Name: Adiele Chibueze
Matric No: 15/SCI07/003
Course Code: AEE 512
Course Title: Agriculture Resource Economics

1. Population growth, Urbanization and Ageing

While, in general, world population growth is slowing down, in some regions population will continue to expand well beyond 2050 and even into the next century. More people now live in cites than in rural areas, and this discrepancy is projected to increase as population grows. Urbanization has been accompanied by a transition in dietary patterns and has had great impacts on food systems.

As a whole, the world population is growing older. Ageing is now also accelerating in low-income countries, where the process tends to start earlier and is becoming more pronounced in rural areas. Urbanization and ageing will have important repercussions on the agricultural labour force and the socio-economic fabric of rural communities. These population dynamics must be taken into account when charting sustainable development pathways that can ensure food security for all.

In its projections, FAO has always considered, as a key driver of changes in demand for food and agricultural products, not only population in absolute numbers but population dynamics, which includes diversity in regional trends, structure by age groups, and location. The United Nations Population Division has estimated population growth in three different scenarios, known as the low, medium and high variants.

The medium variant suggests a gradual decline in absolute increments to slightly over 55 million people by 2050, and a further decline to 15 million per year by the end of the century. Cumulatively, these increments translate into a world population of 9.73 billion by 2050 and 11.2 billion by 2100.
The global trends mask considerable differences across and within regions and between high-income and middle- and low-income countries. While the high-income countries would reach their maximum population size by 2040, low- and middle-income countries would see only slow declines in growth over the medium and even the longer term. There are also considerable differences in population growth rates within low-income countries.

Rapid urbanization is accelerating the dietary transition;
For decades, the world's population was predominantly rural. Thirty-five years ago, more than 60 percent of all people lived in rural areas. Since then, the urban-rural balance has changed markedly, and today slightly more than half of the global population (54 percent) is urban. Thirty-five years from now, in 2050, more than two-thirds of all people may be living in urban areas.
Changes in agriculture,notably technical progress and the adoption of labour-saving technologies, have helped underpin increasing urbanization. At the same time, agriculture, food and nutrition have been, and are likely to continue be, affected by the changes brought about by urbanization.

Ageing will also accelerate among rural populations;

Ageing in rural areas tends to start earlier and proceed faster than national averages would indicate. Rural ageing has major implications for the composition of the rural labour force, patterns of agricultural production, land tenure, social organization within rural communities, and socio- economic development in general. Environmental degradation, climate change and limited agricultural technology tend to affect older farmers more than their younger, healthier and better-educated counterparts. The disadvantages faced by older farmers may be compounded by discrimination against older rural people in accessing credit, training and other income- generating resources. Agricultural innovations, such as the diffusion of new agricultural technologies and the introduction of improved seeds and tools, often bypass older farmers, as many have neither the financial resources to buy additional inputs, nor the skills (e.g. literacy) nor energy to invest in adopting new practices. Older women are particularly disadvantaged because gender divisions in agricultural production limit their opportunities to obtain credit and training, or participate in market exchanges.

In countries where the agricultural labour force is ageing, the adaptation of farming technologies and agricultural policies to the capacities and needs of older farmers could help to keep older people engaged in productive activities (Anriquez and Stloukal, 2008). In areas experiencing ‘compressed ageing’, the provision of social services may involve the adaptation of social support systems to accommodate the new age structure.

2. Global economic growth, investment, trade and food prices

FAO's most recent projections of future patterns of agricultural demand and supply are based on moderate global economic growth to 2050, at a pace which is slower than in most of the SSPs.

Changing assumptions regarding GDP per capita will affect the projections of quantities, values and composition of agricultural demand, particularly for low- and middle-income countries, where the reactions of consumers to changes in income are expected to be stronger, in terms of their demand for food, than in high-income countries. Less conservative hypotheses would shift the demand for agricultural goods upwards. More importantly, however, the rise of a global middle class, as a result of the fast income growth in emerging countries, has accelerated dietary transitions that are changing the composition of the demand for food. The trend is strongly towards higher consumption of meat and dairy products and other more resource-intensive food items, hence with implications for the sustainable use of natural resources.

3. Competition for natural resources

Projections to 2050 suggest the emergence of growing scarcities of natural resources for agriculture (Alexandratos and Bruinsma, 2012). Intensified competition for these resources could lead to their overexploitation and unsustainable use, degrading the environment and creating a destructive loop whereby resource degradation leads to ever increasing competition for the remaining available resources, triggering further degradation. For millions of farmers, foresters, pastoralists and fisherfolk, this could create insurmountable barriers to improving their livelihoods and escaping poverty.

