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The U.S. Government's Global Hunger & Food Security Initiative



Workshop Report—Niche Market Product Deployment Model for High-Iron Beans

Stakeholder Consultation and Dissemination of Pilot Study Results



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ACRONYMS

ABC	Alliance of Bioversity International and CIAT
CECM	County Executive Committee Member
CGA	Cereal Growers Association
CIAT	International Center for Tropical Agriculture
EASEED	East African Seed
EGS	Early Generation Seed
FCRI	Food Crops Research Institute
HIBs	High-Iron Beans
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Center
KALRO	Kenya Agricultural and Livestock Research Organization
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Services
KRA	Kenya Revenue Authority
MoA	Ministry of Agriculture
MoE	Ministry of Education
MOALF	Ministry of Agriculture Livestock and Fisheries
MoH	Ministry of Health
MoL	Ministry of Livestock
MoT	Ministry of Trade
NARIGP	National Agricultural and Rural Inclusive Project
PABRA	Pan-African Bean Research Alliance
PoS	Point of Sale
S34D	Feed the Future Global Supporting Seed Systems for Development activity
USAID	United States Agency for International Development

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1. BACKGROUND

The Alliance of Bioversity International and CIAT (ABC) and PABRA in partnership with KALRO, Cereal Growers Association (CGA), Catholic Relief Services (CRS), Bubayi Products Ltd and its agrodealer network and 17 county governments (in western, lower eastern and central parts of Kenya) developed a niche market product deployment model with the objective of ensuring efficient and effective delivery of high-iron beans (HIB) to farmers. A variety is said to be niche if it has the following characteristics: i) special attributes linked to breeding (disease resistance, micronutrient richness, etc.) that are of urgent need among end-users; ii) the process of regulatory approval and release for commercialization is fast-tracked due to this need; and, iii) early on-boarding of the private sector for release and subsequent commercialization of the varieties. HIB varieties fulfilled all the above criteria. The model integrated the use of motorbike riders (*boda boda*) for last mile delivery of HIB seeds, as an exploration of non-traditional avenues for seed delivery.

Between 2018 and 2019, the partners carried out demand creation campaigns of HIB varieties (Angaza and Nyota) and high-zinc variety (Faida) across 17 counties (see Appendix 1 for the attributes of the three varieties). East African Seed Company Ltd and Bubayi Products Ltd produce and distribute Angaza and Faida seeds, and Nyota seeds respectively.

To track the movement of the Nyota HIB seeds in Bungoma and Trans-Nzoia counties within the framework of the niche market model, ABC-PABRA and CRS piloted a point-of-sale (PoS) mobile application with 123 farmers, 14 agrodealers, and Bubayi Products Ltd in Trans-Nzoia and Bungoma counties in September and October 2019, and received post-harvest farmer feedback in January and February 2020.

The one-day workshop (see Appendix 4 for the program) was organized to disseminate the pilot results, and thirty-one participants attended the meeting across 16 organizations (Appendix 5).

The specific objectives of the workshop were to:

1. Share the findings on the use of the PoS mobile application in monitoring the last mile delivery of HIB seeds.
2. Share findings on the use of motorbikes (*boda boda*) in last mile delivery of HIB seeds to the farmers.
3. Receive feedback from stakeholders on the potential use of PoS application in monitoring the last mile delivery of HIB seeds.

2. OPENING SESSION

2.1 Welcome remarks

The stakeholders meeting started at 9:00 am. Justin Mabeya (ABC-PABRA) welcomed the participants and expressed optimism on delivering the aspirations of farmers. To drive his point home, he referred to the famous speech “I have been to the mountain top” by Martin Luther King Jr. Thereafter, Justin highlighted the overall and specific objectives of the workshop, and then asked the participants to pair up: get to know the name of the person they paired with; their workstation and role; what contribution the person wants to make in agriculture and one key expectation from the meeting (Appendix 2). Each participant then stood up and introduced their partner based on information provided.

2.2 Opening remarks by the Bean Programme Leader & Pan African Bean Research Alliance Director (ABC-PABRA)

Jean Claude (JC) Rubyogo thanked the participants for making time to attend the workshop. He commended the restaurant for serving the real beans from farmers during breakfast. JC highlighted the importance of beans in Kenya. While emphasizing Kenya’s uniqueness to ABC, he indicated that the Alliance has the

obligation to improve the bean value chain. JC indicated that bean productivity in Kenya remains low, despite strong contribution from the government and stated that other stakeholders such as the International Fund for Agricultural Development (IFAD) are increasingly interested in bean value chains – particularly how to move volumes. JC indicated that ABC aims to continue working with more seed companies and counties to reach smallholder farmers with seed, while moving with speed and adopting different delivery models. He appreciated the contribution of various donors including USAID. Finally, JC mentioned that ABC is determined to make a difference in Kenya by developing ‘bankable’ research products and facilitate the utilization of the products to improve livelihood of the bean value chain actors and national economy.

2.3 Opening remarks by Director of Food Crops Research Institute – KALRO

Dr. Joyce Malinga recognized the various stakeholders who honored the invitation and attended the workshop. She indicated that KALRO remains the key research institute in Kenya, with 52 centers across the country, including the Food Crops Research Institute (FCRI) – which she leads. While acknowledging that most seed companies had the most sought-after bean varieties, and that several varieties have been released, Joyce questioned why only six varieties have been moved to farmers! She stated that Nyota, Angaza and Faida are the most recent varieties, while Punda will be released soon. Joyce emphasized that it does not make sense to put money in Ugandan farmers’ pockets (by importing bean grain from Uganda), while most Kenyan farmers have little income. However, she noted a difficulty is that farmers recycle seed. She indicated that the current levels of seed production by KALRO (600 MT), Bubayi Seeds (300 MT) and East Africa Seed company (500 MT) are far below the national seed requirement to plant more than 1 million hectares. Thus, she posed the question: what should we do differently? There is need to conduct more on-farm trials for awareness creation on use of improved certified seed because people buy seed from local market, which is mixed seed. However, there are no volumes to supply the seed demand, hence the need for increased seed production!

