1. Mainstreaming and promoting the Science Agenda
   1. Strengthening African ownership and leadership of the Science Agenda
   2. Social marketing the S3A so that farmers, producers, and rural entrepreneurs come closer to science, as the processes of science become more appealing to rural society.
   3. Identifying appropriate channels for communication (mass media, electronic media, workshop and conferences) and utilise them
   4. Develop popular messages in communication and policy briefs.
   5. Use of African and non-African champions/ambassadors to sell the S3A

# Annex 1: Agriculture in Africa – Key Statistics

Agriculture as share of GDP: **30 – 40 per cent**

Employment in agriculture as share of total workforce: **60 per cent Sub Saharan Africa (SSA)**

Female employment in agriculture as share of total rural workforce: **50 per cent (SSA)**

Contribution of agriculture to the income of the rural workforce: **50 per cent**.

Agricultural export earnings as share of total export earnings: **40 per cent.**

Agricultural produce lost to poor post-harvest management system: **30 – 40 per cent of total production**

Average food import bill per year in the 2000s: **USD 20 billion**

Annual growth rate of agricultural GDP (in real terms), 2002 – 2007: **5.5 per cent**

Irrigated land as a proportion of potential: **7 per cent** (East and South-East Asia: 29%; South Asia: 41%)

Use of fertiliser per hectare: (Sub-Saharan Africa) **13 kg** - i.e., 7 per cent of the average for East Asia; (North Africa) **73 kg**- i.e., 38 per cent of the average for East Asia

Farm power sources in percentages - **SSA** (Other Developing Regions): **Hand, 65** (25); **Animal, 25** (25), **Engine, 10** (50)

# Annex 2: Developing the Science Agenda – The Process

The S3A is one of four strategic thrusts of knowledge and knowledge support under the ‘CAADP sustaining the momentum’. Its development began as one of the five work streams of the *Dublin Process,* which aimed at improving alignment of the CGIAR to the CAADP agenda. Under the championship of IFAD’s President, and an Oversight Group of African stakeholders, the S3A has become an African-led initiative to reaffirm the role of Science for Agriculture in Africa. Of particular importance in this respect is two meetings that were held in Accra, Ghana during the first quarter of 2013, which helped define work plan and methodology for the formulation of the Science Agenda. The outcomes of these meetings, which were also endorsed by subsequent meetings in Rome (March 2013) and in Dublin (April 2013), came to be known as the *Accra Consensus on the Development of the Science Agenda for Agriculture in Africa*.

The whole process for the formulation of the Agenda is Africa-owned and Africa-led. It is endorsed by the AUC and the NEPAD Agency. It is led by an Oversight Group (OG) reporting to the FARA Board. Furthermore, an Expert Panel (EP) composed predominantly of African professionals was entrusted with drafting the Science Agenda as well as implementing a process of broad stakeholder consultation. In this regard, the EP produced a *Discussion Paper* that laid out the issues that a S3A needs to explore and which was circulated to all relevant stakeholders for further inputs. FARA presented a progress report to the Sixth African Agricultural Science Week held in July 2013 in Accra. The Discussion Paper served as a background reference document for an e-consultation process undertaken in August 2013. The outcomes of these processes and the results of a small number of focused commissioned studies on critical topics of relevance to the S3A discourse served as source materials for developing the present document: *“Science Agenda for Agriculture in Africa- Connecting Science: A science agenda for transforming agriculture in Africa ”*.

FARA Secretariat submitted the draft Science Agenda document to the FARA Board for endorsement. This document was also presented at pertinent CAADP, SRO and other agricultural science fora to solicit additional inputs and enhance buy-in.

In April 2014, the FARA Secretariat formally submitted the edited version of the S3A document to the AU Commission on behalf of the African community of stakeholders. Key recommendations of this strategic framework document will be deliberated by AU high-level organs, including the Conference of African Ministers of Agriculture in April 2014. This conference will be preceded by a technical meeting of senior agricultural experts from all AU Member States. This will set the stage for the adoption of the Science Agenda through Summit-level Decisions by African Heads of State in July 2014 as part of the celebration of the AU’s Year of Agriculture and Food Security.

