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Final report

project

Analysing Schools as Platforms to Improve Diets Livelihoods and the Environment in four countries in East Africa

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1 Acknowledgments

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2 Executive summary

This Small Research Activity (SRA) builds upon a direct procurement approach tested in Busia County, Western Kenya, between 2014-2017 with support from ACIAR. The approach, which also encouraged the incorporation of underutilized, nutrient-rich crops in school meals, was able to successfully link farmers to schools and provide healthy school meals to approximately 5,500 pupils while creating employment opportunities for the farmers involved.

Despite this success, there is little evidence showing that procurement approaches such as these can be sustained in the long-term or that they can be implemented in different geographic locations.

The aim of this SRA was to provide an understanding of the policy and organizational environment within which home-grown school feeding approaches such as the one implemented in Busia, Kenya, could be developed in other East African countries.

Results show that in Ethiopia, Tanzania and Uganda, as well as Kenya, home-grown school feeding (HGSF) approaches are seen as essential for achieving a number of the Sustainable Development Goals (SDGs) and the Agenda 2063 of the African Union (AU), but that few operational examples exist. HGSF is also considered a useful social protection mechanism that supports smallholder farmers and contributes to food security. However, government support and policy environments that foster HGSF vary from country to country.

Challenges also remain with regards to planning and delivering nutritious meals in schools. The introduction of locally available, affordable, safe and nutrient-rich neglected crops that can be supplied by local farmers is not impossible provided issues around coordination, operational modalities, contributions from parents and more importantly the diversity and adequacy of school meals are addressed.

Furthermore, limited evidence exists of the impact of HGSF approaches on livelihoods, nutrition and food security. Recommendations call for a deeper and more rigorous understanding of the agroecological conditions and market linkage settings required in the different geographic locations for HGSF approaches such as the one tested in Busia to yield positive agricultural development and nutrition outcomes alongside economic and social outcomes stemming from the provision of a reliable market for smallholder farmers.

3 Background

Women and men smallholder farmers living south of the Sahara still face considerable challenges in terms of malnutrition, poverty, food insecurity and increasing vulnerability to climate shocks and conflicts[1,2]. Young workers are particularly vulnerable, with an estimated 67% living in poverty[2]. Agriculture remains the largest source of employment and income, with most farmers practicing subsistence agriculture on a mixed crop-livestock production system. Low productivity, food safety and quality issues, limited access to technology, markets and credit all contribute to a rise in poverty indices, while major challenges exist around developing efficient and effective value chains, especially those that are knowledge intensive such as vegetable value chains. Coupled with rapid population growth, environmental challenges and greater climate variability, these problems hinder the capacity of communities, households and individuals to access safe food in sufficient quantity and quality to satisfy their nutritional needs. School procurement approaches – when properly evaluated and documented - could play an important role in creating profitable livelihoods while improving nutrition, education and preserving the environment. Furthermore, building capacity and empowering farmers and farmer groups to target school food procurement across production and supply, will encourage farmers to explore alternative market opportunities and reach a larger community of consumers and actors along the vegetable value chain.

This SRA built upon a pilot activity that was undertaken in Busia County, Kenya, between 2015 and 2017 within the framework of three projects: the ACIAR-funded *Linking Smallholders to Markets* (HORT/2014/100) and the *School Food Revolution* (GP/2017/007) as well as the Global Environment Facility (GEF)-funded Biodiversity for Food and Nutrition (BFN) project (www.b4fn.org). The pilot set out to test how schools and community health units can offer predictable and stable markets for smallholder farmers practising sustainable agriculture and increase demand for underutilized, micronutrient-rich crops (including indigenous and orphan crops). Since the pilot was launched in one school in mid-2016 catering for 410 students, the farm-to-school network in Busia is now providing healthy school meals to approximately 5,500 pupils and has created employment opportunities for the farmers involved.

Despite this success, a number of key challenges and lessons learned were identified during project implementation. The current capacity of farmers to produce safe, quality indigenous vegetables in sufficient amounts to satisfy increasing market demands remains limited, and infrastructural, political and financial mechanisms need to be in place to support farmers to respond to demand for traditional crops from public procurement. At the same time, there is a need to raise awareness and appreciation among different stakeholders (farmers, policy makers, parents and students) of the nutritional and environmental benefits of indigenous vegetables and to reinforce the need for species conservation by utilization. Limited evidence exists to suggest that links such as the pilot established in Busia can be sustained in the long-term in Kenya or in other geographic locations, or that the approach can improve incomes and boost entrepreneurship in local communities[3] accompanied by agricultural development as well as social and nutrition outcomes.

To better assess the potential to scale up the Busia model in other parts of Kenya as well as in Ethiopia, Tanzania and Uganda with additional crops, foods and partners, the

[1] Niles, M.T and Salerno, J.D. (2018) A cross-country analysis of climate shocks and smallholder food insecurity. PLOS ONE 13(2): e0192928. https://doi.org/10.1371/journal.pone.0192928

[2] FAO and ECA (2018) Regional Overview of Food Security and Nutrition. Addressing the threat from climate variability and extremes for food security and nutrition. Accra. 116 pp.

