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The status, challenges, opportunities and strategies to grow Agricultural Engineering: West-African perspective

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Agricultural Systems Approach



Agriculture is a multi-disciplinary, multi-enterprise and multi-faceted industry, where collaboration and effective coordination are key to success.

Agricultural extension experts:

Policy-Research-Extension-Farmer-Input-Linkage-System, (PREFILS).



Agro-Ecology & Demography of West Africa



ECOWAS made up of 15 Anglo and Franco-Phone Countries

Annual Rainfall: 500 mm – 4,000, declined by 25% in the last 60 years

Land: Cultivable - 236 million ha
Pasture - 119 ha
Irrigated - very low, hence
Agric is predominantly rain-fed



Transforming African Agriculture



Women bear considerable burden of farming



Transforming African Agriculture



Women bear considerable burden of on-farm processing



Challenges of Agricultural Production



Low level of agricultural mechanization - low tractor use or penetration density of the order of 0.2hp/ha.

- Poor maintenance and use of farm machinery
- Diminished stock of middle-level technical personnel – mechanics, operators, welders, fabricators, etc

Limited supply and use of critical inputs - agrochemicals and fertilizers, low adoption of modern varieties

Inadequate extension services to disseminate information esp. to Small holders

Low level of irrigation



Challenges of Agricultural Production



Low level of value addition - on and off-farm, AVCs

Unregulated importation of cereals (rice, wheat) and seed oils

Preponderance of small holder farming – Need to expand commercial farming/Agri-business

Low investment inflow

Unattractive to Youths, hence mostly Aged Farmers



Opportunities and Growth Strategies



A. Focus on Critical Farming inputs:

- 1. Provision of effective and efficient well planned farm machinery and equipment supply, hiring and management system**
- 2. Provision of high-yield crops**
- 3. Adopt genetically modified (GM) crops**
- 4. Increase the use of fertilizers**

B. Enhanced Extension is Key to Success

C. Boost Irrigation for all-year round cropping



Opportunities and Growth Strategies



D. Boost rural infrastructure, market access, regulations, and governance

E. Step up integration into Agricultural Value Chains (AVCs)

F. Digital Technology use in Agriculture

G. Mainstreaming Climate SMART Agriculture into Agro-Environmental Engineering Practice



Opportunities and Growth Strategies



- H. Taking advantage of Convergent Technologies – Nano, Bio, ICT, GIS, AI**

- I. Making Agriculture a Youth Enterprise**
- J. Educating the New Corps of African Agro-Revolution Engineers & technologists – Need for Curricula reform**
 - **Education opportunities in IoT and modern -era intelligent systems**
 - **Localized Engineering Application Paradigm (LEAP)**



Some Success Stories



- 1. Ghana Mechanization Action Plan**
- 2. The Nigerian policy on tractor availability and strategy to boost rice production**
- 3. Poverty on the Decline in Cote d'Ivoire**
- 4. Our Experience with Rural Women in a DFID Funded Project at OAU**
- 5. An Exemplary (Ghana) Digital Millennial Farmer – Obed Okyere**
- 6. Agricultural Centers of Excellence**



Agricultural and Agric Mechanisation Policies



- **New Continental Impetus for Transforming African Agriculture through Technology - Technologies for African Agricultural Transformation (TAAT) - AfDB**
- **Comprehensive Africa Agriculture Development Programme (CAADP) – NEPAD**
- **ECOWAS Agricultural Plan for West Africa (ECOWAP)**
- **National Plans – Nigeria, Ghana....**
- **Paucity of Agricultural Engineering Provisions in Agricultural Plans**



Plan of Action to Grow Agricultural Engineering



- 1. Advocacy to key into current Agricultural Policies, & entrench mechanization activities, and give strong voice in all countries.**
- 2. Provide leadership in developing comprehensive Agricultural Value Chains (AVCs)**
- 3. Lead Digital Technology use in Agriculture, Promote Climate SMART Agriculture and use of Convergent Technologies**
- 4. Educate the New Corps of African Agro-Revolution Engineers thro Curricula reform**