2.4 Opening remarks and official opening by County Executive Committee Member for Agriculture, Livestock, Fisheries and Cooperatives - Trans-Nzoia

Dr. Maria Nzomo, who doubles as the National Chair of Agricultural CECs appreciated the organizers for conducting the pilot in her county, noting that Trans-Nzoia is the breadbasket of Kenya. She apologized for being late and explained that her delay was occasioned by locusts’ invasion within the county. Maria emphasized there is currently a shift of focus from food security to food and nutrition security – a key component of the Big 4 Agenda of President Uhuru Kenyatta. This, she noted was necessitated by the fact that about 26% of children under five years old are stunted – hence the need to produce nutrient-dense food. Common bean is well-suited to tackle the malnutrition problems given that its per-capita consumption of 56% in Kenya is the highest in Sub-Saharan Africa. Further, Maria noted that the predominant farming system (intercropping) is reducing bean yields, especially in western Kenya. However, this is changing and the beans are receiving more attention. Bean varieties such as Angaza, Faida, Metameta and Nyota have been released – these varieties have higher potential to ensure food and nutrition security. Moreover, youth are more interested in crops that can provide faster returns – this presents an opportunity for beans because it can be produced twice in a year. Beans can also be incorporated in the school feeding programs to enhance food security, and support local businesses. Maria reported that a county investment dialogue sponsored by ABC (then called CIAT) was held in Nakuru with the aim of promoting HIB varieties. The forum brought together 20 bean growing counties in Kenya. As a follow-up to that forum, the CEC Bungoma has taken the initiative to promote HIBs with support from donors including the World Bank through the National Agricultural and Rural Inclusive Project (NARIGP). Maria noted that the county is increasingly impressed with participatory research; and as a result, there are currently 25 model farmers in Trans-Nzoia County – with scaling up of the HIBs technologies expected this year. She applauded Jonathan Mayer (the Managing Director of Bubayi Seeds Ltd) for the good work in availing the bean varieties. She appreciated other seed companies and KEPHIS for ensuring quality seed supply and indicated that the aim was to ensure that bean

seed system is mainstreamed and aligned to the Big 4 Agenda. Finally, she declared the workshop officially opened.

The meeting was adjourned at 10:30 am for group photo and health break

3. SESSION 2: PROMOTION AND DISTRIBUTION OF HIGH IRON BEANS

The meeting resumed at 10:50 am. Dr. Boaz Waswa welcomed the participants back and introduced the presenters for the session.

3.1 Overview of seed systems in Kenya by KEPHIS representative

Ephraim Wachira, the Regional Manager, KEPHIS Kitale Regional Office, briefly highlighted the role of KEPHIS and indicated that the majority of farmers in Kenya obtain their seed from informal seed sources. For instance, over 1 million kg of bean per week is imported informally through Moyale alone, some of which may end up being used as seed. In this informal seed system, a large percentage of seed is sourced from farmers own-saved seed sharing, exchanging, bartering and selling. He pointed out that seed from informal system can only support subsistence and not commercial production, due to low-quality. The varieties used are mostly local landraces, and awareness about improved varieties, seed availability and seed access is limited. On the contrary, the formal seed sector operates within specified quality standards. Further, private companies mainly respond to commercial incentives on hybrids of high-value seeds, these may constrain its ability to meet the diverse needs of farmers. Ephraim indicated that while there is a limited range of bean cultivars, the varieties available have been bred for purposes of high-value processing e.g. canning. Finally, the integrated seed system combines components from both the formal and informal sectors including local seed supply systems to supply seed of new bean varieties to farmers. He emphasized that the purpose for seed certification is to ensure that seed meets the acceptable level of quality. On whether seed certification increases the cost of seed, Ephraim answered “yes and no,” depending on what the seed is being used for. The bottom line is to ensure customer confidence in seed quality. This is achieved through seed labeling. Generally, considerations for variety release include 5% higher yields and special attributes such as higher zinc/iron, and noted that the process is longer but pays dividends. Finally, he announced that plans were underway to hold field days in Bungoma and Tran-Nzoia (Kitale) and invited ABC to participate and promote HIBs.

Question arising from KEPHIS presentation

Question: A participant wanted to know if the bean varieties promoted by KALRO are better than the farmer varieties nutritionally, since farmers prefer varieties whose nutritional features they know, such as low acidity and flatulence.

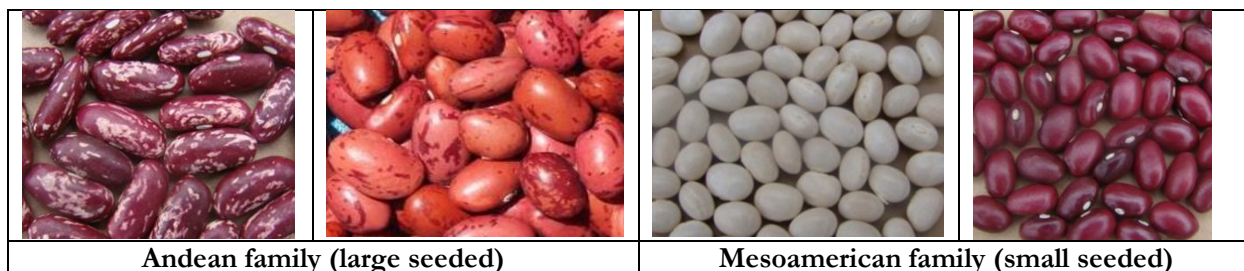
Answer: Yes. One of the considerations during variety testing is special attributes of a variety such as iron/zinc content and phytic acid contents. HIB have improved nutritional content and have lower phytic acid content than most local and older varieties.

3.2 Overview of Bean Research and Development in Kenya by David Karanja, KALRO

The National Coordinator Grain Legume Programme in KALRO started by describing the regions in Kenya as being either production/consumption zones (Western, Nyanza, Rift valley and lower eastern) or consumption zones (Eastern and Northeastern). David pointed out that the critical issue in Kenya is low yield/productivity, which has an impact on the cost of production – the latest record of productivity ratio is 1:60. Data from Economic Review of Agriculture (2017) MOALF Validation Report indicate that production nearly doubled from 383,000 MT to 728,000 MT between 2007 and 2016. However, yields recorded a meager increase from 0.4 to 0.7 Tons/Ha within the same period. This begs the question: what behavioral change is required among target beneficiaries and project partners to contribute to (i) increased production and

productivity of market demanded bean varieties taking into account gender considerations; (ii) achievement of improved household consumption patterns (rural, peri-urban & urban); (iii) improved food and nutritional security; (iv) increased social and economic welfare; and, (v) positive contribution to environmental conservation?

According to David, there is need to: (a) change approach to production – and focus on bean corridors, (b) shift from individual to collective marketing, (c) change the varieties grown, (d) assess farm-level productivity - i.e. if you plant 1kg, what is the harvest? (e) Invest in value addition and produce new bean-based products. He highlighted that the priority bean breeding traits in Kenya include drought tolerance, early maturity for drought escape, tolerance to low soil fertility and diseases, market orientation, and special attributes e.g. high iron bean varieties. He provided a list of bean market classes with huge market potential (see examples below).