[3] African Union (2018) Sustainable School Feeding Across the African Union. Addis Ababa, Ethiopia

current SRA (GP/2018/101) *Analysing Schools as Platforms to Improve Diets Livelihoods and the Environment in four countries in East Africa* collected information on the current livelihood and food security contexts in the target countries, the existing national policy frameworks for school food procurement as well as the current market settings and opportunities for establishing farm-to-school networks such as the Busia pilot.

4 Objectives

The **Objectives** of this Small Research Activity were:

1. To describe the current **livelihood and food security contexts** in the targeted countries - by analyzing the household food security and livelihood contexts, dietary diversity and nutrition patterns in the target countries and understanding how these differ among women, men, children and youth, as well as characterizing the agro-ecological conditions in which the potential for alternative nutrient-rich crops can be tested;

2. To examine the **existing policy framework** for school food procurement in the target areas - by reviewing national policy frameworks for school food procurement and documenting existing programmes. The research wanted to provide an understanding of the policy and organizational environment within which home-grown school feeding approaches such as in Busia, Kenya, can be developed in other East African countries.

3. To assess **market settings and opportunities** for establishing farm-to-school networks - by describing market linkage settings of smallholder agriculture in the different countries, in order to assess the potential for establishing nutrition-sensitive agricultural value chains for alternative nutrient-rich crops and linking smallholder farmers to school procurement.

5 Methodology

The four countries used a commonly agreed research protocol established during the technical workshop carried out under this SRA and organized in Nairobi, Kenya, from 23 to 25 July 2018 (Appendix 1). During the workshop, study sites were also selected for validation and future project intervention, based on previous activities and networking in the area, the existence of agriculture for nutrition undertakings and the presence of some form of school meal/school feeding practices.

Country	**Site 1**	**Site 2**
Ethiopia	Oromia	SNNPR
Kenya	Busia	Vihiga
Tanzania	Arusha	Babati
Uganda	Kiboga	Kyankwanzi

The protocol involved an initial systematic review of literature and other information material following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology to gain preliminary insights into national household food security and livelihood contexts, dietary diversity and nutrition patterns as well as enabling/disabling policy environments for home-grown school feeding approaches such as the Busia pilot. Country-specific systematic reviews were carried out within the disciplines of education, nutrition, socio-economics and agriculture; legislative and policy databases; websites and publications of relevant international organizations (e.g. the World Food Programme, the UN Food and Agriculture Organization etc.); as well as relevant national databases and journals. Electronic searches used the following keywords: *home-grown school feeding*; *school feeding*; *school meals*; *public or institutional food procurement*; *value chain*; *gender; nutrition*; *biodiversity*; *food for education* (FFE); *home-grown school meals*; *nutrition intervention*; *livelihood*; *food security*; *diet diversity*; *food procurement* specifically coupled with the country name. As the search progressed, new, relevant keywords were included. For the policy review, a broad range of publication types were considered. These include international agreements and strategies such as the Scaling up Nutrition (SUN) documents; national strategies such as the National Biodiversity Strategy and Action Plan (NBSAP), national policies and legislation (e.g. Ministry of Health, Education, Social development and Agriculture); research articles; country reports and statistics from international and national organisations touching upon relevant topics. Grey literature such as unpublished or published information in non-commercial form (e.g., theses, dissertations, government reports, fact sheets) was also reviewed using direct content analysis. The detailed protocol is provided in Appendix 2.

Information gaps identified during the systematic review of secondary data were filled using primary data collection using qualitative methods; specifically, **focus group discussions** (FGDs) and **key informant interviews** (KIIs). Trained data collectors targeted different respondent groups to encompass all actors involved in existing school meal programs, including: elders, representatives of farmer associations, NGOs, market and value chain actors, students, headmasters, procurement officers and school caterers, representatives of Parent-Teacher Associations (PTA) and School Boards and

Committees. Interviews were also organized with government representatives, mainly from the Ministries of Agriculture, Education and Health. Ethical clearance and respondent consent was obtained prior to data collection. Further information on crop availability and market capacity was gathered using the rapid assessment Four-Cell Approach (FCA), a participatory technique to assess the abundance and distribution of local crop diversity within farming communities; to identify common, unique and rare/endangered varieties or species; and to enhance knowledge for potential intervention.

