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ABOUT AAPA

The mission of the African Association for Precision Agriculture (AAPA), is to organize and contribute to the development of precision agriculture in Africa, and engage the global precision agriculture community through scientific, informative, extension, and training activities.

JOIN THE AAPA

AAPA membership is free to all registrants.

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Introducing the African Association for Precision Agriculture (AAPA)

By Dr. Kwame Frimpong, AAPA President

Do You Want to Join an Association that Prepares You for the Future?

The African Association of Precision Agriculture, an initiative of the African Plant Nutrition Institute (APNI), is an equal opportunity, non-profit, international scientific organization.

The mission of AAPA is to organize and contribute to the development of precision agriculture (PA) in Africa and to engage the global precision agriculture community through scientific, informative, extension, and training activities.

AAPA aims to work towards this mission using the following objectives:

- Provide equal opportunities for and engage in research, extension, and training activities for the purpose of promoting the advancement and dissemination of PA tailored to the needs and aspirations of the African people and the furtherance of international collaborations.
- Promote leadership skills development, advocacy, and engagement with policy towards creating the enabling environment needed to advance the frontiers of knowledge in relevant areas of PA for persons, whether members of AAPA or not, and in such manner as it shall determine, with particular emphasis, on the advancement of the science and practice of PA in Africa.
- Promote innovative capacity building, research, outreach, and professional development by challenging members to



be creative, innovative, and responsible advocates and practitioners of PA, providing PA solutions and advice across national, regional, and global scales in diverse ways.

As the enthusiasm for PA and the willingness of various stakeholders to work together to develop and scale up tailored PA models that tackle food security challenges in African countries grows, AAPA will focus mainly on how PA can help to reduce yield gaps in Africa. AAPA is committed to the core values of equal opportunity, excellence, empowerment and ethical behaviour.

AAPA invites partners from academia, research institutions, agri-food industry, financial institutions, and public and private sector organizations to join forces for the development of an initiative that incentivizes truly sustainable and responsible integration of PA in Africa to

address food security, climate change, and land degradation challenges. **AAPA**



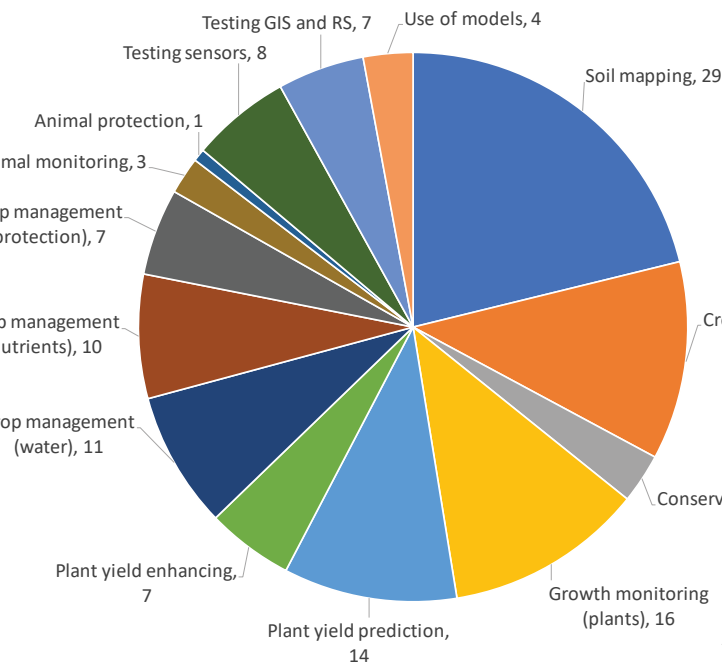
Precision Agriculture Research in Sub-Saharan Africa

“To what extent has precision agriculture (PA) been studied in Sub-Saharan Africa?” This was the research question addressed in a recent study published in Precision Agriculture by Dr. J.M. Nyaga and colleagues. Nyaga et al. used systematic mapping methodology to investigate the application of PA concepts in research in SSA countries.

After an extensive literature search and screening process, the initial 7715 articles identified in the search were reduced to 128, which were included in the systemic map. It should be noted that the literature search only included articles with an abstract in English, so it's possible that research from SSA published in French or Portuguese would not be included.

The results showed that most of the studies were conducted in countries with socio-economic and technological advancement, mainly South Africa (35), followed by Nigeria (19) and Kenya (16). This is not a completely unexpected result as the more economically advanced countries in SSA would be expected to offer a more conducive environment for precision farming, and PA research, relative to other African countries. Conversely, Burundi, Madagascar, Mauritania, South Sudan, and Togo – countries that have more socio-economic and technological challenges – had only one published study each on PA reflecting a more limited capacity for precision farming.

The studies included in the map were conducted at various spatial scales ranging from field to country level with field-scale studies being the most common. Most studies were conducted on relatively small farms, typical of most agricultural systems in SSA.



Number of studies conducted under different precision agriculture categories in SSA.

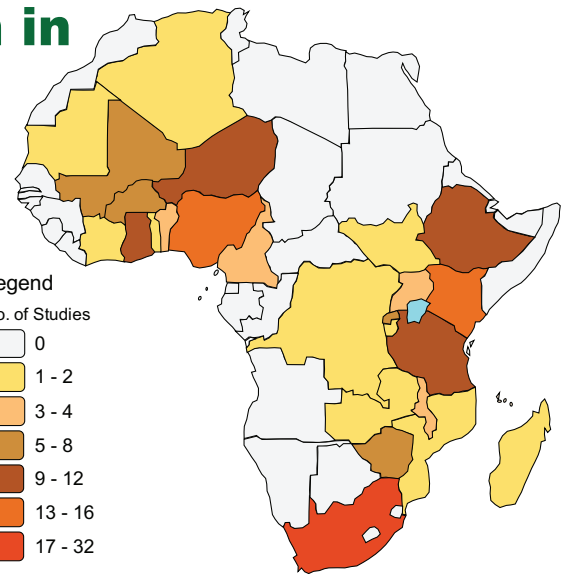
Thirty-nine percent of the studies were conducted solely by researchers from Africa. This result suggests that a significant contribution of PA research in SSA is coming from outside the continent, mainly Europe and the United States, or is a combination of researchers from within and outside Africa.