David stated that whereas 33 bean varieties were released between 2008 and 2019, and subsequently gazetted by KEPHIS; however, seed companies only wanted few varieties to be licensed to them. He wondered whether a few companies would be willing to work with different varieties and what could be done to popularize the other varieties including the HIB varieties e.g. Angaza, Metameta and Faida released in 2017. David also wondered whether farmers would be willing to replace the old varieties, and further indicated that there are new root rot resistant varieties developed by KALRO-Kakamega. The critical question is whether legumes will contribute to the fourth Industrial Revolution. While opportunities abound for pre-cooked bean products (canned beans, wet beans, composite bean flours, frozen beans and pre-cooked dry bean products such as snacks), producing enough tradeable volumes of market-preferred varieties remains an impediment. He concluded by stating that the country has varieties that are good for commercial exploitation, while some of the varieties are better for food. Main challenges are in achieving tradeable volumes of market-preferred varieties and their aggregation. County Governments and stakeholders need to see which areas are for subsistence production and which are for commercial production, since approaches for production will differ. Most counties in the past have taken beans as ‘normal’ in their lives hence the bean value chain was not prioritized (Laikipia, Nyeri, Elegoyo Marakwet (first counties), and then Bungoma, Trans Nzoia, Turkana, Vihiga, Narok & Bomet. He urged the partners to allow the champion farmers and champion promoters to continue promoting the varieties.

3.3 Understanding PABRA S34D Niche Market Model for last mile delivery of HIBs in Kenya – Background

Jean Claude Rubyogo started by highlighting the background of PABRA, its partners and an institutional framework of bean R&D / investments in Africa. He provided the consolidated trends of bean production, yield and area under beans in eastern Africa (2003-2017) and then narrowed down to individual countries including Burundi, Ethiopia, Rwanda, Kenya and Uganda. However, bean productivity in Kenya remains low and seed supply is the lowest in Eastern Africa. Anecdotal data reveals that the current quality seed supply in Kenya stands at 510 MT – meeting less than 1 % of national seed requirement. The general outlook of production and trade parameters indicate that in 2017-2018, area under beans was 1,170,173 ha (2018), productivity 0.65 T/Ha (2018), national production, 517,000 MT (2017) while national demand was 860,000

MT (2017) with a deficit of 334,000 MT (amount imported) in 2017. There is huge potential to harness the power of crop improvement to increase productivity and business.

Box 1: What happens if productivity is enhanced?

Assuming an increase in productivity by 0.1 Ton/ha with current area under beans = 1,170,173 Ha. This translates to 117,017 MT in increased production, reducing the national deficit by 35%. At current bean grain price of US\$1.2/Kg, total financial gains from additional 117,017 MT of bean grain produced would be in excess of US\$140 million injected into the economy. Good news – there is huge grain demand! In addition, there are opportunities to catalyze investment along the bean value chain by exploring the bean corridors.

3.3 Implementing the Point of Sale (PoS)¹ pilot by Justin Mabeya, PABRA

Technology Transfer Officer

Justin Mabeya provided a brief background of the niche model. He explained that last mile refers to how the seeds get to the farmers who plant them; and that the need for a niche variety is premised on the current emphasis on food and nutrition security. ABC – PABRA conceptualized the niche market product deployment model with the view of ensuring efficient and effective last mile delivery of HIBs to farmers. Awareness creation campaigns were conducted (through demonstrations and field days) in over 17 counties; 10 in western Kenya and 7 in lower eastern and central Kenya (Kiambu, Machakos, Makueni, Muranga, Nakuru, Nyeri, Laikipia) - reaching over 15,000 farmers, with positive results (performance and demand for the HIB seeds). Results from the demonstration sites indicated that the niche varieties had higher yields compared to the local varieties, with Nyota recording 1.1 Ton/ha and Angaza and Faida 1 ton/ha and the local varieties less than 1Ton/ha. Besides the higher yields, the niche varieties mature early, have good taste, low flatulence and are more nutritious; hence, eliciting interest and demand among farmers. More than 2000 MT valued at KES 526,500 of niche varieties' seeds were purchased by famers from several counties. However, seed availability is not guaranteed. PABRA is working with KALRO and seed companies to enhance seed production. Most of the HIB programs are either county-led or NGO-supported – informed by nutrition and yield attributes. There are opportunities to enhance adoption of HIBs including post-harvest management and youth integration, value addition for youth and women empowerment.

Box 2: Adopting a tripod program for school feeding?

Is it possible for the Ministries of Health, Agriculture and Education to come together and push the HIBs as a major component of the school feeding program? Currently, the County Government of Bomet has shown great interest in adopting this strategy and conversations are ongoing with other county governments to adopt the strategy and boost demand and consumption of HIBs.

3.4 Last mile point of sale (PoS) application piloting

Justin explained that ABC-PABRA piloted the PoS mobile application in Trans-Nzoia and Bungoma counties to understand the deployment, adoption and use of high iron Nyota seeds. The objectives were (1) to establish evidence and data using geospatial location of sellers (agrodealers) and consumers (farmers) to show how far Nyota seeds travel; (2) to understand the factors affecting the adoption of the niche varieties along the supply chain; and, (3) to understand the prevailing regulatory framework affecting use of motorbike riders (*boda boda*) in seed distribution.

¹ CRS led the development of the PoS application, generated the data base and conducted all quantitative analysis and produced analytics. However, CRS could not travel to attend the dissemination workshop. Mr. Mabeya shared results and findings from the PoS data with the stakeholders. CRS provided remote support with preparation for the workshop. CRS also led the customer feedback survey and collected data over tele-interviews with farmers after the harvest period in February 2020. Those results were prepared by CRS and ABC-PABRA shared findings at the workshop.

3.5 Findings from the PoS pilot by Noel Templer, Seed Systems Specialist – S34D (ABC-PABRA)

Noel Templer provided the background and process of the PoS study. PoS is an approach to capture information about sales (quantities, price) of new HIB variety (in this case, Nyota) at the retail sale points (such as, the agrodealers). It is premised on the need to better understand varietal dissemination, track the movement of the new variety, profile of customers purchasing the new variety, and assess varietal adoption and performance. It is implemented through developing and use of digital application to digitally record sales, and customer profiles at the agrodealer shops using tablets and/or mobile phones. Because the customers who bought Nyota seeds are registered, it is possible to follow-up with them after harvest to assess varietal performance and collect other critical feedback that is necessary to improve the business model and its roll out in the future agricultural seasons. Data was collected from 123 farmers (90 males and 33 females), 14 agrodealers, and Bubayi Products Ltd during the planting season, September and October 2019. Farmers purchased approximately 1.4 MT of Nyota seeds during the study. Farmers cited early maturity, higher yields and better taste as the major attributes informing their preference for Nyota. While a majority (79%) of farmers indicated that they would make a repeat purchase in the next season, 21% would not make repeat purchase – citing poor yields and unsuitability of Nyota for the area. Non-traditional avenues (*boda boda*) were adopted for seed delivery. Anecdotal data indicated that frequency of delivery of agro-inputs averaged 10 times a week per rider during planting seasons, with the longest distance being: Kitale – Moi’s Bridge (approximately 25 to 30km). The relationship between agrodealers and the *boda boda* riders is informal and need-based. However, agrodealers would want to make these relationships formal. Income for riders from last mile delivery depends on the seasons. There is need to work on regulations which allow the formal use of motorcycle riders as transporters of farm inputs – and link them up formerly with the agrodealers. This should also include basic training on distribution and use of farm inputs.