Figure 1– Example of Locally Available ABD Four- Cell Component

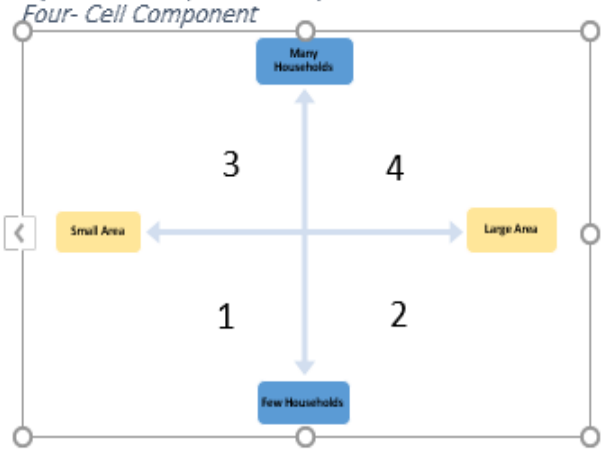
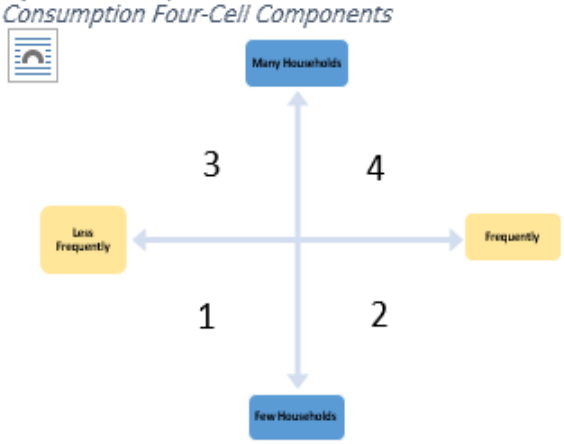


Figure 2– Example of Markets and Consumption Four-Cell Components



Source: Ahern et al. (2017) Agrobiodiversity Assessment. Four-Cell Focus Groups: A Guide to Methodology and Analysis. Bioversity International.

A summary of the study's research approaches

Approach	General Description	Country Specific Notes (as relevant)			
		Kenya	**Ethiopia**	**Tanzania**	**Uganda**
Desk Review	Assessment of published and grey literature including reports and policy documents. Subsequent gap analysis used to inform primary data collection.	Building on prior research in Busia County			
Focus Group Discussions and Key Informant Interviews	Standardized questionnaires were used for different individuals and groups including school officials, caterers, students, members of parent-teacher associations, community elders, representatives of farmer organizations, policymakers, market or value chain actors.	5 schools	30 KIIs, 10 FGDs (focused on community groups, schools, and NGOs directly involved with HGSF)	21 KIIs, 27 FGDs (10 schools, 217 participants)	28 KIIs, 28 FGDs (4 schools, 2 farmers groups)

Four cell approach	Rapid participatory approach to understand amount and distribution of local crop diversity at the community level.				
Other notes	Ethical clearance was obtained for each country. Data collectors were trained to follow specific guidelines, which included receiving signed consent and anonymous transcription.				

6 Achievements against activities and outputs/milestones

Objective 1: To understand the current livelihood and food security contexts in the target countries

No.	Activity	Outputs/ milestones	Completion date	Comments
1.1	Identify sites for project intervention	Standardized site selection (2 per country, 5 schools per site) established during Technical Workshop #1	July 2018	Completed
1.2	Conduct a literature review (grey and scientific literature)	Literature review completed	September 2018	Completed
1.3	Collection and analysis of existing data in the 4 countries' project sites	Data collection and gap analysis completed by designated focal points	January 2019	Completed
1.4	Complement existing data with field investigation/expert interviews in selected areas to fill information gaps	Four cell analysis, focus group discussions, and key informant interviews conducted by designated focal points, and compiled into country reports	January 2019	Completed

PC = partner country, A = Australia

Objective 2: To understand the existing policy framework for school food procurement in the target countries

No.	Activity	Outputs/ milestones	Completion date	Comments
2.1	Review of existing policy framework driving current school meal programmes	Policy framework included in country reports	December 2018	Completed
2.2	Documenting current meal composition of school meals in the selected locations and gaps in diet quality	School meal status summarized in country reports	December 2018	Completed
2.3	Assess current influencing factors and capacity to plan and deliver nutritious school meals for school-aged children based on age/gender	School meal capacity summarized in country reports	December 2018	Completed
2.4	Identify and prioritise nutrient-rich local foods currently available by season, or with potential to become available, that could be included in institutional procurement programs; towards outcomes of improved local livelihoods, dietary diversity and nutrition outcomes.	Local foods identified	December 2018	Completed

PC = partner country, A = Australia

Objective 3: To understand market settings and opportunities for establishing farm-to-school networks

No.	Activity	Outputs/ milestones	Completion date	Comments
3.1	Identifying farmer groups and schools (and other institutional markets) to be included in the project intervention	Promising farmer groups and markets identified in reports	December 2018	Completed
3.2	Carrying out a comprehensive analysis of the institutional settings in the different locations, current public procurement mechanisms and costing framework capturing fixed and recurrent costs incurred at school level and diagnose differences across the countries that will impact how the programme would function	Country reports including market assessment data	December 2018	Completed

PC = partner country, A = Australia

7 Key results and discussion

Detailed reports stemming from the country literature review and qualitative analysis are provided in Appendices 3-9. A summary report is also provided in Appendix 10.

