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BRAIN RE-ENGINEERING CONCEPT AND REIMAGINATION: STRATEGY FOR EARLY CAREER ACADEMICS IN AGRICULTURE AND FOOD SYSTEMS RESEARCH

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ABSTRACT

With environmental changes hard to predict, we must turn to innovation in agriculture technology. The agriculture sector is strategic, primary and real upon which all other sectors directly or indirectly depend. The study examined Early Career Academics (ECAs) involvements as they employ the pillars of brain re-engineering concept and reimagination (BRECR) in building the food systems of Africa, how to alter their perceptions with the aim to encourage them in agriculture to proffer plausible ways to building the ensuing food systems of the future, while also bearing notable risks from economic and social inequities, among others issues. The BRECR strategy hinges on swapping the wrong perception the younger generation nurse about agriculture and the how the recent scientific and technological advancements to building food systems initiatives, driving efficiency and increased food production, job creation, provision of raw materials for industry, providing outstanding foreign exchange earnings through international trade, among other benefits. Data was collected from six institutions of higher education to support that BRECR strategy can be enhance ECAs in food systems research and study results further urges as well as stimulated ECAs to employ the BRECR pillars which borders on perception-change, ideation and entrepreneurship, technology and sustainability.

Keywords: BRECR, agriculture, ECAs, perception change, ideation and enterprising, technology, sustainability, social equity in public policy.

Introduction

The important role early career academics (ECAs) play in the food and agriculture sector cannot be over emphasised and are key to reshaping and advancing food systems research (Agbugba, 2023; FAO, IFAD, UNICEF, WFP and WHO, 2023). We must reckon that ECAs are confronted with multiple bottlenecks in their career pathway, such that their importance and contributions are neutralised in the industry in Africa and other developing nations. The agriculture sector remains strategic upon which every other sector either directly or indirectly depend upon. In order words, the sector's impact on society is irreplaceable and remarkable. The younger generation should be on the leading edge in building the ensuing sustainable food systems of the future (Afande *et al.*, 2015). Although, this is yet to materialise in an African context given that most experts are described as displaced, wrong or obsolete in their perception of the youth regarding the sector, and the gross technological backwardness as pertinent to the continent (Ashford, 2007; Zulu *et al.*, 2022). While most recent studies focus mostly on notable risks from economic and social inequities, climate change issues, political criticisms and so on, little or no attention is given to strategies towards boosting youth involvement, contribution and engagement to the sector.

Aim/Objectives

The ECA is positioned to achieve the following targets using the BRECR Strategy:

- i. Describe ECAs in agriculture and food systems studies in developing nations than in developed nations;

- ii. Suggest steps for ECAs in agriculture and food systems studies to tackle the perception problem of youths;
- iii. Opportunities for ECAs along the food and agricultural value-chain and linkages with other sectors; and
- iv. Contributions of youths for ECAs towards recommendations for policy in securing optimum participation and production output.

Graduate and postgraduate students of agriculture will be interviewed to collect needed information. The findings are expected to contribute towards the effort to increase food production, job creation, provision of raw materials for industry, foreign exchange earning expansion through international trade, among other benefits or contributions as it touches on the following subsectors (crops, livestock, fisheries and forestry).

Key Research Question

- i. How best would ECAs state of contribution to agriculture be mobilized?

Sub-research questions

- i. Can you justify that there are ECAs in agriculture and food systems studies in developing nations than in developed nations?
- ii. What are the suggested steps for ECAs in agriculture and food systems studies to tackle the perception problem of youths?
- iii. What are the opportunities for ECAs along the food and agricultural value-chain and linkages with other sectors
- iv. How can ECAs' contribution be improved towards recommendations for policy in securing optimum participation and production output?

Problem Statement

The younger generation are on the leading edge to building the ensuing the future of food systems in developing nations, but these young people lack interest in agriculture, agribusiness and entrepreneurship (Agbugba, 2023a). Hence, the role and interest of youngsters in agriculture and food systems has dwindled over the years mainly due to their wrong perception and mindset which can, to a large extent drive some reasonable influence in changing their imprecise perception about agriculture, contribution to the food systems and research (Wambura, 2023). The effort in rebranding agriculture for youngsters and the youth still receive little or no attention in Africa due to the existence of social development upkeep and technological deficiency. Again, there are increasingly notable risks from economic and social inequities, climate change issues and political criticisms which are linked to use of land and profitability in Africa (World Food Forum, 2023).

ECAs must perceive agriculture and food systems initiatives holistically in the context of a value-chain approach for young persons and there is a dearth in information in this. This option will offer ECAs the opportunity to unlock opportunities and potentials for youths to change their perception, create more opportunities to create business models and ideate on enterprise solutions in the face of technology solutions (such as automation, robotics, IOTs, etc), as well as adopting sustainability strategies thereby leading to efficiency in production of food and other agricultural resources, clean and renewable energy solutions, among other raw materials for industry (FAO, 2023).