Key takeaways and farmers’ feedback

- Farmers have loyalty to some agrodealers. They may prefer certain agrodealers to others. They always do not choose the nearest outlet.
- Farmers obtain quality seeds for their preferred varieties from multiple sources. In addition, they utilize whatever channel is available to source those. Interestingly, farmers use both formal and informal systems to access farm inputs.
- Adjusting to climate change and variability in rains is a concern for farmers. Many farmers have noted that they prefer Nyota because of its shorter maturity period.
- Farmers have raised concern of limited availability and quality of seeds and at the right time.
- Despite having a good harvest, there is often inadequate market demand for farmers to sell their crops.
- Farmers find the price for Nyota to be quite high, and since it is first time in the market, many of them would like to test it first with small purchases. They have further expressed interest in having 1 kg packs or less.
- Expanding the reach of Nyota needs additional efforts. Here are some thoughts from the farmers themselves.
 - Heavy rains negatively affected the harvest
 - Despite the climate, many farmers (both men and women) remarked about the beans flowering well – compared to other varieties
 - Need assistance with extension services – for example, good agricultural practices (like spacing) and identifying markets.
 - Some farmers indicated neighboring households were interested in purchasing Nyota

3.6 Nutrition aspects by Irene Induli, ABC Nutritionist

Irene, a nutritionist at ABC provided brief insights on nutrition and the importance of beans as a source of dietary iron. She explained that iron and zinc are micronutrients of public health concern, and are also the

main fortificants contained in HIBs. The two are essential micronutrients for normal body functions. She cited an efficacy study conducted in Rwanda among 239 female students aged between 18 to 27 years from University of Rwanda.² 120 students were fed on 175 grams of HIBs per meal in two meals per day (lunch and dinner) for over 128 days, while the remaining 119 students were served with control beans to measure the effects of HIBs. One criteria for selection to the study was low iron stores of <20 mg/L serum ferritin. 37% of study participants suffered from anemia, 87% of which was iron deficiency anemia. Fortified beans contained high-iron concentration compared to normal beans (86mg iron/kg and 50mg iron/kg respectively). Students who consumed HIBs recorded near double levels of iron consumed per day- 14.5mg/day compared to normal beans which provided 8.6mg/day. The daily amount of absorbed iron from HIBs was 1.06 mg/d and 0.79 mg/d for control beans, representing 75% and 56% of the daily iron requirement respectively. Blood assessment before and after the treatments revealed improved iron status among study participants. Considering iron is one of the micronutrients of public health concern due to its high deficiency levels, there is urgent need to invest in HIBs as a healthy, affordable and easily accessible alternative source of iron to alleviate iron deficiency anemia and resulting complications, especially among women of reproductive age (15-49 years), and children under five. While a lot of effort and emphasis is placed on increasing bean production, there is need to educate everyone in the value chain – from producers to consumers, of the nutritional benefits of HIBs and encourage its production and consumption to help tackle hidden hunger. The ultimate goal is to improve the nutrition status of consumers.

Irene also mentioned the Strategy for Improved Nutrition in Tanzania using HIB as one that could be emulated and scaled out in other countries including Kenya. The seven-step strategy includes: (1) identify/release higher iron adapted and consumers preferred varieties, (2) identify partners (nutrition, seed companies, traders and processors, policy makers, extension) (3) create awareness, and build capacity for nutrition, (4) develop diversified bean based food products, (5) promote diversity of diets through bean products and food baskets, (6) enhance nutrient availability through processing & technology and, (7) pursue multiple channels for delivery/advocacy.

On integration of the value chain and household nutrition, a two-pronged approach could be adopted which incorporates community nutrition and private sector involvement. These include (i) using markets and agricultural income to impact nutrition and (ii) recipes and culinary demonstrations and community education in collaboration with district health and nutrition teams. Nonetheless, social behavioral change communication through nutrition education and promotion should be used to influence both households and private sector.

4. SESSION 3: GROUP DISCUSSIONS

4.1 Organization of groups and capturing of issues to be discussed

Jean Claude ushered in the participants into a session of discussion by issuing cards for listing seed systems issues (challenges). He clarified that the issues could be challenges faced with respect to seed availability, access and utilization – what farmers and other stakeholders wish could be done to make varietal adoption and utilization more effective and efficient. The issues were then grouped based on running themes and five groups (see the list below) were formed to deliberate on the issues and suggest possible solutions/actions.

- Group 1: Unavailability of early generation seed (EGS)
- Group 2: Awareness creation
- Group 3: Grain market development to pull seed
- Group 4: Regulations governing seed and grain production

² Jere D Haas, Sarah V Luna, Mercy G Lung'aho, Michael J Wenger, Laura E Murray-Kolb, Stephen Beebe, Jean-Bosco Gahutu, and Ines M Egli, (2019). Consuming Iron Biofortified Beans Increases Iron Status in Rwandan Women after 128 Days in a Randomized Controlled Feeding Trial. *The Journal of Nutrition, Community and International Nutrition*, pp 1586 – 1592.

- Group 5: Seed distribution

4.2 Key issues and solutions from group discussions

Group 1: Unavailability of early generation seed (EGS)

- There is need for licensing varieties to more seed companies for enhanced production of all the seed grades from breeder to certified seeds against an agreed upon seed road map pegged to sustainability, expected county specific seed demand and impact on grain production and livelihoods.
- There is need for human capacity building and financial support for breeder seed production
- Production of EGS could be enhanced by supporting efficient irrigation facilities. This will ensure timely and consistent production of the seeds.

Group 2: Awareness creation

- While awareness creation using mass media (e.g. use of radio) is able to reach many farmers, it was found to be expensive. To reduce the costs there is need to complement it with use of bulk SMS, mobile app, use of local FM radio stations rather than national stations, and social media platforms (WhatsApp, Twitter, and Facebook).
- Awareness creation should focus on the nutritional benefits of the HIBs among children, women and men – and integrating the government departments of education, health and agriculture (a tripod strategy) to improve on consumption and therefore demand.

