Research Application Summary

Building local capacities for innovative research through RUFORUM: Experiences from South Sudan

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Abstract

South Sudan is endowed with abundant natural resources that can sustain diverse agricultural activities. Decades of civil strife greatly hindered agricultural development until peace returned with the signing of the Comprehensive Peace Agreement (CPA) in 2005. Although there are combined efforts by Government and development partners to rejuvenate agricultural productivity, production is low and options for increased productivity are grossly under-utilised. In order to meet these challenges rationally and to pro-actively seize available opportunities, increasing and committing more resources to Agricultural Research for Development (R4D) could bring the much anticipated agricultural transformation in South Sudan. Hence, building local expertise for innovation research is vital the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) has played a leading role. Through RUFORUM, the author secured a Masters Degree scholarship in Plant Breeding and Seed Systems (2008/2011). This training enhanced his research skills and significantly improved his performance as a research scientist at his institution. He is now leading a number of agricultural programmes in South Sudan.

Key words: Agricultural Research for Development (R4D), RUFORUM, South Sudan

Résumé

Le Sud-Soudan est doté de ressources naturelles abondantes qui peuvent soutenir diverses activités agricoles. Des décennies de guerre civile qui a pris fin avec la signature de l'Accord de Paix Global (CPA) en 2005, ont grandement entravé le développement agricole. Malgré les efforts conjugués des partenaires du gouvernement et ceux du développement pour restaurer la productivité agricole, la production demeure faible et les options pour une productivité accrue sont largement sous-utilisées. Afin de répondre à ces défis de manière rationnelle et de saisir d'une manière proactive les opportunités disponibles, augmenter et engager davantage les ressources à la recherche agricole pour le développement (R4D) pourraient apporter la

transformation agricole la plus anticipée au Sud-Soudan. Par conséquent, le renforcement des compétences locales pour la recherche de l'innovation est vital et le Forum Régional des Universités Africaines (RUFORUM) a joué un rôle de premier plan. Grâce à RUFORUM, j'ai obtenu une bourse de maîtrise dans le domaine de la sélection végétale et des systèmes semenciers (2008/2011). Cette formation au-dessus de tout a perfectionné mes compétences en recherche et nettement amélioré ma performance en tant que chercheur dans mon établissement.

Mots clés: Recherche agronomique pour le développement (R4D), RUFORUM, Sud-Soudan

Background

Overview of Agriculture in South Sudan. In South Sudan, Agriculture provides a livelihood for over 80% of the people. Almost 90% of the total land area is considered suitable for agriculture of which 50% (105.6 million ha) is regarded as prime agricultural land (FAO, 2011). However, less than 2% (1.3 million ha) of the total area is utilised for agricultural production (FAO, 2011). Agriculture is predominantly rainfed with annual rainfall increasing from North to South and from East to West, with average annual rainfall of less than 500mm/year in the semi-arid zone of Eastern Equatoria to about 1800mm/year in the Green belt zone. Farming is mainly at subsistence level comprising traditional livestock rearing, crop production, fishing, wild food collection and game hunting. A combination of these elements makeup specific household economies that are preconditioned by prevailing agro-ecological zones that include; the green belt, iron-stone plateau, nile-sobat corridor, hills and mountains, eastern flood plains, western flood plains and arid zones. A wide range of crops cultivated in South Sudan often have specific importance attached to them depending on the agro-ecological or livelihood zones where they are grown. Major staple cereals include sorghum and maize while rice, bulrush millet and finger millet are minor cereals. Other important crops include roots and tubers such as cassava, oil seeds, pulses, fruit trees, and vegetables. Despite the huge potential for agriculture in South Sudan, the country faces a daunting task to meet its domestic food needs and is often forced to import plenty of food from neighbouring countries. Major constraints include; threats and pressures on stability, weak institutional and labour capacity, absence of a clear policy on land and resource use, poor and inadequate rural infrastructure, lack of inputs and inputs supply channels, lack of market facilities, inadequate research

and extension systems, and lack of agricultural data and information flow (Ogoto *et al.*, 2010).