Key results show that although the general economic outlook in the four target countries has seen positive trends in recent decades, poverty levels remain high (30% in Ethiopia, 34.6% in Uganda, 40% in Kenya and 26.8% in Tanzania), with the majority of the poor living in rural areas and dependent on subsistence and rainfed agriculture for their livelihoods. Furthermore, where rural households are female-headed the incidence of severe poverty is significantly higher, indicating the engagement of women in low productivity and low remuneration jobs and businesses (Tsimpo Nkengne, 2016; World Bank 2015a, 2015b and 2016). Nutrition statistics in these countries are also far from encouraging. Despite positive trends in improving the nutritional status of children (IFPRI, 2016), stunting in children under five ranges from 26% in Kenya (KDHS, 2014), to 29% in Uganda (UBOS & ICF, 2017), 34% in Tanzania (MoHCDGEC et al. 2016) and up to 38.5% in Ethiopia (CSA &ICF, 2016).

Food security is a pressing issue in the four countries, especially in Ethiopia where the demand for food in 2017 was 19.3 million tons, likely to grow to 31.4 million tons by 2030. Food security pressure on agriculture in these four countries has had the effect of focusing the bulk of food production on a small number of staple crops like maize and wheat, leading to loss of biodiversity, less nutrient-dense food in the field and on the plate, the gradual disappearance of traditional varieties, and crucially, a loss of local genetic plant resources better adapted to climate change than the small number of staple varieties carried by commercial seed catalogues.

School feeding

In Africa, work on school feeding is driven by the New Partnership for Africa's Development (NEPAD) while the link between school feeding and local agricultural production (i.e. home-grown school feeding) is one of the key initiatives of the CAADP established in 2003 by NEPAD in collaboration with the World Food Programme (WFP) and other partners including the Partnership for Child Development (PCD). African sub-regional school health and nutrition networks, consisting of members officially appointed by the different ministers of education, provide a platform for sharing good practice and operational experience in school feeding. The Eastern Africa Network includes: Burundi, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Uganda, United Republic of Tanzania and Zambia and networks meet and communicate regularly and are guided by their yearly action plans. Between 11-14 June 2019 in Nairobi, CAADP held its 15th Partnership Platform Meeting focusing on “Enhancing intra-African trade & market access for accelerated agriculture transformation”. During the meeting the AU urged African countries and pan African institutions operating in the agriculture sector “to create an enabling environment for agricultural trade through appropriate policies, governance and institutional arrangements.” The AU also stressed the need to enhance investments and market access in the agriculture sector in order to ensure agriculture commercialization and the participation of all players in the value chain, which include African smallholder farmers, the youth and women. Today, at least 20 African countries are implementing Home-grown School Feeding (HGSF) strategies. Some countries are fully supported by their governments while others are partially funded by development partners. For the countries involved, the HGSF programme is seen as an essential component to achieve a number of the SDGs and the Agenda 2063 of the African Union (AU), a social protection mechanism that supports smallholder farmers and contributes to food security.

Although the four countries are committed to the implementation of school feeding programmes, actions to include the promotion of HGSF approaches are quite variable. The Kenyan school feeding programme is probably the largest nationally-owned

programme, supporting school feeding to spur local agricultural development and promote food security. Formerly, the country had two programmes providing mid-day hot meals: the Home-Grown School Meals (HGSM) programme, sponsored by the Ministry of Education, and the *Njaa Marufuku Kenya* (Eradicate Hunger in Kenya – NMK). These have since been discontinued (except in very remote, drought-prone areas), but have contributed to Kenya leading the way of the four target countries in terms of the coverage of school feeding programmes generally with 28% compared to Tanzania (15%), Ethiopia (5%) and Uganda (1%) (WFP, 2013). In *Ethiopia*, the HGSF programme began as a pilot in 2012, targeting 37 schools in the State of Southern Nations, Nationalities and Peoples' (SNNP) region of Ethiopia. By 2017/18, HGSF beneficiaries had increased to 139,038 students in 302 schools in other regions. HGSF programmes in Tanzania, piloted in the Mara and Singida Regions by WFP in collaboration with the Government of Tanzania and other partners including Plan Concern International (PCI), reached over 28,000 students from 40 primary schools between 2011 and 2016 (WFP, 2016). In Uganda the reach of HGSF is limited and mostly WFP-led. Begun in 2015 and initially providing school meals or take-home rations for internally displaced people in Northern Uganda, the program now provides hot meals for children in the Karamoja region as well as selected refugee settlements (WFP, 2017).

School meals

Severe malnutrition affects children in Uganda, Kenya, Ethiopia, and Tanzania, leading to the prevalence of micronutrient deficiency and stunting. In East Africa, the prevalence of vitamin A deficiency (VAD) significantly exceeds the WHO threshold for public health concern and is one of the main public health problems in Uganda. Due to cost, sourcing issues, and availability, the typical school meal provided to children in Uganda, Kenya, Ethiopia, and Tanzania is calorifically-adequate yet nutritionally-poor. The 2016 Global School Feeding Sourcebook: Lessons from 14 Countries[4] revealed, for example, that school meals in Kenya currently provide less than 30% of the Recommended Dietary Allowance (RDA) of essential vitamins, protein, and nutrients. The current dietary focus tends to be on meeting the child's basic energy (calorie) needs rather than on ensuring that they are consuming the right type of food to meet their overall health and development needs, a gap that leads to micronutrient deficiency. So, while the average school meal in these four countries might contains sufficient calories (for one meal at least) at an average of 700+ calories per 198gr portion, the meal is nowhere nutritionally-diverse enough to supply the child with the essential diversity of nutrients his or her body needs for full physical development, cognitive function, height, and so on.

