions

After the presentations by each work packages are completed, the floor was opened for questions and answers. The session was facilitated by Dr. Henry Ndegwa from University of Helsinki. A number of comments and questions were raised and the presenters responded to all of them accordingly. A summary of some of the points raised during the questions and answers session are compiled as follows:

- **Food processing:** Regarding germination and phytic acid concentration; when the fava bean is germinated it showed significant decrease in the Phytic acid concentration in germinated fava bean compared to the raw fava bean.
- **Issues with pyrimidine glycosides in fava bean:** Ethiopia is second to china in the manufacturing and export of fava bean. Some of the issues related with vicine and convicine was raised and weather work has been done to determine vicine and convicine in the lab and the response was that the research didn't try to attempt it because of the unavailability of the facility to do that. Because the vicin and covicine is not determined the novel food product developed from fava bean may cause fart in children, so the target is the hydro thermal treated Fava bean for adult food.
- **Shortening of value chain:** When we talk about maize, quality of the harvest and the existence of long value chain are two big problems. In order to address these problems, the research proposes various mechanisms such as better storage structures, application of better chemicals and other mechanisms which are discussed in the full report. Regarding creating shorter value chain process the research recommends the need to create better linkage mechanisms which can lead to establishment of various form of linkage which can connect the stakeholders involved directly shortening the long value chain process. Concerning the process issues the farmers suggest that fertilizer factories should be established in their locality. Even in the study areas participation of the private sector is very small this should be also changed; when we come to the government it should also review the policy issues regarding buying, selling, exporting and importing.
- **Food fortification:** In order to address many challenges related with food nutrition, the Ethiopia government has designed a national food fortification programme in three food items under the ministry of agriculture; edible oil, wheat flour, and edible salt. Innofoodafrica WP2 will be optimizing the diet to see what is possible within the food. Even after that from our experience even if we optimize the food there will still be gaps so our role is to highlight what is possible by shifting the diet and also by integrating new food products and see how far it will take us. Yet, there will always be some gap, so by quantifying that gap we will give you the evidence so that you can determine the level of food fortification required.
- **Bread formulation:** Regarding increase of enzymatic activity during germination process and its unwanted consequences in bread formulation and baking, the project intentionally chose fermented teff and 48hrs hydro germinated fava bean for bread formulation and not the germinated one avoiding any significant increase in enzymatic activity.
- **Orange Fleshed Sweet Potato:** It is currently growing at various parts of the country and this is a good opportunity for food processors to explore various food products out of it. The fact that the research has found out that OFSP grown in Dilla area is more productive than Kabode area was contested during the workshop. The researchers confirmed the result but the level of production depends on the season and specific location. Another evidence is the fact that OFSP grown in Kabode is not preferred by the farmers due to its test.
- **Factors that contribute to malnutrition:** The research acknowledges that factors such as the increase of food prices, conflict, pandemics and other factors considerably contribute to malnutrition. In order to address these challenges there is a need for a concerted effort from various stakeholders and from multilateral dimensions.
- **Reduction in malnutrition:** The report also shows that there is reduction of malnutrition in some parts of the country such as Harerge and Eastern parts of the country. The reason for this are

stipulated to be the improvement of health care system, the growth of GDP and the introduction of WASH program

- **Malnutrition in rural places:** Even though the producers produce all the IFA crops they don't consume it. They usually sell their produce to make money for other needs. Furthermore, most of them produce cereals and legumes but not vegetables and fruits. The project acknowledges this as a complex problem and more needs to be done in terms of creating awareness on nutrition challenges so that the community themselves can have the required level of understanding to address the issue.
- **Consideration of gender:** The incorporation of gender in the research study and especially in the value chain and market survey is of concern raised by participants. The project has tried to collect data taking into consideration the gender aspects. But gender based questions were not specifically included in the survey. Rather the project tried to incorporate the view points from both sexes.

The workshop was concluded successfully by a closing remark by Dr. Tilaye Teklewold, the director of the Amhara Agricultural Research Institute (ARARI). The full recording of the workshop can be accessed [HERE](#).