Although agriculture at the global level has become more efficient, in recent decades, competition for natural resources has intensified owing to consumption patterns driven mainly by population growth, changing dietary patterns, industrial development, urbanization and climate change. Land degradation, deforestation and water scarcities are among the most visible manifestations of this unsustainable competition. Paradoxically, some efforts aimed at reducing greenhouse gas (GHG) emissions have led to further intensification of competition for land and water resources. This is the case where countries have moved towards the production of resource-intensive bioenergy instead of choosing other available, and more sustainable, energy sources.

Globally, 33 percent of the world’s farmland is moderately to highly degraded. This degradation affects particularly dryland areas, affecting the quality of local people’s livelihoods and the long-term health of ecosystems. In general, land degradation is an impediment to realizing food security and reducing hunger. Globally, there are few opportunities left for further expanding the agricultural area. Moreover, much of the additional land available is not suitable for agriculture. Bringing that land into agricultural production would carry heavy environmental, social and economic costs (FAO, 2014).

The expansion of agricultural land continues to be the main driver of deforestation and the global expansion of agricultural land has stabilized over the last 20 years at around 4.9 billion hectares (ha), while forest losses have amounted to less than 100 million ha. Globally, net forest conversion has been decreasing over the last 15 years and annual losses have been reduced by 50 percent since 1990 (FAO, 2015). Projections indicate a need for less than 100 million ha of additional for agricultural use in 2050 (Alexandratos and Bruinsma, 2012).

However, these global figures hide significant regional differences. Gains in forest areas have been limited to boreal and temperate zones, where the area under agriculture has declined. In tropical and subtropical regions, annual forest losses still amounted to 7 million ha between 2000 and 2010, while the agricultural area expanded in the same period by 6 million ha per year (FAO, 2016). Low-income countries experienced both the largest annual net loss of forest area and annual net gain in agricultural area.

Agriculture is estimated to be the proximate driver for around 80 percent of deforestation worldwide. Commercial agriculture is the most important driver of deforestation in Latin America, accounting for around two-thirds of total deforested area. In Africa and tropical and sub-tropical Asia, subsistence agriculture accounts for a larger share of deforestation than commercial agriculture (Kissinger, Herold and De Sy, 2012).

Clearing the land of forests leads to severe environmental degradation that can make the competition for other natural resources more acute among different users. For example, clearing forests in highland areas causes soil erosion, which reduces the quality of drinking water for downstream users and water used to sustain aquaculture. The loss of forestland owing to the expansion of commercial farms deprives forest communities, particularly the most impoverished forest communities, of plant and animal biodiversity that is often critical to their food security. The loss of forest biodiversity also has repercussions for global food security, as it reduces options for breeding new crops and plant varieties that may allow food systems to better adapt to climate change. Deforestation also is a major source of GHG emissions. Pressure to clear forests is expected to grow owing to urbanization and changing patterns of consumption driven by population growth, migration, greater prosperity, expanding commodity markets and climate change adaptation. However, there is evidence that it is possible to reconcile food security and forest conservation. Twenty-two countries – or around half of all countries that, by FAO estimates, have reduced both the number and the prevalence of undernourished people (FAO, IFAD and WFP, 2013) – have improved agricultural production and food security in the past 25 years, while maintaining or increasing their forest cover (FAO, 2016). Their achievement is due to the simultaneous implementation of policies to promote the intensification of agricultural production, the sustainable management of forest resources and other measures that improve food security.

4. Climate change

The impacts of climate change are expected to be most adverse in low- and middle-income countries, where millions of people depend on agriculture and are vulnerable to food insecurity. In 2015, world leaders explicitly acknowledged the need to address this threat. They negotiated, under the aegis of the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement on climate change, which recognizes the fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse effects of climate change' (UNFCCC, 2015).

Food and agriculture sectors contribute substantially to greenhouse gas emissions, but mitigation options exist. Over the past 50 years, greenhouse gas (GHG) emissions resulting from 'Agriculture, Forestry and Other Land Use' (AFOLU) have nearly doubled, and projections suggest a further increase by 2050 (Tubiello et al., 2014). In 2010, emissions from the AFOLU sector were an estimated 10.6 gigatonnes (Gt) of carbon dioxide equivalent, and were mainly caused by land use, livestock production, and soil and nutrient management. The sector produces an estimated 21 percent of total global GHG emissions (FAO, 2016). However, forests also mitigate climate change by removing GHG from the atmosphere through biomass growth.

Agriculture contributes the largest share of global methane and nitrous oxide emissions. Most of its methane emissions is produced by enteric fermentation during the digestive processes of ruminant animals, and by rice cultivation. The nitrous oxide emissions originate mainly from the application of nitrogen-based fertilizers and animal manure management. A 2016 study of biomass dynamics in the Amazon rainforest over three decades found that the region is losing its ability to sequester carbon dioxide owing to an increasing rate of biomass mortality (Brienen et al., 2016).