The process and methodology to develop and ratify the Science Agenda recognises the necessity of linking the technical strategy with effective political buy-in and accelerated implementation. The goal is effective institutionalization of the Agenda within the AU and regional and sub-regional bodies.

# Annex 3. Summary Characteristics of the Fourteen Major Sub-Saharan Farming Systems

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Farming Systems** | **Defining characteristics** | **Mean LGP** | **Market access** | **Main livelihood source** | **% Sub-Saharan rural poor <$1.25/day** |
| **Maize Mixed** | Sub-humid and humid areas, dominated by maize with legumes | 191 | Medium | Maize, tobacco, cotton, cattle, goats, poultry, off-farm work | 19.9 |
| **Agro-Pastoral** | Semi-arid areas, mixed sorghum/millet and livestock systems | 129 | Medium-high | Sorghum, pearl millet, pulses, sesame, cattle, sheep, goats, poultry, off-farm work | 17.3 |
| **Highland Perennial** | Moist highland areas with a dominant perennial crop either banana (often with coffee) or enset in Ethiopia | 267 | Medium-high | Banana, plantain, enset, coffee, cassava, sweet potato, beans, cereals, livestock, poultry, off-farm work | 15.0 |
| **Root and Tuber Crop** | Lowlands, dominated by roots and tubers with no major tree crop, | 271 | Medium | Yams, cassava, legumes, off-farm work | 10.9 |
| **Cereal-Root Crop Mixed** | Two starchy staples alongside roots and tubers | 186 | Medium-high | Maize, sorghum, millet, cassava, yams, legumes, cattle, off-farm work | 9.3 |
| **Highland Mixed** | Above 1700 m; LGP, temperate cereals due to altitude | 193 | Medium | Wheat barley, teff, peas, lentils, broad beans, rape, potatoes, sheep, goats, live-stock, poultry, off-farm work | 8.1 |
| **Humid Lowland Tree Crop** | Where tree crops replaced forest; > 25% source of cash income; Oil palm has local market | 292 | High | Cocoa, coffee, oil palm, rubber, citrus, yams, cassava, maize, off-farm work | 6.5 |
| **Pastoral** | Household income from extensive livestock production | 70 | Medium | Cattle, camels, sheep, goats, remittances | 4.5 |
| **Fish-Based** | Proximity to sea or lake; fish is significant livelihood source | 194 | High | Fish, coconuts, cashew, banana, yams, fruit, goats, poultry, off-farm work | 3.5 |
| **Forest-Based** | Humid lowland heavily forested areas | 343 | Low | Subsistence food crops including cassava, maize, beans, coco yam and taro, and off-farm work. | 2.5 |
| **Irrigated** | Large scale irrigation scheme; mappable; absence of rainfed agriculture | 53 | High | Rice, cotton, vegetables, rain fed crops, cattle, poultry | 1.1 |
| **Perennial Mixed** | High production intensity and commercial orientation | 145 | High | Deciduous fruits, tree plantations, sugarcane | 0.9 |
| **Arid Pastoral and Oasis** | Strong connection between oases and arid surroundings for water and livestock management | 15 | Very low | Date palms, cattle, small ruminants and off-farm work, with some scattered irrigated crops and vegetables | 0.4 |
| **Urban-Based** | Center or fringes of cities, high population density | Variable | High | Fruit, vegetables, dairy, cattle, goats, poultry, off-farm work |  |

\* Measured by travel time (hours) to town of 20,000 inhabitants. Classes include: Very Low 15+; Low 9-15; Medium 7-9; Medium-High 4-7; High 0-4 hours

# Annex 4: International Case Studies of Science Transforming Agriculture

**BRAZIL:**

Brazil has transformed from a food importer to one of the world’s largest agricultural producers over the past several decades, catching up with developed countries that have historically dominated grain exports. The Brazilian Agricultural Research Corporation (Embrapa) was a key reason for this extraordinary growth, literally changing the landscape of Brazil to increase the cultivation of the cerrado, Brazil’s savannah.