The typical school meal food basket in these four countries features a large portion of a staple carbohydrate like ugali/posho (maize porridge) or kinche (wheat porridge), supplemented with additional flours such as corn-soy blended flours (CSB), fortified vegetable oil, and a small portion of starchy legumes such as beans, lentils, or chickpeas. Some seasoning is provided, but generally, the school meal is designed to meet little more than the basic energy requirements. The school meal is inadequate to the micronutrient needs of the child and currently misses out on an important opportunity to promote learning on the nutritional importance of consuming a diversified diet.

Apart from maximizing micronutrient density, the other key issue for school meals is cost. In most EA countries, the school meal is either partially or fully subsidized by parents, and not all families can afford a meal for their child, let alone a nutritious one.

There is a growing recognition within the governance of these EA countries that policy intervention is required to reform the school procurement system and address the concern over childhood malnutrition and micronutrient deficiency.

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[4] *Drake L., Woolnough A., Burbano C. and Bundy D., 2016, London: Imperial College Press. https://openknowledge.worldbank.org/handle/10986/24418*

Another significant challenge for these four countries is climate change. While climate change impact on agriculture is dependent on changes in temperature, precipitation and climate variability, the interaction of these variables makes it difficult to predict how climate change will impact at regional level (Alemu and Mengistu, 2019), with an estimated loss of up to 20% of GDP in some regions in Africa (Yalew et al. 2018).

Markets

The lack of value chain activities linking smallholder production to secondary markets and processing facilities represent another significant challenge. Although 70% of SSA's food comes from smallholder farms, there is often no place for these crops to be sold. The lack of a market for smallholder farmers (SHFs) is often cited as one of the main causes of post-harvest loss, estimated by FAO to be at 30% of all food produced in Africa (FAO 2011). FAO estimates that this 30% of wasted food could feed 48 million people in SSA annually. Public tenders for staple crops are common: public tenders for the more traditional, neglected and under-utilized species such as the broad range of almost forgotten African Leafy Vegetables (ALVs) do not exist at all. Even when market opportunities do exist, smallholder farmers lack the capacity to pursue them; few can write a business plan or a loan application to a local micro-finance institution (MFI), let alone a commercial bank. This means that smallholder farmers lack access to a steady market for their crops and miss out on value addition opportunities that would generate extra income.

Food safety

Food safety is a major concern in SSA, especially in Uganda where public concern over the use of harmful pesticides and chemicals in the food production system leads to consumers preferring bulk-grown staple crops such as maize erroneously believed to be the safer bet compared to the less familiar dark green leafy vegetables, roots, or tubers. Despite the positive results of the Busia pilot, the evaluation team found that specific challenges do persist around seasonal water shortages, storage facilities, and issues of food safety, and that these issues must be addressed in future proposals, such as this one, that are larger or more ambitious in scope.

Enabling policies

Despite some gains in school feeding, efforts to date to integrate agriculture and nutrition concerns and make better use of underutilized, micronutrient crops into programmes, especially HGSF approaches, are still very limited with the exception of a few recent pilot studies, most notably in Kenya. However, on the positive side, each country has, to some degree, a developing enabling environment of policy frameworks, financial capacity, institutional capacity and coordination, design and implementation and community participation that provides much opportunity and which can be targeted to better promote and integrate underutilized, micronutrient-rich crops.

The Agriculture, Health and Food Security sectors in all four countries are taking steps to recognise and to address the worrying economic and dietary trends highlighted above. Kenya's Vision 2030 as well as its National Food and Nutrition Security Policy (GOK 2011) suggest the promotion and consumption of locally-produced agricultural products, building capacity of farmers, MSMEs and cooperatives to undertake farming as a business and creation of on-farm jobs to increase on-farm employment as some of the strategic interventions to reach its objectives. Similar considerations are included in Uganda's National Agriculture Policy (2015), in Ethiopia's Agriculture Sector Policy and Investment Framework (2010–2020) and Tanzania's Agriculture and Food Security Investment Plan (TAFSIP). The action also aligns closely with commitment by the four countries to the African Regional Roadmap of the 10YFP (2014) for sustainable consumption and production, particularly the priority activity 'sustainable public procurement' and the 2030 Agenda for Sustainable Development.

Kenya, Tanzania, Ethiopia and Uganda are also highly to moderately committed to ending malnutrition in all its forms, respectively ranking 4th, 5th, 17th and 25th among 45 African

countries on their political commitment to tackling hunger and undernutrition (HANCI-Africa, 2018). Having all joined the Scaling Up Nutrition (SUN) Movement and recognising the need for multisectoral programming, particularly with regard to nutrition, the four countries are looking for evidence-based models to guide their national nutrition policies and strategies.