Agricultural Research for Development (R4D) in South Sudan before the war. Yambio Agricultural Research Station was recognised as the only national agricultural research institution in Southern Sudan located in one (Green Belt) out of the six agro-ecological zones of South Sudan. Research was not fully functional due to shortage of basic infrastructure and human resources to run it efficiently. However, NGOs and development partners including Norwegian Church Aids (NCA), Africa Committee for Rehabilitation of South Sudan (ACROSS), the German Forestry Team, and the European Union sponsored Project Development Unit (PDU) made significant contribution in introducing improved crop varieties and extension services. Training of Diploma level Agriculture technicians was conducted at Yambio Institute of Agriculture, while the University of Juba not only produced South Sudanese Agriculture graduates but also participated in wheat research at Katire Gilo. By 1981, there were sufficient Agricultural human resources from South Sudan including both under and post graduates from Khartoum and Egyptian Universities that set phase for organised Agricultural Research for Southern Regions that led to the formation of the Regional Agriculture Research Technical Committee (RARTC). Plant breeding in South Sudan between 1970 and 2010 can be accredited to the work of Project Development Unit (PDU) and Norwegian Church Aid Sudan Program (NCASP). PDU established an agronomy section in 1974 in Yei, carried out food crop trials and developed district testing sites throughout Eastern Equatoria and Lakes (Rumbek). Current crop improvement programs although promising, are still basic due to limited capital, infrastructure and human capacity. Three research stations and three basic seed centers are in the process of establishment by MAFCRD-RSS, spread across the six agro-ecological zones and targeting three greater regions including Palotaka basic seed center and Yei research station (for Greater equatoria), Halima basic seed center and research station (for Greater Bhar el ghazal) and Renk basic seed center and research station (for Greater upper nile). Currently, Palotaka basic seed center (in Eastern Equatoria state) and Yei research station (in Central equatoria state) are functional.

Priorities for re-stimulating research in South Sudan include;

i. Formulation of agricultural research policy to help restructure research strategies; establishment of functional research stations and programmes in South Sudan;
ii. Encouraging the Government to fund research programmes;
iii. Development of variety testing and release procedures for South Sudan;
iv. Creation of linkages with national agricultural institutions in neighbouring countries and international agricultural research centers through fellowships, visiting and collaborative research programmes;
v. Collection, characterisation and conservation of local germplasm as a base for a sustainable plant breeding programme in South Sudan;
vi. Introduction of improved genotypes from National Agricultural Research Systems (NARIs) and IARCs for adaptation and yield potential;
vii. Acquisition of breeder and basic seed of superior and adapted varieties from NARIs and IARCs for seed multiplication by local seed companies and contracted seed growers;
viii. Development of guidelines for variety release and seed production inspection, and operationalised through ministerial order (as seed act, seed policy and regulations);
ix. Demonstration sites to be identified at State and/or county level as a way of disseminating and popularising technologies/ varieties with high yielding potential;
x. Varieties identified to combine yield potential with stability to be disseminated through Participatory Variety Selection (PVS) methods on farm for quick adoption;
xi. Multi-location sites for National variety trials (NVTs) and National performance trials (NPTs) to be identified for testing introduction of new varieties or ''best bets'' from neighbouring NARIs and IARCs.
xii. Human resource development especially training of new plant breeders at different levels (MSc., Ph.D, short-courses and fellowships) is a priority for building options and a critical mass for establishment of plant breeding programmes for South Sudan;

Narrative of my role and contribution. Upon completion of my studies at Makerere University in 2011, I was assigned to my former station in Yei (about 160 km from Juba) which is within the Greenbelt Agro-ecological zone, this time as a Research Scientist/Research programme leader for the station.

I manage research and seed programmes in Yei and Morobo Counties that are considered among the food basket areas.

Integrated Seed Sector Development for South Sudan. In 2011, I participated in the National Seed Sector Assessment study with the support of the Africa Seed and Biotechnogy Programme and Wageningen UR Centre for Development Innovation (CDI). The study was part of the integrated seed system assessment in six African countries including South Sudan. The objective was to better understand the interface among seed sectors, programs and policies that provide input to the development of African Seed and Biotechnology programme and other relevant national as well as Regional Economic Community programs. The output of the study was used to strengthen seed systems including the CoBaMa (Community based and market oriented seed production) pilot project which I coordinated. Three CoBaMa groups were established and have been linked to local seed companies under AGRA support (Greenbelt seed company and Century seed company), and to other stakeholders for seed production.

Overview of Yei Research Station (YRS) and major activities. Yei Research Station was established in 2006 by the then Government of South Sudan, under the former Ministry of Agriculture and Forestry after the conclusion of the South Sudan Agricultural Revitalisation Program (SSARP) that was supported by USAID. The center is located in Central Equatoria State (CES) within the Green belt agro-ecological zone. The mandate of Yei Research Station is to conduct basic and adaptive research and ensure seed quality control for various crops including; maize, rice, sorghum, groundnuts, cassava, millet, cowpeas and sesame among others. The Center's goal is to ensure seed quality control and to conduct basic and adaptive research for disseminating best practices and technologies for improved varieties and production systems to enhance food security, poverty eradication and economic growth. The station has a director, an administrator, an accountant, one plant breeder/research program leader, two research assistants, four research technicians, a farm manager, an accountant, a storekeeper, a tractor driver, a secretary, three drivers/ mechanics, 10 supportive staff members and 14 casual labourers. Total fenced land allocated for research activities is approximately 25 hectares. The center also conducts basic seed production for cereals, legumes, tubers and root crops, fruits and vegetables.