The country is notable for the science-based development of successful tropical agriculture. Until Brazilian agricultural researchers developed new crops and forage varieties with agricultural practices tailored for tropical agriculture to create a modern and strongly competitive agriculture in Brazil, it was believed that only temperate regions could effectively and efficiently feed the world. For instance, the research and entrepreneurial efforts made in Brazil to develop and cultivate soybean varieties for lower latitudes are capable of producing yields as high (and possibly higher) as those produced in temperate regions. In conjunction with this genetic effort, it was necessary to adopt new technologies, such as novel agricultural practices and modern innovations, including improved seeds, fertilizers, and agrochemicals, to change the farming environment into a highly productive one.

**CHINA:**

Smallholder agriculture drove China’s agricultural revolution, which provided the basis for the country’s dramatic economic transformation and poverty reduction in the last 30 years. Both the state and the market spurred on China's agricultural revolution. Public policies increased incentives for family farming, beginning with a pragmatic reform of land tenure arrangements. Rural industries and off-farm jobs were generated through special schemes for rural enterprises and employment creation. Progressive widening of regional and national markets led to more diversity and greater specialization within the agricultural sector. Incentives for farmers to meet market demands were supported by public investment for infrastructure and small-farmer oriented agricultural research and education, all as part of a broad, coordinated agenda to achieve medium and long-term objectives.

As a result, farm productivity rose rapidly. This, in turn, created economic surpluses that fuelled both rural and urban industries. With fertility rates held in check, per capita food production and consumption also rose quickly. Knowledge supported China’s agricultural strategies and progressive diversification. Decision-making was evidence-based. China sought and absorbed agricultural know-how from other countries.

**SOUTH KOREA:**

The rapid development in Korean agricultural technologies include areas such as biotechnology, breeding, soil and nutrition management, agricultural mechanization, and post-harvest management. Strong support from international partners was critical to this development and includes technology transfer, provision of equipment, human capacity development, and improvement of technology development systems.

One of the most significant areas of international assistance was in the agricultural development system. In 1947, Korea adopted the Land Grant College system from USA, which established the National Agricultural Development Institute, responsible for agricultural research-extension-education. The strong bond between research and extension resulted in rapid transfer of agricultural technologies to farmers using the extension workers as catalysts. Because of this effective linkage between research and extension, Korea was able to achieve self-sufficiency in rice with its Green Revolution in a short period of time.

**THAILAND:**

From the mid-1980s, agriculture in Thailand began to transform rapidly. Job opportunities in manufacturing, urban services and rural non-farm economy attracted the labour force which drifted away from agricultures. At the same time, the land frontier was closing and it became harder to add new land. Consequently, agricultural growth slowed to about 2%–3% per year, although productivity increased notably. Given opportunities in both domestic and international markets, new activities emerged such as rubber, cassava, pineapples, and high value perishables for the fast-growing cities. Most farm households diversified their income sources, while some became more specialized in higher-value agricultural products sold into more sophisticated marketing chains. The rural non-farm economy rapidly grew to a point where it now provides around half of all rural jobs. Successful industrialization of the country s allowed direct and indirect net taxation of farming to be virtually eliminated.

In the early 1960s, more than 60% of the rural population lived in poverty. By the early 2000s that had been cut to only a little more than 10%. From 1988 to 2007, the number of households affected by food poverty declined from 2.55 million to 418 000. With more and cheaper staples, and reduced poverty, child malnutrition has also declined. The incidence of underweight young children fell from 17% in 1987 to 7% in 2006; while that of stunting was reduced from 25% to 16%. During the 1960s and 1970s, most of the improvements came from increasing farm incomes. Subsequently, incomes from rural non-farm jobs and remittances from migrants became important.

The Thai story is an example of a successful transition from an initial situation in which it was possible for agriculture to grow by putting underused factors of production to work, with only limited improvements in productivity, to a later stage where land and labor became increasingly scarce and growth could only continue through improved returns to these scarce inputs. Success has been achieved primarily through private initiative, with the state playing a strategic role in setting an investment climate, investing in roads and research, and also supporting agricultural credit to overcome market failures.