Group 3: Grain market development to pull seed

- There is need to establish grain commodity exchange, which is capable of sharing the information with the market anywhere in the world through e-marketing with clear standards which are accepted international.
- To contribute towards streamlining the grain market, there is need to help set up aggregation centers for smallholder producers to make them attractive to grain offtakers as result of availability of tradable volumes.

Group 4: Regulations governing seed and grain production

- Use of motorbike riders (*boda boda*) for farm input delivery is common practice, even though they are not officially allowed and regulated. There is need for KEPHIS to establish specific regulations that govern use of *boda boda* for last mile delivery of farm inputs, in such a way that there is accountability, quality control on inputs, and trust.
- KEPHIS's laboratory capacity needs to be enhanced to enable fast tracking of approval of seed for distribution in time planting seasons.
- There is need for integration of an ICT tool in the regulatory system that can help trace the seed as it moves (traceability) from the source to the user for enhanced quality control. This will complement general awareness of regulations governing seed distribution.
- There is need for advocacy to include beans as a major staple alongside maize, so as to get it recognized by government as a safe, affordable source of protein which will contribute to achieving Agenda 2 - *Food Security and Nutrition* of the Big 4 Agenda of the President.

Group 5: Seed distribution

- There is need for availability of sufficient volumes of HIB seeds through agrodealer network close to the farmers. This can be enhanced by ICT enabled last mile delivery using *boda boda* (uberization)³ which enables raising of orders, mobile payments, information sharing and delivery of farm inputs.

³ Uberization is terminology borrowed from the word 'uber' of the uber mobile application used in taxi transport business




Participants were advised to consider the entire value chain while discussing. The full list of concerns identified and solutions/action points suggested are indicated in Appendix 3.

5. CLOSING REMARKS

The Director, KALRO Food Crops Research Institute, Dr. Joyce Malinga thanked all the participants for honoring the invitations and for active participation in the workshop. She encouraged the participants to maintain the partnership and push forward the HIBs agenda for enhanced food and nutrition security – but pointed out that, it all starts with seed security. Finally, she wished everyone safe journey back to their destinations and declared the workshop officially closed.

6. APPENDICES

Appendix 1: Attributes of Angaza, Faida and Nyota Niche Varieties

ANGAZA	FAIDA	NYOTA
		
<ul style="list-style-type: none"> • Speckled sugar type, medium size and kidney shaped • Bush bean type • Has light pink flowers • Flowers in 40-42 days • Matures in 80-84 days • Yields 1.4-2.5 t/ha (6-12 bags/acre) • Sweet grains with low flatulence levels with high sucrose content • Tolerant to common bacterial blight (CBB), rust (<i>Uromyces sp.</i>), bean common mosaic virus (BCMV) and angular leaf spot (ALS) • Micro-nutrient rich with high grain iron content (>97 ppm) • High zinc grain content (>57ppm) • Has low phytic acid • Fast cooking compared to most beans 	<ul style="list-style-type: none"> • Red mottled/speckled type • A semi-climber (has tendrils) • Has white flowers • Flowers in 45-46 days • Matures in 84-85 days • Yields 1.4-2 t/ha (6-9 bags/acre) • Tolerant to common bacterial blight, rust (<i>Uromyces sp.</i>), bean common mosaic virus (BCMV) and angular leaf spot (ALS). • High grain Zinc content (>56 ppm) and low phytic acid • Fast cooking compared to most beans 	<ul style="list-style-type: none"> • Brilliant red mottled grain • Has light pink flowers • Flowers in 30-40 days • Matures in 60-70 days • Yields 1.4-2.2 t/ha (6-10 bags/acre) • Drought tolerant suitable for arid and semi-arid lands (ASALs) and cold dry highlands • High grain iron content (>95 ppm), high zinc grain content (>39ppm) with low phytic acid • Fast cooking compared to most beans • Good for making bean flour

Appendix 2: Participants' key expectations, PoS Stakeholders' Meeting, Eldoret - Kenya

1. To see the impact of research on bean production in Kenya
2. To see a roadmap to seamless availability and distribution of HIB seeds
3. To learn about the Feed the Future work in this 1st meeting
4. To see how nutrition has been incorporated in the program
5. To see how the program assists as many smallholder farmers as possible access certified bean seed
6. To be exposed to bean production practices and also the bean value addition prospects
7. To see how best Kenya can become a food secure country
8. To learn from and experience bean research work
9. To cultivate better partnerships with smallholders to drive increased access to bean seed
10. To receive positive market feedback from stakeholders and how to improve it
11. To understand dynamics on beans especially on consumer needs
12. To learn about the efficiency of the niche model and PoS in food dissemination
13. To see how stakeholders will encourage farmers to do tradable volumes of beans
14. To see improved bean seed systems and more partnerships in them
15. Better interaction with core interested parties
16. To get feedback from previous market survey and what that means for the stakeholders in the meeting
17. To learn of how best to deliver seed from shops to smallholder farmers
18. To learn how bean seed reaches the farmers from the research shelves as well as clear variety pathway mapping
19. How to get more women farmers involved as well as partners develop a better understanding of farmer needs and respond to these
20. To get an alternative approach for the TAAT project instead of the demo plots
21. To learn of new findings that will be instrument in commercialization of beans
22. To get a genuine understanding through discussion on how to get foundation seed for an efficient HIB seed delivery system
23. To get a better understanding of HIBs, available sources and sustained availability of seed