Furthermore, ECA must approach the BRECR initiative in integrating agriculture and food systems studies in other aspects of the economy which revolves around the subsectors of the agriculture sector touching on crops, livestock, forestry and fisheries. More so, this offers a grave potential for ECAs in utilising wastes from food and agriculture and identifies inroads and opportunities for neglected foods and agro resources with miscellaneous benefits.

ECAs must understand that eco-tourism which is a branch of agriculture is gaining some grounds in transforming economies of nations especially in Africa and other parts of the world. For instance, South Africa innovation is a booming industry, which is already attractive to the youth. Vertical farming needs to be integrated to smart-climate cities. Almost like the same idea as that of Saudi Arabia skyscraper dubbed 'Mirror Line'. Youth will be interested in these types of innovations. Outside production there are issues relating to agricultural financing where strategic partnerships appears viable solutions as youth do not have collateral to start farm businesses.

Preliminary Literature Review

United Nations Report and Youth Engagement in Agriculture: The Perception Problem?

By 2050, the demand for food will surge by 70%, which aligns with rapid population growth. Research findings from a UN study indicates that about 9.9% of global population still goes hungry, so the thought of feeding almost 10 billion persons is still anticipated as daunting. With environmental changes hard to predict, we must turn to innovation in agriculture technology. The role of youths and youngsters of Africa is really a concern as their perception towards farming and agribusiness is outdated and regarded as wrong (Agbugba, 2023a). Their importance in tackling this issue cannot be over emphasized. Hence, the concept of brain re-engineering and reimagination which forebears on changing the wrong perception problem youths have about agriculture thereby underscoring it as a prospective strategy for enhancing youth engagement in agriculture to build their entrepreneurship capacity.

According to the findings of Woodhill *et al.* (2020) & FAO (2021), young people are driving transformation in the agri-food systems space however, the following points must be noted:

- (i.) That youth are on the front lines to build the food systems of the future, while also bearing significant risks from climate change, social and economic inequities, and political marginalization.
- (ii.) That food systems provide a wide spectrum of opportunities for the engagement and employment of young people across diverse global contexts, but these jobs do not always provide decent and meaningful work or adequate livelihoods.
- (iii.) In response, policies, and initiatives to protect and strengthen youth engagement and employment in food systems need to be based on the pillars of rights, equity, agency, and recognition. The redistribution of resources, knowledge, and opportunities for youth innovation and engagement in the development of context-specific employment and labour policies can not only contribute to creating jobs for youth but can also directly support transitions to sustainable food systems.

Gender-related roles

Gender roles, in particular, create barriers for African women researchers, with studies from The African Education Research Database, highlighting the complex pressures that constrain women's research careers. Only 32% of researchers (UNESCO, 2019) in Africa are women, in spite of the African Union's commitment to increasing the number of African women

researchers. Against this background, a central question thus becomes: what type of support and capacity building will effectively promote and accelerate women's career advancement? We must reckon that some institutions have made great attempts to tackle some of the bottlenecks experienced by ECAs as that benefitted some team of researchers from the University of New South Wales (UNSW) Business School and the University of Pretoria (UP) Food Systems Research Network for Africa (FSNet-Africa) through their Australia-Africa Universities Network (AAUN), as well as through their Partnership Research and Development Fund (PRDF).

From the findings of FSNet-Africa, the extent to which ECAs in Africa successfully attain career paths in food systems research were expressed through the FSNet-Africa fellows which constitute the sample for this study (FNSNet Africa, 2023). The female fellows are in the process of being interviewed to gather data that will provide insights into their academic journeys, aspirations, the challenges they encounter, and the academic support they need to pursue research careers and professional networks.

Conceptual Framework

i. Brain Re-Engineering and Reimagination Conceptualised

The core focus of brain re-engineering and reimagination is conceptualized and hinges on changing this perception problem as it stands to provide a veritable strategy in transforming sunken economies through the agriculture or agribusiness sector in an age where environmental concerns and climate change issues are at an all-time high; and sadly, sustainable farming is a hotbed subject (Laborde and Torero, 2023). Our population is growing and increasing shortages of land and water poses a noteworthy threat to the longevity of humans as we know it. But while many politicians stall immediately, agriculture technology start-ups are busy taking action. We must establish that advances in machinery have increased the scale, speed, and productivity of farm equipment. Hence, this leads to a more efficient cultivation of more inputs and variables in productive lands with seeds, fertilizers and irrigation also have greatly improved thereby ultimately helping farmers in increasing their yields in either crops, livestock, agroforestry or fisheries (World Bank, 2023).

ii. Pillars to Brain Re-Engineering Concept and Reimagination (BRECR)

The pillars of the BRECR hinges on awareness creation or education of youngsters and youths (Abugba, 2023a). For ECAs to make impact in the academia, they must note that the BRECR is a paradigm shift that entails building of ideas and knowledge levels of youths for them to volunteer their willingness to creatively change the negative or wrong ideologies and mindset to appropriate a correct or right perceptive towards agricultural systems or agro related ventures entrepreneurially to employ technology solutions to drive a sustainable change. The institutions that can actualise this are institutions or platforms such as educational institutions (formalised and non-formalised), and the social media (Dolislager *et al.*, 2023).