In terms of nutrition governance, the four countries have set national targets that align with the World Health Assembly (WHA) targets of significantly reducing child stunting by 2025 (also a principal indicator for SDG2), and have all established multi-sectoral policy nutrition frameworks, multi-sectoral platforms for nutrition coordination and have included nutrition objectives and outcomes in their agriculture, food security, health and social protection policies and programmes.

In 2018, African leaders stepped up their efforts to fulfil their commitment to the Comprehensive Africa Agriculture Development Programme (CAADP) and the Malabo Declaration, which strives to end hunger and halve poverty by 2025, and launched the African Agricultural Transformation Scorecard, an innovative tool that tracks agricultural progress across 43 indicators, including agricultural productivity and development. While 20 out of 47 countries (including Ethiopia) scored 3.94 out of 10 and are considered on track to accomplish their Malabo commitments, Africa as a continent scored only 3.6. As of August 2018, only 19 African countries had made headway in preparing their Malabo-compliant National Agriculture Investment Plans (IFPRI, 2019).

Mindful of these shortcomings, on 3 May 2019, the Agricultural Ministries of 14 African countries –including Ethiopia, Kenya, Uganda and Tanzania– pledged to devolve at least 1% or more of their total national budgets to agricultural research in line with the Forum for Agricultural Research in Africa's (FARA) Science Agenda for Agriculture in Africa (S3A) agenda. Among the targeted measures are the “implementation of crop diversification practices and similar multidisciplinary research efforts that show promise in boosting and stabilizing productivity and safeguarding the resource base in the face of climate change.”

In April 2019, recognition of the limited progress in improving the food security and nutrition situation in Eastern Africa, led to the formation of the *Eastern African Parliamentary Alliance for Food Security and Nutrition* (EAPA FSN), which is committed to promote the Right to Food and urge African governments to enact sound legislation and allocate adequate resources to fight food insecurity, malnutrition and hunger. Among its goals is to “ensure governments are on the right path to transform the agricultural sector from its existing rudimentary stage to a modern system, where the youth can benefit in terms of employment and investment”.

Available biodiversity

The four countries are home to a wide diversity of unique underutilized, micronutrient-rich crops and animal species (including highly adapted local animal breeds, plant varieties and wild edibles) that are often more nutritious than typical food staples (FAO, 2010). These include green leafy vegetables and fruits rich in key nutrients such as iron and vitamin A (Remans & Smukler, 2013; Kehlenbeck et al. 2013). According to estimates, 539 species of vegetable and 645 fruit species can be found in Africa (PROTA 2010), only marginally addressed by research and development.

Despite their abundance, they remain largely unused due to limited data about their nutritional properties, lack of awareness of their health benefits and other bottlenecks along their value chain, hindering their sustainable use enhancement (Abukutsa-Onyango, 2007; Padulosi et al 2013; Gido, 2017).

8 Impacts

8.1 Scientific impacts – now and in 5 years

The diagnostic study carried out as part of this proposal offered interesting insights into the agriculture, markets, nutrition and health, economic, education and policy domains in the four countries. The study helped establish a general overview to potentially scale out the Busia approach tested in the ACIAR-funded *Linking Smallholders to Markets* (HORT/2014/100) and the *School Food Revolution* (GP/2017/007), but more rigorous research is needed to establish the tangible impacts of such an approach in the East African region. The limited impacts and potential down-stream effects envisioned are described in the sections below.

In terms of scientific impact, the project helped establish a knowledge platform that could foster the exchange of information and south-south cooperation around nutrition and home-grown school feeding (HGSF) in the four countries where the study was carried out.

Further research on the integration of underutilized, micronutrient-rich crops in the school supply chain and in the School Meal Planner tool is needed to help fill the knowledge gap for mobilizing biodiversity to improve dietary diversity (i.e. how to effectively integrate biodiversity into strategies that address malnutrition).

Filling this gap could, in the next five years contribute to the tracking of relevant global indicators in the area of biodiversity, health, agriculture and food security, which are receiving considerable global attention and for which limited information is currently available. Bioversity International is adequately embedded in the relevant global processes and mechanisms and could ensure that the information feeds into the achievement of the CBD Strategic Plan for Biodiversity 2011-2020 and monitoring of relevant global indicators, such as the new Aichi Biodiversity Targets, the Global Strategy for Plant Conservation (GSPC) indicators, the indicators on agricultural biodiversity embedded in the Global Plan of Action (GPA) of the ITPGRFA, as well as the relevant core indicators of the Sustainable Development Goals and the Committee on World Food Security. The Busia example has already been used to inform global forums that aim to mainstream biodiversity into sustainable food systems using public procurement and particularly schools as a platform for improving nutrition (Bioversity, 2017; UNSCN, 2017).

8.2 Capacity impacts – now and in 5 years

In the respective countries, the study built local capacity to undertake qualitative data collection and analysis. By connecting parents, teachers, students, and school officials to discuss the merits of home-grown school feeding, the study established a platform for dialogue around alternative, sustainable models of feeding and procurement. By identifying common barriers and challenges, community members should be empowered to plan more effective approaches. However, in order to adequately implement the Busia approach, additional technical and financial support to the different HGSF players is needed.