The majority of the studies (67 out of 128) focused on soil and/or crop mapping and plant growth monitoring. Satellite- and drone-based remote sensing imagery and GIS, together with the use of various sensors, were the most common PA technologies used in SSA research (73 studies). The least number of studies (4) were conducted on PA for livestock. Micro-dosing is a PA technique that is largely specific to smallholder farmers in Africa; however, there has surprisingly been very little primary research work done on the topic (14 out of 128 studies).

This study concluded that despite the many socio-economic and technological challenges facing PA in Africa, there have been significant strides towards its relevance and use in the region. There is a very low volume of published research (128 articles) and 21 countries have no published PA research, suggesting that PA has a huge potential for growth in SSA, but more research to support its adoption is needed. **AAPA**

The complete open access article by Nyaga et al. can be viewed at <https://link.springer.com/article/10.1007/s11119-020-09780-w>

Contributed by Dr. Steve Phillips, African Plant Nutrition Institute, Morocco



Geographical distribution of the number of precision agriculture studies per country in SSA.

What are the Potential Precision Agriculture Practices for Higher Fruit and Vegetable Production in West Africa?



Example of microdosed fertilizer measured by bottle cap and applied to individual plants.

Fruits and vegetables are an important source of vitamins and minerals of many people in West Africa. However, the current yield gap is very wide due to constraints caused by poor, inefficient and unadapted agronomic practices. In order to tackle these constraints, mainly in the context of precision agriculture promotion and adoption, a team of researchers from the Laboratory of Genetics Horticulture and Seed Sciences (GBioS), Faculty of Agricultural Sciences, University of Abomey Calavi (Benin Republic), conducted a study aimed at assembling the existing knowledge on efficient and adapted agronomic practices for high yielding fruits and vegetables in West Africa.

Out of the 353 papers pre-selected for the study, 71 scientific papers were selected for further analysis based on the experimental site, the period during which the research was conducted, and the adaptability of the technology to fruit and vegetable production.

Results found a great potential for the development of precision agriculture in West Africa. Technologies such as seed priming and seed treatment (13% of selected papers) and conservation agriculture (12% of selected papers) were more specific to the semi-arid West Africa region whereas site-specific fertilizer management (25% of selected papers) was most present in the humid region of West Africa. However, low-cost mechanization (6% of selected papers), fertilizer micro-dosing (21% of selected papers) and precision water management (23% of selected papers) are currently used throughout West Africa.

An integrated and multidisciplinary model is proposed for wide adoption of these technologies among fruits and vegetables farmers in West Africa. [AAPA](#)

For more information about this research conducted by Dr. Fassinou Hotegni, Leocade Azonhoumon, and Enoch G. Achigan-Dako, please see the AfCPA 2020 Proceedings at <https://paafrica.org/Proceedings>.

Contributed by Dr. Nicodeme Fassinou Hotegni, University Abomey Calavi, Benin.

Precision Nutrient Management for Cassava Farmers



AKILIMO is a suite of decision support tools developed by the African Cassava Agronomy Initiative (ACAI) to increase the availability of appropriate and affordable technologies to sustainably improve cassava production in Africa.

The AKILIMO tools were developed for extension agents and farmers to receive guidance on different aspects of cassava production including site-specific fertilizer recommendations.

The effectiveness of AKILIMO-based fertilizer recommendations was discussed in detail during the 2020 African Conference on Precision Agriculture (AfCPA).

Using data from approximately 700 farms in Nigeria and Tanzania, researchers compared fertilizer recommendations with the AKILIMO tool, which combines crop modelling, geospatial analysis, and machine learning with data on soil, weather, fertilizer and cassava root prices, and budgets against farmer's standard practices.

Compared with standard practices, AKILIMO-recommended fertilizer rates increased root yield in >75% of cases, with average yield increases of about 7 t/ha in Nigeria and 4 t/ha in Tanzania with maximum yield increases reaching 20 t/ha and 15 t/ha, respectively. Revenues generated through these site-specific recommendations were also positive for most farmers but variable within the price range of cassava roots on the market. **AAPA**

Learn more about this research in the AfCPA Proceedings: <https://paafrica.org/Proceedings>

For more information about ACAI and AKILIMO visit: <https://acai-project.org>

Contributed by Dr. Guillaume Ezui,
African Plant Nutrition Institute, Kenya



UPCOMING OPPORTUNITIES

1st Conference on Farmer-Centric On-Farm Experimentation (#OFE2021)

Montpellier, France – October 13-15
<https://www.hdigitag.fr/en/ofe2021/>

Pre-Conference Online Webinars

Theme 1: Value Creation – May 10
Theme 2: People & Processes – May 12
Theme 3: Data & Analytics – May 17
Theme 4: Policy Linkages – May 19

African Plant Nutrition Scholar Award

Application Deadline – May 31
<https://www.apni.net/scholar-apply/>

European Conference on Precision Agriculture (ECPA)

Budapest, Hungary – July 18-22
<https://www.ecpa2021.hu/>