Pillars of Brain Re-Engineering



- a) **Perception Change:** This involves identifying the wrong ideologies and mindset about agriculture and willingness to drop them. This thought process must be frank, sincere, and intentionally approached in interchanging the wrong mindset or way they perceive agriculture.
- b) **Ideation and Entrepreneurship:** This can be addressed on a dual basis and entails formation of new ideas or concepts, as well as building or developing their entrepreneurship capacity. Having or showing initiative and resourcefulness is intended to be accompanied by expressing some good degree in being innovative which is all about being original, creative, and introducing some new business ideas.
- c) **Technology Integration:** This variable or pillar is said to enhance Ideation and entrepreneurship. This involves application of the knowledge of science to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment and at the same time unlock creativity and innovativeness among ECAs. In addition, training on different technology solutions is not left out. Today's agriculture routinely uses sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology. These advanced devices and precision agriculture and robotic systems allow businesses to be more profitable, efficient, safer, and more environmentally friendly.
- d) **Sustainability:** This revolves around being intentional, constant, and productive in an agro enterprise or agro business over time. Every activity and practise between production, manufacturing, processing or value-addition, marketing or distribution from time to time and from season to season must factor in training and education; research and innovation; cross-sector collaboration; regenerative practices and nature-based solution; and also, transparency and traceability. More so, ECAs must know that adopting a circular economy can ensure a more sustainable and efficient economy if approached on a five (5) concept perspective which are: logistics reversal for environmental sustenance; recycling in feasible and environmental manner; incorporating the community in waste acknowledgement; as well as resorting to emerging technologies. ECAs in agriculture and food systems must understand that this sustainability perspective will imply that wastes from food and agriculture can be well-utilised and optimally managed to ensure efficiency in food and agricultural systems.

- **Social Equity in Public Policy:** This is relevant for ECAs and tries to conceptualise the description from an expression of impartiality, fairness, and justice for all people especially agripreneurs in social policy. Social equity considers systemic inequalities to ensure every person in a community has access to the same opportunities and outcomes. The main aspect of equity in public policy breaks down social equity, fairness, unbiasedness, inclusivity, fiscal and monetary policies, public and government (Vignola *et al.*, 2021). This whole idea hinges on uniform prerogative for key players in supply and value chains of food and agricultural systems such as equal rights to resources and government assistance such as subsidies, funding and agtech solutions. We must understand that social justice or equity is about “whether citizens of diverse social blocks are treated equally and whether they receive the same treatment.

ECAs must not only express awareness about what agriculture stands to bring, but must understand the fact that rebranding or repackaging agriculture as high tech and the fact that today's agriculture routinely employs sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology (Fabregas *et al.*, 2019; Sonnino *et al.*, 2023). Farmers and others use science and technology to collect data, analyse efficiency, monitor growth and quality, and more to save money and get better yields. In essence, advanced devices, precision agriculture and robotic systems allow agribusinesses to be more profitable, efficient, safer, and more environmentally friendly.

Fourth Industrial Revolution (4IR) and Precision Farming: Bridging the Gap

The fourth industrial revolution (4IR) is characterised by the blurring of boundaries between the physical, digital & biological worlds. It is a fusion of the advances in agricultural innovation systems (AIS) which explains about people, their knowledge, technology, infrastructure, and cultures they have created or learned, who they work with, what new ideas they are experimenting with. Examples of AIS are agricultural drones, artificial intelligence, blockchain technology, Internet of things (IoTs) and automation; Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) and genetic editing (Biotechnology & Nanotechnology) (Santos Valle and Kienzle, 2020) .

Precision agriculture is an approach to farm management that uses IT to ensure that the crops and soil receive exactly what they need for optimum health and productivity. The goal of PA is to ensure profitability, sustainability & protection of the environment. Conclusively, new technology solutions, including chemicals and larger tractors, allowed farmers to work larger areas of land with less labour. Government policies encouraged farmers to scale up their operations. Farmers were also motivated by economies of scale—the economic advantage of producing larger numbers of products.