In the long term, training on sustainable agricultural practices and implementation of the Farmer Business School is expected to enhance the capacity of smallholder farmers, particularly those trained in the sustainable production of underutilized, micronutrient-rich crops and able to apply for tenders and compete in supplying schools with these foods.

This will be essential in improving livelihoods and generating broad-based health and economic growth. Further training on value addition, as well as on drying and preservation methods will help farmers reduce post-harvest losses and ensure year-round capacity to supply of traditional vegetables to schools and other buyers.

With better knowledge, capacity and networks it is also likely that farmers will begin to invest more resources in the production and marketing of underutilized, micronutrient-rich crops. Trainings on gross margin analysis can increase farmer skills in contract negotiation and in determining equitable prices for their products and might encourage farmers to build sustainable out-grower schemes, diversify into new enterprises, reach more distant markets and inspire other farmers to learn new production methods and technical skills, improving community productivity and profitability. Overall, farmers linked to schools should expect increases in household income, increased farm resilience and greater levels of food security.

The integration of neglected and underutilized nutrient-rich crops into school meals is expected to positively impact dietary diversity and the nutritional quality of school meals with important positive effects on enrolment, attendance and completion.

8.3 Community impacts – now and in 5 years

Although no direct impact was generated by this study, it is expected that impacts deriving from the implementation of the Busia approach in the four countries would include:

- Increased diversity of smallholder production systems
- Increased economic stability and income opportunities
- Increased consumption of local foods
- Increased sense of ownership among communities and farmers involved

Awareness–raising events and communication activities carried out as part of the approach (e.g. food fairs, cooking competitions, cooking demonstrations and media events) can increase community participation in managing biodiversity by changing people's mind-sets and attitudes towards underutilized, micronutrient-rich crops. Fairs enable farmers to share biodiversity-related information and associated traditional knowledge as well as planting material and seeds, while enabling researchers to learn more about underutilized foods and locate new custodians of biodiversity. These activities also encourage consumers, schools, youth, policy-makers and farming communities to make continued use of local crops and varieties, thereby contributing to their conservation.

8.3.1 Economic impacts

The diagnostic study produced no tangible economic impacts; however, if the Busia approach were implemented in the respective sites and sustainable linkages established between farmers and schools (with additional income possible through exploration of alternative/secondary markets), this would enable farmers to:

i) Come together in farmer organizations and have greater standing in negotiations with schools where they can come to the table as equal partners;
ii) Access financial resources to take advantage of emerging opportunities, helping them to overcome poverty;
iii) Compete in school procurement bids; and
iv) Better negotiate farm-gate prices; form companies; own shares in processing centres

Economic impacts have been measured (HORT/2014/100) for one farmer group which successfully linked to a local school for the supply of African Leafy Vegetables (ALVs). Average profits for the farmer group supplying 91kg of ALVs to the school per week amounted to $0.15 per kg supplied. This translated into weekly profits of $13 and yearly profits of roughly $540. Farmers would prepare their own manure and sell it at $10 per bag, and help neighbours set up their own kitchen gardens at $15 per household.

Savings were also reported by the school. By avoiding middle men and purchasing directly from family farms the school was able to save up to $0.10 per kg of ALVs purchased, corresponding to yearly savings of $360.

Furthermore, while the Busia pilot focused on promotion of African Leafy Vegetables, it is possible to include other nutritious fruits and vegetables such as sweet potato, beans, roots, and vitamin A-rich plantains, thus diversifying the production base of farmers and consequently their financial and operational sustainability. Diversification is also a good mitigation tool for offsetting the risks associated with single crop focus like seasonality, local price fluctuations associated with market interventions or crop surpluses/shortages, sudden crop failure, or climatic events.

Adding value to existing crops grown by smallholder farmers and identifying alternative market opportunities outside of the school system will generate additional income.

Longer-term socio-economic impacts of diversified school procurement within producer households, as well as down the entire supply chain and the value transfer to families that are benefiting from the model would require additional research. Broad-based economic benefits have been reported and quantified for similar models leading to increased household investments in productive assets (Molinas and de la Mothe, 2010).

8.3.2 Social impacts

Although the diagnostic study did not produce direct social impacts, potential long-term social impacts of applying the Busia approach in different geographical settings include an improved standing and reputation of farmers within the community, as they are perceived to improve nutrition while promoting environmental sustainability. Broader impacts of an approach similar to the one implemented in Busia include improved nutrition and health at household level, safer food especially for children, fewer pesticide applications, and productivity gains, especially among school children, whose performance and mental alertness at school.

The establishment of production plots on school land and the use of plots as education tools can promote renewed interest in sustainable agriculture as a profitable business venture, and awareness of environmental issues among younger generations. This can depend, however, on individual country context and on the possibility of school land being specifically allocated to the production of underutilized, micronutrient-rich crops. Schools may also see the relationship of linking to local farmers as part of their social corporate responsibility.