Appendix 3: Issues Arising from Group Discussions and Proposed Action Points

Group 1: Unavailability of early generation seed	
Issues	Proposed solutions/action points
<ul style="list-style-type: none"> • KALRO custodian of breeder and basic • Shortage of EGS 	<p><u>Breeder seed:</u></p> <ul style="list-style-type: none"> • License varieties to companies which will be producing all the seed grades from breeder to certified seeds • Engage other KALRO centers to take advantage of the seasonal complementarity • Periodization of the varieties so that the seeds are produced based on demand • Draw a coordinated and agreed upon seed road map with seed industry players • Financial support and human capacity building for the breeder seed production • Engage partners to produce early generation seed under KALRO contract • KALRO should change their mindset and think about impact/result driven systems • KALRO should produce breeder seed in sustainable manner and commercially • KALRO should start creating awareness through ICT means and engage seed industry continuously • Hold joint meeting with counties/seed companies to plan production and availability of seeds <hr/> <p><u>Basic seed</u></p> <ul style="list-style-type: none"> • Prioritise the varieties based on demand • Broaden more licensed companies to produce basic seed • Improve the KALRO licensing process which is currently very bureaucratic and slow • Develop coordinated seed road map for seed value chain • Support efficient irrigation facilities • Support seed companies to produce basic seed production • Study of cost benefit analysis of basic seed production • Capacity building of seed producers
Group 2: Awareness creation	
Issues	Proposed solutions/action points
Cost of radio is expensive	<ul style="list-style-type: none"> • Use bulk SMS (10 SMS for 45 cents) • Customizing information to reduce the cost • Creation of a mobile app dealing with bean production and distribution (example MOA and GIZ). Used I-Shamba platform (farmers could get up to 3 SMS per day) • The value-added products need to be widely advertised – there is need for proper branding (example • Digital marketing using social media platforms (WhatsApp, Twitter, Facebook) • Talk shows on local radio stations e.g. Ramogi, Sulwe, Kameme, West FM, Inooro, Musyi FM, Nyota TV • Use platforms like LINDA MAMA • Use programs targeting youths to pass critical information • Tap into bloggers' platforms • Information must be well packaged • Use promotional packs with information on attributes • Use demos to bring masses at lower cost
Nutrition education	<ul style="list-style-type: none"> • Capacity building of the extension officers in county governments – e.g. H+ supporting counties for extension and other technical infrastructure • Adopt integrated approach bringing in MOH, MOA and MOE in tripod arrangement to create awareness • Engagement with MOH antenatal and post-natal clinics • Make deliberate efforts to focus on women - Its women who make decisions on food consumption • Target schools (MOE) and integrate HIBs in school feeding programs • Nutrition trainings need to trickle down to the ground level – especially for the community based health workers
Information on seed sources (access)	<ul style="list-style-type: none"> • Ensure more local agrovets (agrodealer shops) have access to the seeds • Adopt the PoS model and use bodaboda to bridge the gap • Formation of bean multi-stakeholder fora
Sensitization of agrodealers on HIBs (they are the major movers)	<ul style="list-style-type: none"> • Training of agrodealers to be armed with relevant technical information • Involve more agrodealers in on farm demos and field days • Link traders to the demos and have them participate in field days
Limited extension services	<ul style="list-style-type: none"> • Adopt e-extension • Involve agric. extension officers at the wards • Engagement of seed companies • Adopt lead farmer concept – train few farmers to be ToTs and assist the few extension staff available

Inadequate farmers education on benefits of HIBs	<ul style="list-style-type: none"> • Sensitization and training of farmers • Field days • Adverts, during agrodealers' trainings • Use of posters and fliers
Facilitation of demo plots/sites	<ul style="list-style-type: none"> • Ensure good distribution of demos across the counties • Collaboration with various stakeholders (multidisciplinary approach) input suppliers, chemical companies for cost sharing and creation of business/ investment opportunities • Showcase the various bean varieties to bring out the contrast including the nutritional attributes (model demo) • Increase the number of demos at county level • Bigger size of demos to help farmers have a clear view of the crops and help them conceptualize the varietal impacts • Include the gross margins – connected to investments • Use billboards
Follow up of demo plots	<ul style="list-style-type: none"> • Link up local agro vets to demo plots – promotional demos using gunny bags • Adopt model demos/farms
Participation of women and men	<ul style="list-style-type: none"> • Availing resources to women to enhance access to seed and market information • Also target youths with limited access to funds • Increased engagement of women in bean marketing • Increased engagement of men In bean production
Adverse bean growing conditions	<ul style="list-style-type: none"> • Adopt climate smart strategies • Target areas/seasons with less rains
Awareness on existence of early maturing varieties	<ul style="list-style-type: none"> • Agrodealer training, radio, posters and other innovative promotion strategies
Poor dissemination of new information to the farmers	<ul style="list-style-type: none"> • Provide adequate nutrition information • Getting the product/market information right
Group 3: Grain market development to pull seed	
Issues	Proposed solutions/action points
Lack of market linkages between the producer and market	<ul style="list-style-type: none"> • County governments to invest resources to support awareness creation about available grain among farmers and marketing of the same. • Establishment of the school feeding programme to provide market for the grain at local level. • Aggregation support from identified producers to have tradable volumes for schools, hospitals • Seed companies to be in contact with the people who have bought seeds and estimate the volumes which will be produced and share the information with the county governments to link up with the school, hospitals and traders. • Establish grain commodity exchange, which can share the information with the market anywhere in the world through e-marketing with clear standards which are accepted international. • Help set up aggregation centres for smallholder producers • Collaborate with EAGC and similar organizations to support the establishment of standards for grain production and marketing. • Awareness creation among the farmers of the grain quality standards required by the market. Whatever we are producing from the farmer should be good. This is the responsibility of extension. Seed companies should provide quality seed as a start. • Encourage the producers to join the commodity exchange. • Explore the contract marketing. CGA can support this arrangement. • Strengthening the linkages between the players along the value chain, from research to consumption. • Bring stakeholders together – producers and off-takers – EAGC is an example. This will provide room for making business deals between the farmers and off-takers. • Link the local traders, aggregators and off-takers with the farmers. Linking the boy and the girl is critical. • Too many varieties. We need to withdraw old varieties.
Value added products are not there in the local shops	<ul style="list-style-type: none"> • Develop an inventory of the companies involved in value addition • Awareness creation about the products through media campaigns, local and national radio • Awareness of the value-added products in the counties through shows, field days, expos, etc. • Counties to support and encourage local value addition – through the department of trade, health (nutrition) and agriculture • Promotion of value-added products in the school shops – tuck shops, and the school feeding programmes. • Encourage the government to include the value-added products in the blended flour regulations of the Ministry of Agriculture. Talk to Jane Wambugu.