Identifying the latest teeming productive and prolific technology options in agriculture for youths are drones which are mainly employed in following ways: crop monitoring, as well as spraying of crops with fertilizers and pesticides. They are referred to as unmanned aerial vehicles (Onomu *et al.*, 2020). Interestingly, this latest trend in agriculture and agricultural technology is revolutionalising the agriculture and food systems space by lessening the amount of labour required to either propagate a crop or raise and manage livestock.

Brain Re-Engineering Concept and the Fourth Industrial Revolution (4IR): Focus on Agricultural Production

Truly, the potential level of agricultural production is generally considered to be determined by physical factors such as quality of the soil, quality and availability of water and the prevailing climate. In so doing, the need of the hour is to drive transformation in an economy through these recent new dimensions of technology since the whole idea of brain re-engineering seizes the opportunity and leverages on the advent of technology and fourth industrial revolution (4IR) which operates on Cyberspace systems such as Artificial Intelligence (AI), Blockchain technology, Internet of Things (IOTs), Agricultural Drones, among other technology solutions (Fabregas *et al.*, 2019).

Technological innovations have largely shaped the agriculture sector throughout time. Examples of technological solutions in the 4IR era are: Bee vectoring technologies; precision agriculture; indoor vertical farming; livestock farming technology; laser scarecrows; farm automation; real-time kinematic (RTK) technology; mini-chromosome technology; farm management software; and water management technology. From the creation of the plough to global positioning system (GPS) driven precision farming equipment, humans have developed new ways of making farming more efficient and productive.

Brain Re-Engineering Concept and Reimagination: Are youths the key target?

Of course, youths are the rationale behind the brain re-engineering concept and reimagination. However, this concept can also work in empowering women through the process of re-engineering of their mindset, ideologies, and perception especially for communities where their traditional values are antithetical to women empowerment. Similarly, women play a significant role in agricultural production and household food security (Agbugba 2023b).

Despite the central role that the evolving agriculture sector has earmarked for the youth, the younger generations are reluctant to take up vocations in the sector due to various misconceptions associated with the industry, and a lack of information and awareness of opportunities. Deficiency associated with linkages between amplification created around the fourth industrial revolution and the agriculture sector has led to youths searching for professional career opportunities focusing on sectors that are non-agricultural.

No doubts, the younger generation are regarded as society's future (Agbugba, 2023a). When the youth contribute his/her ideas and energy to resolve social issues, he/she becomes a capable leader and can also make a difference in people's lives of others. Truly, the younger generation simply needs to renew, refresh, and maintain the status of society. They are expected to advance the current technology, education, politics, peace of the country. On the other hand, youths are vested with the energy and drive to maintain society's culture and values thereby contributing to advancing developmental projects of nations.

For instance, the role of youths in elevating the agriculture sector as touching on higher crop productivity, decreased water, fertilizer and pesticides usage cannot be over emphasized. Youths' role will collapse food prices, as well as reduce its impact on natural ecosystems, less runoff of chemicals into rivers and groundwater.

That youth are on the front lines to build the food systems of the future in developing and developed nations of the world, while also bearing significant risks from climate change, social and economic inequities, and political marginalization cannot be over emphasized (Agbugba

et al., 2014). Interestingly, the role of youths in agriculture can be felt in the usage of automated harvesters, drones, autonomous tractors, seeding and weeding implements to transform their culture of cultivating food crops (permanent or perennial or plantation crops; field crops and horticulture crops). Technology controls the menial and recurring tasks, allowing them to focus on more critical tasks.

Brain Re-Engineering Concept and Reimagination: Impacting the Younger Generation

Whether youngsters or youths will engage in farming depends on how productive and profitable farming is now and in the future. This depends on agricultural policies and programmes that will help youths in adopting new technology innovations and access productive resources including land, credits and markets. These opportunities would really drive young persons in seeking viable and attractive career options in the sector.

Most importantly, youngsters are persons who fall within the age category of 15 and 24 years between 35 and 40 percent. Youngster is a very flexible word as it does not have a specific meaning as teenager or toddler. The word youth is a little more complex, as it can refer to a young person; and, to the period of life when you are young. All the same, the question of governments of developed and developing nations attracting youths to agriculture will go a longer to tackle the unemployment problem of creating jobs within the supply chains and value chains thereby leading to economic growth and development. Firstly, agriculture needed to be appealing to youths which can be done by sharing the benefits of agriculture as a business and enabling them to understand or change their ideologies that agriculture is no longer in the old economy when our parents and fore-parents practiced agriculture in the field under the sun with drudgery using crude implements. Truly, social media is a vehicle or tool that can rebrand agriculture factoring the blessings of the fourth industrial revolution such as Artificial Intelligence, Blockchain, Internet of things (IOTs), augmented realities, metaverse, among other technology solutions (Allam *et al.*, 2022). Since agriculture is currently perceived by many youngsters and youths as unattractive probably due to an obvious outcome of decades of insufficient support from government and other stakeholders of economic growth and development.