8.3.3 Environmental impacts

Environmental impacts were beyond the remit of this study; however, it was found that the land cultivation practices—and environmental degradation--across the four countries are very similar; therefore, each country could benefit from the approach adopted in Busia. In the long-term, integration of neglected and underutilised species and further diversification of farmland could provide benefits such as improved resilience to pests and diseases, decreased use of pesticides, improved soil management including better nutrient retention, and decreased soil erosion. Diversification could help in climate change adaptation and mitigation strategies as many locally-adapted varieties are hardy in the face of droughts and weather fluctuations.

8.4 Communication and dissemination activities

Although limited external communication occurred during project implementation, the project recognises the critical importance of communication and extension to achieving empowerment in target populations and sustainable project outcomes. Particularly, future communication activities should seek to:

(i) Secure broad consumer-level (community leaders, community members, parents, and school administrators) support for the value of a safer, healthier, more nutrient-rich school meal and offset fears about increased costs, and;

(ii) Ensure the buy-in and political good will of key policy and governance stakeholders for scaling the Busia approach out to a broader number of schools in other districts and advocate for policy and governance measures that will secure sustainability of the model, through working in partnership with PCD on messaging, briefs, and workshop events with stakeholders.

The second is particularly important for the long-term sustainability of the project. Government (and non-government) agencies play a key role in supporting school procurement supply chains. The endorsement of the Busia Biodiversity Policy, which occurred under SRA GP/2017/007, has attracted considerable attention and put the conservation of local biodiversity for food and nutrition on much stronger footing. It also recognizes the role farmers play in safeguarding much of this diversity and opens up opportunities for farmers to engage in the production and marketing of these neglected and underutilised species.

9 Conclusions and recommendations

9.1 Conclusions

The diagnostic study achieved its intent of providing an understanding of the policy and organizational environment in Ethiopia, Tanzania and Uganda as well as an additional county in Kenya with a view to implementing a similar approach as the one tested in Busia, Kenya between 2014-2017. Results show that in four countries home-grown school feeding approaches are seen as an essential component to achieve a number of the SDGs and the Agenda 2063 of the African Union (AU), as well as a social protection mechanism that supports smallholder farmers and contributes to food security, but that government support and policy environment varies from country to country. Furthermore, challenges remain with regards to planning and delivering nutritious meals in schools. The introduction of locally available, affordable, safe and nutrient-rich neglected crops that can be supplied by local farmers is not impossible provided issues around coordination, operational modalities, contributions from parents and more importantly the diversity and adequacy of school meals are addressed. Furthermore, limited evidence exists of the impact of HGSF approaches on livelihoods, nutrition and food security, making it all the more necessary for rigorous scientific evidence to be collected

9.2 Recommendations

Recommendations from the four countries to successfully implement a HGSF approach such as the one tested in Busia include resolving issues around policies and practices that deal with food production and meal preparation, government support, and awareness-raising. These are summarised in the table below. Recommendations also include gathering sound scientific evidence of the impacts of HGSF. In 2019, the World Food Programme (WFP) will stop funding the national school feeding programme in Kenya and in other East African countries and is looking for sustainable alternatives while it hands activities over to the respective East African governments.

Selected HGSF Recommendations across the 4 countries

Focus Area	Shared Factors	Additional related Factors
Policies	Guarantee government support	Develop capacity of smallholder farmers to produce local nutritious foods and plant fruit trees on farm Build farmer capacity to manage their farms as a business Build farmer capacity to organize themselves as a group
		Endorse School Feeding Strategy and Guidelines with provisions for linking smallholders to schools and other institutional markets Endorse the inclusion of local, nutritious, underutilised fruits and vegetables into school meals Simplify tender process to allow farmer participation
Practices	Raise awareness of parents and community on the importance of	Sensitize farmers, parents and schools on the process

	school feeding and providing nutritious meals	
	Improve storage facilities for perishables	Support fully functional school food committees
	Diversify meals	Consider cultural and societal norms in school meal preparation Add soybean flour to maize porridge Add vegetables and fruits to meals
	Build farm-to-school networks	Create access to small-scale irrigation schemes for sustained vegetable production Use schools as a platform to build community capacity

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10.2 List of publications produced by project

A peer-review paper is being prepared for publication later in 2019. Alongside the country reports that are integral to this submission, a list of publications and outcomes stemming from the ACIAR-supported *Linking Smallholders to Markets* (HORT/2014/100), the *School Food Revolution* (GP/2017/007) and the current SRA is provided in Appendix 12.

11 Appendixes

Appendices 1-11 are included as part of this report in a separate folder. These include:

Appendix 1 - ACIAR Technical Workshop Report July 2018

Appendix 2 - Methodology Systematic Review

Appendix 3 - Ethiopia Desk Review

Appendix 4 - Ethiopia Field Report

Appendix 5 - Kenya Vihiga Report

Appendix 6 - Kenya Busia Report

Appendix 7 - Tanzania Report

Appendix 8 - Uganda Desk Review

Appendix 9 - Uganda Field Report

Appendix 10 - Summary of SRA results

Appendix 11 - ACIAR Final Technical Workshop Report 1-3 April 2019

Appendix 12 – List of outcomes and publications from the ACIAR SRAs 2014-2019