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|  |  |  |  |
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# List of Acronyms and Abbreviations

ABI Africa Biosciences Initiative

ASALs Arid and Semi-Arid Lands

AFAAS African Forum for Agricultural Advisory Services

ASARECAAssociation for Strengthening Agriculture in eastern and central Africa

ANAFEAfrican Network for Agriculture, Agro forestry & Natural Resources Education

APRM African Peer Review Mechanism

ASATI African Science for Agricultural Transformation Initiative

AUAfrican Union

AUCAfrican Union Commission

AU-IBARAfrican Union InterAfrican Bureau for Animal Resources

AU-PANVAC African Union Pan African Veterinary Vaccine Centre

AWARD African Women in Agricultural Research and Development

BeCABiosciences eastern and central Africa

BMGF Bill and Melinda Gates Foundation

CAADPComprehensive African Agriculture Development Programme

CCARDESA Centre for Agricultural Research, Development and Extension in Southern Africa

CGIAR Consultative Group of International Agriculture Research

CIMMYT International Maize and Wheat Improvement Center

CORAFConseil ouest et centre africain pour la recherche et le développement agricoles

CPAConsolidated Plan of Action

CRPsCGIAR Research Programmes

CSO Civil Society Organisations

CTATechnical Centre for Agricultural and Rural Cooperation (ACP-EU)

DNADe-oxyribo Nucleic Acid

DPDiscussion Paper on S3A presented to African Agricultural Science Week

DRCDemocratic Republic of the Congo

EAAPPEast African Agricultural Productivity Programme

EMBRAPABrazilian Agricultural Research Corporation

EPExpert Panel

FAAPFramework for African Agricultural Productivity

FAO Food and Agriculture Organization

FARA Forum for Agricultural Research in Africa

FFA Frame Work for Action

GCARD Global Conference on Agricultural Research for Development

GDPGross Domestic Product

GHGS Green House Gases

GIS Geographic Information System

GMGenetically Modified

HYVsHigh Yielding Varieties

IAASTDInternational Assessment of Agricultural Knowledge, Science and Technology for Development

IACInter Academy Council

IBLI Index Based Livestock Insurance

ICTInformation Communication Technology

IFADInternational Fund for Agricultural Development

IFPRI International Food Policy Research Institute

IITA International Institute of Tropical Agriculture

ILRIInternational Livestock Research Institute (ILRI*)*

IPM Integrated Pest Management

ISSM Institute for the Study of Security Markets

KARI Kenyan Agricultural Research Institute

LGP Length of Growing Period

MAS Marker Assisted Selection (MAS

NARS National Agricultural Research Systems

NEPAD New Partnership for Africa’s Development

NERICA New Rice for Africa

NGONon-Governmental Organization

NPCA NEPAD Planning and Coordinating Agency

OG Oversight Group

OIE Office International des Epizooties,

PAFO Pan African Farmers Organisation

PANAACPan African Agribusiness and Agro Industry Consortium

PANGOC Pan African Non-Governmental Organizations Consortium on Agricultural Research

PCR Polymerase Chain Reaction

PPR Peste des Petites Ruminants

R&D Research and Development

RUFORUM Regional Universities Forum for Capacity Building in Agriculture

S3AScience Agenda for Agriculture in Africa

SPAARSpecial Programme for African Agricultural Research

SROsSub-Regional Organizations

SSASub-Saharan Africa

STISAScience, Technology and Innovation Strategy for Africa

S&T Science and Technology

STEPSynthesis Team of the Expert Panel

TAEIsTertiary Agricultural Educational Institutions

TAG Technical Advisory Group

TFP Total Factor Productivity

UK United Kingdom

UNUnited Nations

UNECA United Nations Economic Commission for Africa

UNESCOUnited Nations Educational, Scientific and Cultural Organization

UNIDOUnited Nations Industrial Development Organisation

UPOV International Union for the Protection of New Varieties of Plant

WAAPP West African Agriculture Productivity Programme

WARDA West Africa Rice Development Association,

WECARDWest and Central African Council for Agricultural Research and Development

WHO World Health Organisation of the United Nations