Innovative Opportunities for Technology, Agriculture and Business

With the new technological discoveries, agriculture and agricultural business are undergoing radical changes, innovation being the core around which farmers seek solutions to streamline their activities, increase their production by maximizing resources (Yuan *et al.*, 2022). The business process consists of any group of activities performed to produce a specific customer-oriented or market-specific result. The business environment is constantly changing and new techniques and methods for developing this process are required.

In Romania, through the funds attracted by agricultural entrepreneurs, higher productivity, and access to modern solutions for agriculture can be obtained, with a major role in increasing efficiency (Mass Challenge, 2023). An information system created in support of agribusiness companies offers farmers the opportunity to reduce raw material costs, to optimize their production flow, this being possible by applying better technologies, based on information taken directly from the field, or the production area. Each IT solution is based on microservices, on the breakdown of agricultural processes into activities and sub-activities. In this way, we are talking about the overall efficiency of production (Dhanaraju *et al.*, 2022).

Brain Re-Engineering Concept and Reimagination as Veritable Strategy for Youth Engagement

Generally, the youths and youngsters are fascinated by automation, and yearn to see a more-scientific and technologically-driven agriculture and that specifically factors in the use of robots, drones, and autonomous tractors to make farming more efficient (Yami *et al.*, 2019). Precision agriculture is not left out in the brain re-engineering concept and reimagination which involves applying irrigation, fertilizers and pesticides at variable rates, depending on crop needs, rather than uniformly applying them at set times, quantities and frequencies (HLPE, 2019).

Conversely, major technologies that are most commonly being utilized by farms are harvest automation, autonomous tractors, seeding and weeding, and drones. Farm automation technology addresses major issues like a rising global population, farm labor shortages, and changing consumer preferences.

Youth engagement in agriculture is essential and critical for growth and to strengthen local food systems, feeding communities and providing gainful employment opportunities for the world's booming youth population (Zulu *et al.*, 2022). The role of youths in digital agriculture is streamlined in such a way that automated workflows have become invaluable for teams in the agriculture industry.

The more youths and youngsters are in the agriculture space in the 4IR era, the more its potential to increase efficiency, improve quality, and lower costs is assured. However, some of the demerits to the use of technology in agriculture are negligible as that would create more work for the agripreneur or young farmer and can reduce the personal contact farmers have to their farmlands (Nwibo *et al.*, 2016).

Indeed, the brain re-engineering concept and reimagining of what the agriculture sector and its enterprise activities stands to offer which hinges on unveiling the technology new dimensions can allow farmers to better engage in effective monitoring of the health of their livestock and crops, better documentation, more informed decisions, as well as in saving time and money (Agbugba, 2023c).

Brain Re-Engineering and Unlocking Transformation: Changing the Narrative with Entrepreneurship and Technology in Agriculture

Findings from studies carried-out have indicated that one of the brilliant strategies for economic progress whether in developed or less developed economies as it helps in employment generation, and the most important mechanism and tool for it is entrepreneurship. In their study on youth profile and attitude towards agriculture, Maurya *et al.* (2020) concurred that job creation is one of the benefits of attitudinal change when youths are engaged in agriculture. The whole concept of innovation, imagination, creativity, risk-taking, inventiveness and creation of new jobs have subsisted in the past (Drucker 2002), as well as in recent times when entrepreneurship underscores the processes of speeding up the pace at which new businesses and ventures are generated (Agbugba *et al.*, 2013).

With the new technological findings, agriculture and agribusiness are undergoing radical changes, innovation being the core around which farmers seek solutions to streamline their activities and increase their production by maximizing resources. In her research on youth

perception and participation in agricultural enterprises, Giwu (2024) made a similar observation. The business process consists of any group of activities performed to produce a specific customer-oriented or market-specific result. The business environment is constantly changing and new techniques and methods for developing this process are required. In Romania, through the funds attracted by agricultural entrepreneurs, higher productivity, and access to modern solutions for agriculture can be obtained, with a major role in increasing efficiency. An information system created in support of agribusiness companies offers farmers the opportunity to reduce raw material costs, to optimize their production flow, this being possible by applying better technologies, based on information taken directly from the field, or the production area. Each IT solution is based on microservices, on the breakdown of agricultural processes into activities and sub-activities. In this way, we are talking about the overall efficiency of production (FAO, 2018).

Methodology

The study was carried-out using recurrent qualitative sampling methods ranging from convenience sampling, a.k.a. volunteer sampling, purposive and theoretical sampling.