Objectives	Major activities
Conduct seed quality testing and analysis	Basic and breeder seed production
Technology development and dissemination	Regional germplasm evaluation
Germplasm characterization and evaluation	Local germplasm characterization
Conduct basic, adaptive and action research	Cassava germplasm characterization
Basic seed production	Vegetables production
Establish a rice breeding programme	Training of extension workers, seed producers, technicians, students

As a research scientists in Yei, my roles one outlined below are indicated in the sections below;

Current activities. Support to community based and market oriented (CoBaMa) seed production activities with improved OPV maize (Longe 5), improved Sorghum varieties (Macia and Kari mtama-1), and improved cassava varieties (TME14, 4271 and Akena). Conduct National Performance Trials for variety release and adoption in Yei and Morobo for maize and upland rice varieties.

Other activities. Germplasm evaluation of maize (OPVs and hybrids), sorghum, groundnut, sesame, cowpeas, beans, upland and lowland rice varieties, including germplasm collection, population and inbred line development for rice.

Stakeholders and Collaborators. I and other colleaugues are working with State Ministries of Agriculture & Forestry, CoBaMas, Netherlands Government, FAO, World Bank (funding SAFDP), AGRA (funding maize, rice and sorghum improvement projects), IITA and ICRISAT (germplasm), JICA, CIAT (Beans germplasm), NARIs (KARI, NaCRRI for planting materials), Universities (CUSS, UKZN, Juba), USAID, IFDC, FARM Project, Century Seed Company, Greenbelt Seed Company.

Partnerships and Resource leveraging. Between 2011-2012, Yei research station has successfully been able to mobilise funds and technical support from the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA) and the Alliance for Green Revolution in Africa (AGRA). The ASARECA funded project, "Upscaling NERICA adoption in Southern Sudan and Northern Uganda" aims at enhancing uptake of NERICA technologies and innovations, while the AGRA funded project, "Participatory Rice Breeding

for Impact in South Sudan," targets developing and disseminating high yielding, adapted farmer-preferred rice cultivars in South Sudan.

Policy advocacy. Between 2011 and 2012, I was actively engaged in the formulation and development of draft Research and Seed policies for South Sudan. In this respect, elements that are priority for investment are identified including their interaction and institutional arrangements governing seed, research policies and practices. Additionally, I have participated in the South Sudan Comprehensive Africa Agricultural Development Program (CAADP) steering committee, and also as a focal person in formulating the National Rice Development Strategy (NRDS).

Challenges and Lessons Learned

- Research funding has been limited and the flow has not been timely and yet field research activities are rainfed and thus dependent on rainfall patterns.
- Limited number of researchers and technicians has hampered upscaling and outscaling of research activities.
- Expansion and utilisation of research land has been hindered by political decisions (case scenario of Yei research station).
- There has been less emphasis on research documentation, findings and outputs.

Way Forward

- Land is critical for research, therefore there is an urgent need for research land to be clearly allocated, demarcated and fenced off.
- MAFCRD should hasten efforts to recruit proficient South Sudanese Researchers and encourage exchange programs and fellowships with other National Agricultural Research Systems and IARCs.
- Capacity building at all levels should be emphasized for refresher courses, short courses and long-tem training (M.Sc. and Ph.D).
- Administrative structures and management at Research stations and Basic seed centers should be clearly defined.
- Research stations and basic seed centers should be encouraged to initiate and/or sustain income generating activities
- Increased investment in research and development should be encouraged.
- There should be more effort by researchers to conduct on-farm trials and utilise participatory tools to encourage quick adoption and dissemination of technologies.

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References

CIAT, FAO, MAF-GoSS, AAH-I, ATED, ADRA, AMURT, CRS, NPA, DRC, 2011. Seed System Security Assessment Southern Sudan. November-December 2010.Funded by the European Commission Humanitarian Aid Department and the office of Foreign Disaster Assistance, United States Agency for International Development. Juba, Southern Sudan: FAO and CIAT.

Ogoto, J.K., Kenyi, M.R.L., Gamonde, M.N., Kidi, S., Sukeji, M.L., Penaflor, P.E. and Valmoria, R.P. 2010. The Joint Baseline Survey Report on the Agriculture and Animal Resources in Southern Sudan, SSARTO.

Oyiki, C. 2005. Southern Sudan Agricultural Research & Technology Organisation (SSARTO). Revised position paper, March 2007.