	<ul style="list-style-type: none"> • Advocacy programmes on the nutrition products by the MoH, MoA and MoE. • Getting affordable machines for value addition with the support of the county governments. Encourage cottage industries. • Provide some incentives for the producers of value-added products. • Awareness creation through social media • Monitoring by county governments • Support production of grain to supply tradable volumes for value addition • Consider the test and the preference of the consumers • Consider contract farmers to supply to processors • Training farmer groups (including women groups) on value addition, by KALRO
Brand building	<ul style="list-style-type: none"> • Move away from scientific codes with names that buyers cannot easily relate with. Make it easier for the buyers. • Characterise the names with the certain climatic conditions for buyers to easily relate with. • Names and labelling that indicate that the seeds and grain are high in iron and zinc. Enrich the information on the labels and clearly indicating that the products are non-GMO foods to get rid of fear. • Ownership of a brand is of interest of the companies. Possibly change the law allow different companies sell the product in different trade names. That is non-exclusive licencing.
Poor infrastructure in production areas	<ul style="list-style-type: none"> • Integrate the need through the County governments CIDPs • Involve the national government • Advocacy for improved governance at the county governments • Prioritise infrastructure in farming areas
Group 4: Regulation	
Issues	Proposed solutions/action points
Cost of certification is high Can KEPHIS reduce the charges?	<ul style="list-style-type: none"> • The costs are gazetted as government fees • Probably an initiation of review process by seed traders • Self-authorization – companies are allowed to inspect their own materials and KEPHIS comes in for quality control • KEPHIS needs to change the perception of bean seed certification or organize a separate staff to deal with seed companies – the staff should have a clear understanding of the shelf life of crops • There is need to review the costs based on the crop's period of production (legumes vs cereals)
<i>Boda boda</i> regulation	<ul style="list-style-type: none"> • Regulation provides for who the seed dealer can be licensed and the premise from where seed can be sold • Does not allow for seed hawking – including using lorries and other carriers • All transporters are registered by KEPHIS
KEPHIS restrictions on EGS	<ul style="list-style-type: none"> • Standards are higher for EG material for purity to avoid multiplier effect of impurity
Difficulty in attaining quality standards set by KEPHIS	<ul style="list-style-type: none"> • The standards cannot be compromised • The standards are meant to protect the farmers
Heavy reliance on recycled seed that negatively impact on productivity through spread of disease, low quality and other undesired attributes	<ul style="list-style-type: none"> • Use of certified seed to reduce the risk of diseases, pests etc. • Farmers education on importance of quality seed – through demos for self-learning • Supply of new varieties • Subsidize seed price – there is currently a national value chain support program to stimulate the uptake of nutritious foods • County governments should also implement the subsidy program • There is need for zero-rating of bean seed
Retention of seed by farmers might pose a problem to private companies who are mostly commercial oriented	<ul style="list-style-type: none"> • Once a market has been identified and there is demand then farmers will definitely buy certified seed • It's a natural process – driven by demand
Regulation and effect on greater adoption of HIBs (and other beans)	<p>KALRO:</p> <ul style="list-style-type: none"> ○ Seed growers: <ul style="list-style-type: none"> ▪ Minimum acreage of 2-2.5 acres per grower ▪ Get the farmers within a cluster comprising of 20 farmers ▪ This has helped guarantee steady seed production regimes ○ How do we train small-scale seed growers and increase their value offering compared to the large-scale actors? ○ Smallholder farmers (SHFs) not only have a challenge in access to seed but also during the seed production phase especially if not organized in groups ○ It helps when they (smaller growers) have different varieties by company which removes the side selling from one company to the other <ul style="list-style-type: none"> ▪ The fact on the ground is having groups in places takes advantage of the group dynamics and “economies of scale” in managing them

	<ul style="list-style-type: none"> ▪ As an entity recognized by law, quality concerns can be easily tracked over time <p>Boda boda:</p> <ul style="list-style-type: none"> ○ Biggest worry is on quality but the issue to cement is who remains accountable ○ Let's revisit the regulations and accommodate them e.g. proper documentation whether the source is known – with a delivery note ○ Transport – motorbike system should be regulated so that seed does not “disappear” ○ Are Regulations by politicians for politicians? Do not politicize important issues but rather articulate them for the common good ○ A tag when transporting the product – regulation of the transport that guarantees seal is protected
	<p>KEPHIS:</p> <ul style="list-style-type: none"> ○ Multiplication of seed should be zone to enable inspectors get ease of access for certification. This will most likely influence overall costs especially if coupled with the “newly gazetted inspectors” and “acceptability by KEPHIS to authorize private seed inspectors” ○ Mechanism of follow up post farm – how is it done? Random checks are enough or not? ○ Seed shelf life concerns: <ul style="list-style-type: none"> ▪ Can KEPHIS release certificates in advance (or fasten the process?) ▪ Seed shelf life is a factor of many things – Understaffing vs. Private Inspectors... ○ Laboratory capacity is low and sometimes the pressure from seed companies can delay this ○ Seed package tampering – monitoring needs to be done at all levels to ensure the farmer is protected ○ Clear regulations to the public on requirements e.g. digitize and have this information readily available ○ Mandatory scratch label on the seed packages – how do we get down there without distorting the seed? An ICT tool that can be able to help us trace the seed as it moves – <u>TRACEABILITY from the source to the user</u> ○ Awareness on regulations is key. Let the farmers know why we are putting these regulations/standards in place. <p>Government Ministries: MoA, MoT, MoH, MoE, with Departments i.e. KRA, KEBS, KEPHIS etc</p> <ul style="list-style-type: none"> ○ Slot beans as a key crop like maize staple, which pushes attention to streamline and build aggregation point. Government gives emphasis on beans as a safe, affordable protein ---- MAKE IT A POLICY ISSUE TO MAKE BEANS IMPORTANT – ADVOCACY (profile as much as possible)
Group 5: Seed distribution	
Issues	Proposed solutions/action points
Volume of seed to produce:	<ul style="list-style-type: none"> • Sufficient volume of seed- off season production • Prioritize varieties to ensure sufficient production • Subcontract other producers in alternative regions • Offseason production of seed to make it readily available
Information on when the seed is available and where	<ul style="list-style-type: none"> • App to disseminate information on when seed is available (Uber Seed), radio, bulk SMS, field days • Training of distributors/agrodealers/stockists on the product – product awareness • Awareness of agrodealers on the HIBs to facilitate wider distribution • Seed distribution with information as a package • Extension support to create awareness
Points of sale	<ul style="list-style-type: none"> • Open more distribution points of seed, kindly only a few agrodealers involved • Smaller pack to ease access and distribution • Licensing arrangement (regulation) with <i>boda boda</i> riders to get seed to deepest points, e.g. meat transporters- <i>boda boda</i> Stockists
Motivation of agrodealers	<ul style="list-style-type: none"> • Loyalty program for agrodealers by the seed producers • Rebates/Margins to motivate distributors/agrodealers to get seed out there • Differentiated pricing that encourages stocking • Credit arrangement for agrodealers • Credit guarantee by banks
Agrodealer networks	<ul style="list-style-type: none"> • Channels exist- networks e.g. at Kenya Seed • Widen coverage to reach more farmers- Strategic location of agrodealers points in major production sites • Address storage facilities at the agrodealer level- to ensure viability is ensured
Matching demand	<ul style="list-style-type: none"> • Seed road map with partners on annual basis • Advance orders to ensure timely delivery of seed with feedback to seed producers • Bulk orders by groups
Regulation	<ul style="list-style-type: none"> • Reduce inspection costs to make seed cheap • Address issue of fake seed • Seed traceability systems • Receipting to ensure traceability of seed
County support	<ul style="list-style-type: none"> • Subsidy programs to make seed available- voucher system • Infrastructure- County and national government- rainy season

Appendix 4: Program for the Niche Market Product Deployment Model for High-Iron Beans (HIBs) - Stakeholder Consultation & Dissemination of Pilot Results