The respondents were either agriculture students, early career scholars in agriculture discipline and youth farmers who supplied data for the study. Data was elicited from these categories of respondents in the following respective ways which are through individual interviews; focused group discussion and observation. Data was collected from engagements with industry, the academia, research, government, non-governmental organisations (NGOs) in physical sessions at Food Chain Security Programme (MSc) University of Birmingham UK; Business Models in Agriculture Conference (IBMA) in Kigali Rwanda; New Faces for Farming Programme at Writtle University College Chelmsford Essex, UK, as well as Brain Re-engineering Factory virtual webinars organised by Global Sustainable Futures' Network (GSFN) Friday Idea Exchange; Nelson Mandela University Agriculture Programme; and the 6th International Conference on Advances in Agriculture Technology and Applied Sciences (ICATAS), New Delhi India. From the category of respondents already stated, a total of 166 persons supplied their responses.

Analysis Description

Data analysed was somewhat thematic and was manually done. The BRECR was used as the lens in adequately analysing and synthesising data collected to respond to specified research questions. BRECR pillars were used as veritable and plausible strategies for discussing the trajectory and pattern of youth engagement in agriculture and food systems studies (Agbugba, 2023a). Sustainable food production, youth engagement, employment and innovation were the key issues at stake and are central to this study.

Issues of Reliability and Validity

Validity refers to the integrity and application of the methods used and the accuracy with which the finding reflects the information gathered (Mohajan, 2017). While reliability describes consistency within the employed analytical procedures. This study applied two instruments to ensure that the findings can be trusted.

Results and Discussion

Results of the study were generated from the responses of the institutions where the BRECR as strategy for youth engagement in agriculture and for ECAs. Table 1.0 shows the institutions covered in the study.

Table 1.0: Institutions Interviewed

Institutions	Frequency	Percentage (%)
Univ of Birmingham, UK	11	6.6
IBMA Kigali, Rwanda	57	34.3
Writtle Univ College, UK	12	17.9
GSFN Webinar, UK	23	7.2
NMU South Africa Webinar	34	20.4
ICATAS India Webinar	49	29.5
Total	166	100.0

Source: Field Survey Data, 2023

From Table 1.0, the findings showed that majority (34.3%) of the respondents were from the IBMA Conference which comprised of staff and students of agriculture from different African institutions. The rest of the respondents indicated that 29.5% and 20.4% are from ICATAS India, NMU South Africa, respectively. The least institutions recorded 18%, 7.2 and 7% for Writtle University College UK, GSFN UK and University of Birmingham UK, respectively. From the findings, it implies that ECAs in agriculture and food systems in developing nations (such as Africa and India) are more concerned than ECAs in developed nations (such as the UK). Similarly, Agbugba and Isukul (2020) alluded to this finding that driving transformation in the agriculture sector of developing nations is a window to job creation, income generation, eradicator of food insecurity and malnutrition. More so, in their Mckinsey and Company report, Boettiger *et al.* (2017) agrees that almost every developed economy commenced its economic progress with agriculture sector transformation. Hence, the increasing interest of ECAs whose areas align with agriculture and food systems in developing nations.

Steps for ECAs in Agriculture and Food Systems Studies: Changing the Wrong Perception

Since the prospects for agriculture are enormous, the opportunities for scholars and graduates from agriculture and food systems study cuts across many disciplines and professions. ECAs should be vested with the task of preparing themselves, students, learners and trainees for the challenges and task ahead in changing their wrong ideologies and perception issues in agriculture (Gneiting and Sonenshine, 2018). Truly, the academia should not be idle in a time when agriculture is evolving and receiving increasing attention as well as enormous changes in the digital era of 4IR when electronic agriculture, smart farming, precision farming is going fervid by day. The potentials of ECAs will be of great use as the younger generation crave for a more scientific and technologically-driven agriculture.

In order to contribute to global transformation, findings from the study concurred that ECAs in agriculture and food systems should adapt to the following activities:

- a. Concentrate on specialisation and definition of focus;
- b. Stay upgraded and current with trends;
- c. Building strategic and prudent collaborations and partnership;

- d. Seek for guide, coach and mentorship;
- e. Search for funding/scholarship for research;
- f. Firsthand or hands-on experience;
- g. Growth in networking and communication skills;
- h. Engaging in knowledge-sharing ventures such as publishing and presentations;
- i. Adapt to digitalisation and advances in technology;
- j. Incorporate sustainable practice into your research; and
- k. Continuous learning

Opportunities for Early Career Academics (ECA) along the Food & Agricultural Value-Chain and Linkages with other sectors

We must reckon that there are many trajectories to economic engagement for youths in agriculture, and not all of them means getting their hands dirty. ECAs must bear in mind that youths should be encouraged to engage in activities that support agricultural production, capacity building, goods and services, logistics and value addition as service providers and entrepreneurs in the agriculture or agribusiness space (Agbugba, 2023c). Figure 1.0 summarises the opportunities for ECAs in agriculture and food systems studies.

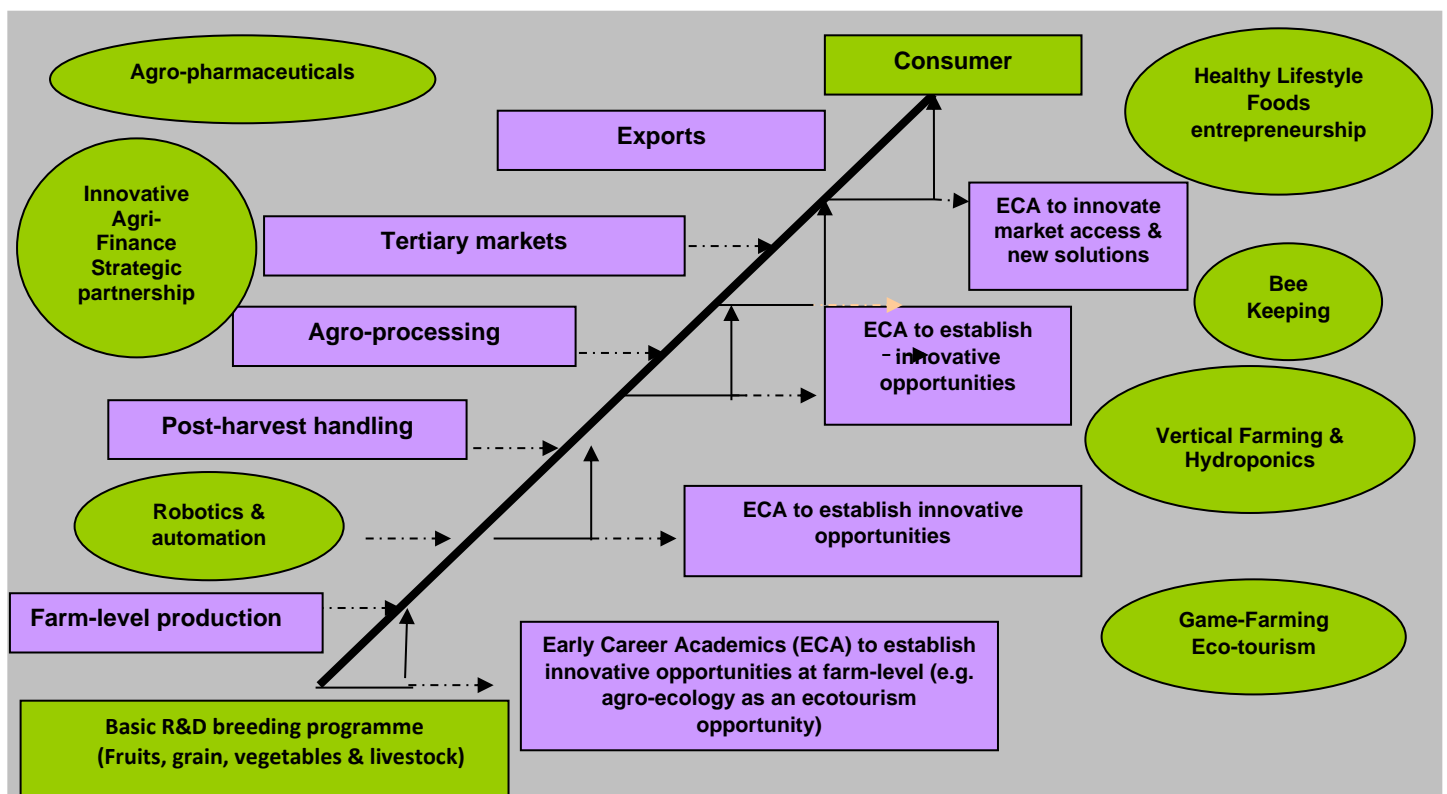


Figure 1: Opportunities for Early Career Academics (ECA) along the Food & Agricultural Value-Chain and Linkages with other sectors
Source: Author's Initiative

Figure 1.0 clear explains the diverse suggested career options for ECAs. In addition, the topical areas or aspects touching on the career options include: smallholder farmers' and empowerment; farmers' productivity and ways of enhancing them; strengthening food and agricultural value-chains and market systems; investing in rural infrastructure and provision of

resilience to communities; reinforcements of policy and governance. Woodhill and Griffith (2020) concurred with this initiative in their international collaboration on farmers and food.