Date: 26 February 2020

Venue: Queens Garden Hotel, Eldoret

Time	Activity	Responsible
Session 1: Welcome & opening ceremonies		
8:00	Registration	Lilian Watakah
8:30	Welcoming remarks and participants' introductions and meeting objectives	Justin Mabeya
9:00	Opening remarks - Bean Programme Leader & Pan Africa Bean Research Alliance Director (ABC)	Jean Claude Rubyogo
9:10	Opening Remarks – USAID Mission Director, Kenya	Mark Andrew Meassick
9.20	Opening remarks – Director Crops, Kenya Agricultural Livestock Research Organization (KALRO)	Dr. Joyce Malinga
9.30	Opening remarks and official opening – CECM Agriculture, Trans-Nzoia	Dr. Maria Nzomo
9:40	Questions and Answers	
9.50	Group photo + varieties and promotional materials exhibition + Bean based product exhibition	All participants (Rosemary Nzuki)
10:00	Coffee/Tea break	
Sessions 2: Promotion and distribution of HIBs		
		Boaz Waswa
10:30	Overview of seed systems in Kenya	Ephraim Wachira
10.45	Overview of Bean Research and Development in Kenya	David Karanja
11.00	Understanding PABRA S34D Niche Market Model for last mile delivery of HIBs in Kenya – Background	Jean Claude Rubyogo
11.15	Implementing the point of sale (PoS) pilot (awareness creation, the process of getting to the PoS) – Methodology	Justin Mabeya
11:30	Findings from the PoS pilot – Findings	Noel Templer
11:45	Identification of Key issues in HIBs value chain and their grouping	Jean Claude
12.00	Questions and Answers	
12:30	Lunch	
Sessions 3: Group Discussions (2.00 – 5.00) depending on the issues identified		
		Jean Claude Rubyogo
2:00	Group 1: Unavailability of early generation seed <ul style="list-style-type: none"> • KARLO custodian of breeder and basic • Shortage of EGS 	Jean Claude Rubyogo
	Group 2: Awareness creation <ul style="list-style-type: none"> • Cost of radio is expensive • Nutrition education • Information on seed sources (access) • Sensitization of agrodealers on HIBs (they are the major movers) • Limited extension services • Inadequate farmers education on benefits of HIBs • Facilitation of demo plots/sites • Follow up of demo plots • Participation of women and men • Adverse bean growing conditions • Awareness on existence of early maturing varieties • Poor dissemination of new information to the farmers 	Wilfred Odhiambo
	Group 3: Grain market development to pull seed <ul style="list-style-type: none"> • Lack of market linkages between the producer and market 	Justin Mabeya

Time	Activity	Responsible
	<ul style="list-style-type: none"> • Value added products are not there in the local shops • Brand building • Poor infrastructure in production areas 	
	<p>Group 4: Regulation</p> <ul style="list-style-type: none"> • Cost of certification is high • Can KEPHIS reduce the charges? • <i>Boda boda</i> regulation • KEPHIS restrictions on EGS • Difficulty in attaining quality standards set by KEPHIS • Heavy reliance on recycled seed that negatively impact on productivity through spread of disease, low quality and other undesired attributes • Retention of seed by farmers might pose a problem to private companies who are mostly commercial oriented • Regulation and effect on greater adoption of HIBs (and other beans) 	Noel Templer
	<p>Group 5: Seed distribution</p> <ul style="list-style-type: none"> • Volume of seed to produce: • Information on when the seed is available and where • Points of sale • Motivation of agrodealers • Agrodealer networks • Matching demand • Regulation • County support 	Boaz Waswa
5.00	Coffee/Tea break	
5:15	Way forward/next steps to close the gaps for access quality HIBs seed	Justin Mabeya
5:30	Closing	Dr. Joyce Malinga

Appendix 5: List of Participants of The Niche Market Product Deployment Model for High-Iron Beans – Stakeholder Consultation and Dissemination workshop

Held at Queens Garden Hotel, 26 February 2020

#	Name of Participant	Organization	Email Address	Telephone No.	Gender
1.	Boaz Waswa	Alliance of Bioversity and CIAT (ABC)	b.waswa@cgiar.org	0734413667	M
2.	Irene Induli	Alliance of Bioversity and CIAT (ABC)	i.induli@cgiar.org	0722401304	F
3.	Justin Mabeya	Alliance of Bioversity and CIAT (ABC)	j.machini@cgiar.org	0722829743	M
4.	Lilian Wataka	Alliance of Bioversity and CIAT (ABC)	L.Watakah@cgiar.org	0721396939	F
5.	Noel Templer	Alliance of Bioversity and CIAT (ABC)	N.Templer@cgiar.org	0728101259	M
6.	Jean Claude Rubyogo	Alliance of Bioversity and CIAT (ABC)	j.c.rubyogo@cgiar.org	0722506529	M
7.	Dianna Atieno	Bubayi Products Ltd.	bubayiproducts@gmail.com	0712600145	F
8.	Jonathan Mayer	Bubayi Products Ltd.	bubayiproducts@gmail.com	0726641025	M
9.	George Mabuka	CGA	gmabuka@cga.co.ke	0723839706	M
10.	Limo Kennedy	CGA	klimo@cga.co.ke	0724736433	M
11.	Wilfred Odhiambo	Consultant Rapporteur	wilfredodhis@gmail.com	0797444351	M
12.	Philip Kyulu	EASEED	P.Kiamba@easeed.com	0721429776	M
13.	Shadrack Kitaka	EASEED	Shadrack.mutuku@easeed.com	0702251314	M
14.	Bilha Wafula	Farmer			M
15.	David Kimaru	Farmer (Bubayi)		0723152224	M
16.	Elizabeth Wanjiru	Hatua Kilimo Agrovet			F
17.	Philip Karuri	IFDC	pkaruri@ifdc.org	0725864333	M
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19.	David Karanja	KALRO	karanjadr@yahoo.com	0727674277	M
20.	Joyce Malinga	KALRO Food Crops Research Institute	Joyce.malinga@kalro.org	0710266737	F
21.	Esther Cherop	Kenya Seed company	Esther.cherop@kenyaseed.co.ke	0702932010	F
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24.	Joseph Otieno	Mazop Plaza		0794429895	M
25.	Maxwel Wasike	Mazop Plaza			M
26.	Edward Osanya	MOA Trans-Nzoia			M
27.	Jane Gitau	MOALFIC Bungoma			F
28.	Boniface J. Wekesa	Nahilingo Agrovet			M
29.	Peter Mbogo	Seed Co Kenya	petermbogo@seedcogroup.com	0715783017	M
30.	Johanna K. Yego	Trans-Nzoia County			M
31.	Mary Nzomo	Trans-Nzoia County			F