Role of Information Systems in Business of Agriculture: Opportunities for ECAs

ECAs must know and further accentuate that information systems are pivotal in the success of an agribusiness (FAO, 2017), which must be measured not only by its efficiency (i.e. in minimizing costs, time, or use of information resources), but also by the support it provides in: elaboration of agribusiness strategies, carrying-out commercial processes, improving the organizational structure and culture of the organization, increasing the turnover and value of the company in a dynamic and competitive environment (Cofas and Chiurciu, 2020). From a managerial point of view, the computer system represents the following:

- i. a principal means for ensuring agribusiness performance;
 - ii. an essential variable that controls the operational efficiency, the productivity of the employees, and relationships with agribusiness partners;
 - iii. an elemental amount of particulars that ensures accurate managerial and decision-making processes in agribusiness;
 - iv. a means to develop new outcomes (i.e. product(s) or service) that ensure a competing superiority;
 - v. one of the most important resources of the organization and business cost analysis.
- Integrated

Recommendations for Policy

Enhancing Sustainability in the Food and Agriculture Sector: Some recurrent eco-friendly practices in food systems especially in the production aspect revolves around water management and energy usage through reclamation and recycling using renewable or endless energy sources, garnering ingredients from local or municipal and organic farmers and stimulating fair labour operations should be encouraged by government and other stakeholder organisations.

Rebranding Agriculture for the Youth: Shifting the mind-set of our youth towards agriculture is an imperative that cannot be overstated, and the present moment presents an opportune juncture to embark upon this transformation. This notion being championed holds immense promise and an innovative framework that amalgamates Brain Re-engineering and Reimagination within the Agriculture Sector. This approach signifies a paradigm shift, one that transcends traditional thinking and redefines the landscape of agricultural engagement. By harnessing the potential of Brain Re-engineering, we tap into the malleability of thought patterns, empowering young minds to perceive agriculture with fresh perspectives. This process of cognitive recalibration fosters an intrinsic appreciation for the sector's vast potential, steering them away from preconceived notions and towards recognizing the multifaceted opportunities it holds.

Rebranding and repackaging of farming activities and agriculture operations in driving the required influence. No doubts, youngsters and youths are increasingly becoming image conscious in this age and era of social media and instant gratification. Self-image has a strong currency and they are attracted to latest slangs and phrases, innovations and have a unique outlook that is all their own. Persistent images associated with agriculture ranging from low wages, and also boring and heavy manual work could grossly repel youths. As agriculture is being rebranded to fit this younger generation, we need to improve on the dialect around farming and agriculture, and replacing them with new ideologies and innovations in agriculture

using images in editorials thereby leveraging on the existing role models who have proven testimonials of excellence in the agriculture space as that would potentially influence the youth.

In this era of fourth industrial revolution (4IR), engaging and embracing technology solutions can drive impact and scale. A good number of tools for digital operations in the agriculture sector can assist for weather information, crop production and market access thereby providing farmers with tools and information to create informed decisions and improve productivity.

Promoting farming as a business can attract youngsters to increase their participation in agribusiness. The business of agriculture is not only central to job creation and food security, but cumulatively impacts economic and social development outcomes. While the formal economy can only absorb less than 10 per cent of labour-market entrants, young entrepreneurs have a far less saturated market to venture into, through agribusiness. Now is the perfect time to attract the youth as attitudes and practices towards agribusiness are experiencing a paradigm shift due to job losses from the pandemic.

Tackling major issues that revolves around productivity and efficiency gaps in young people's participation in value chains is a priority. Key bottlenecks such as inadequate access to information on production, inaccessibility to finance and market intelligence have to be addressed bearing youngsters in mind.

Value addition in food supply chains must be fostered as that would increase entrepreneur's capacity on emerging agribusiness models such as circular economy principles and value addition opportunities, through the adoption of productive use of energy technologies.

Government and stakeholder organisations should ensure that farm implements are made available to youngsters at subsidized rates. Farm machineries such as: ploughs, ridgers, tractors and cultivators should be sold at very affordable rates to encourage youth participation in agriculture.

Conclusion

Brain re-engineering concept and reimagination is a prospective strategy enhancing youth engagement especially in the agriculture space as that would enhance their entrepreneurial capacity. Entrepreneurship in agriculture is a transformative option to unlock income generation through the agriculture sector since it will create jobs and multiple sources of income. Truly, youth agripreneurship creates decent work for young people, strengthens communities and drives inclusive economic growth, but for too many young people, entrepreneurship is out of reach. One of the biggest advantages of getting started with entrepreneurship at a young age is the opportunity to learn important skills such as teamwork, networking, problem-solving, critical thinking, innovation, and self-discipline. All these skills can help in school performance and later in life. We must not forget that entrepreneurs in the agriculture industry are important to market economies, because they can act as the wheels of the economic growth of the country. Also, the need to strengthen youth employment and capability building has become very important. By creating new products and services, the sector stimulates new employment, which ultimately results in the acceleration of economic development and growth.

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