5. Agricultural productivity and innovation

To meet demand, agriculture in 2050 will need to produce almost 50 percent more food, feed and biofuel than it did in 2012. This FAO estimate takes into account recent United Nations (UN) projections indicating that the world's population would reach 9.73 billion in 2050. In sub-Saharan Africa and South Asia, agricultural output would need to more than double by 2050 to meet increased demand, while in the rest of the world the projected increase would be about one-third above current levels.

Meeting the increased demand should not be a major challenge, if past achievements are a guide. Historically, much bigger increases in agricultural production have been recorded in comparable time frames. Between 1961 and 2011, global agricultural output more than tripled. In low-income countries, livestock production has been one of the fastest growing agricultural subsectors. Since the early 1970s, per capita consumption of milk, dairy products and vegetable oils has almost doubled, while meat consumption has almost tripled (Alexandratos and Bruinsma, 2012).

Over the past five decades, per capita consumption of fish has more than doubled. Since the 1980s, virtually all of the increase in the amount of fish consumed has come from aquaculture, which has outpaced population

However, owing to a range of factors, including climate change, pressure on natural resources, underinvestment in agriculture and gaps in technology, maintaining the pace of production increases may be more difficult than in the past. For example, per capita fish consumption in Africa may shrink from 7.5 kg a year in 2006 to 5.6 kg a year by 2030, as the population is expected to grow more rapidly than supply (WFP, 2013, p. 45). Rapid technological development and innovation offers the prospect of meeting future food needs sustainably. However, this can only be achieved through discerning public policies, increased investments and public-private partnerships, which exploit the opportunities for maintaining current levels of productivity, sustainably raising yields, and reducing poverty and food insecurity.

6. Transboundary pests and diseases

Food security is threatened by an alarming increase in the number of outbreaks of transboundary pests and diseases of plants and animals. These pests and diseases jeopardize food security and have broad economic, social and environmental impacts.

A worrying trend is the upsurge in zoonotic diseases, such as avian influenza and swine flu, which can also have serious repercussions on human health. Climate change is, in part, responsible for food chain emergencies arising from transboundary threats. However, while there is clear evidence that climate change is altering the distribution of animal and plant pests and diseases, the full effects are difficult to predict.

With globalization, the risks to crops and livestock are increasing.

Transboundary animal diseases are highly contagious epidemic diseases that spread rapidly across national borders, causing high rates of death and illness. The risk of serious outbreaks is increasing as more people, animals, plants and agricultural products move across international borders, and as animal production systems become more intensive. Because they can have serious socio-economic consequences, including the disruption of regional and international livestock markets and trade, transboundary animal diseases are a constant threat to the livelihoods of livestock keepers, especially in low- and middle-income countries. They undermine food security and prevent livestock sectors from achieving their full economic potential. In recent years, the world has suffered several pandemics of emerging or re-emerging transboundary animal diseases, such as bovine spongiform encephalopathy and highly pathogenic avian influenza.

The spread of transboundary animal diseases is facilitated by the lack of access to goods and services in rural areas, and the disruption of veterinary services and trade in livestock and animal products. A good example is lumpy skin disease, which affects livestock throughout Africa and is spreading quickly to the Middle East, Asia and Europe (Alkhamis and Van derWaal, 2016). Recent upsurges have been facilitated by poorly regulated movements of large numbers of animals and seasonal fluctuations in populations of biting insects that spread the virus (FAO, 2015).

Foot-and-mouth disease (FMD) is another highly contagious disease that affects many countries in Africa, Asia and the Middle East. More than 100 countries are not considered FMD-free and represent a permanent threat to disease-free countries. Other transboundary diseases, such as African swine fever (FAO, 2013a; Arias et al., 2015)

Newcastle disease (Ashraf and Shah, 2014) in poultry and contagious bovine pleuropneumonia in cattle in Africa, have severe negative impacts on the animal industry, mainly in low-income countries, as well as on regional and international livestock markets.

Following the highly successful campaign against rinderpest – FAO and the World Organisation for Animal Health (OIE) officially declared the disease eradicated in June 2011 – both organizations launched in 2015 a global strategy for the control and eradication of the peste des petits ruminants (FAO and OIE, 2015, p.88).

Healthy livestock is crucial for achieving the sustainable production of nutritious and accessible food for everyone. However, given the magnitude of the disease problem, and its entomological, veterinary, medical, public health and environmental dimensions, no single specialized organization can address the risks of a given disease, and prevent, control and eliminate it. Committed international coordination is needed to develop and implement collective global health protection strategies under the umbrella of the One Health concept (FAO, 2011).

Major transboundary plant pests and diseases include insect pests, such as locusts, which are major threats to the agro-pastoral resources and livelihoods in Africa and Asia, armyworms and fruit flies; and crop-specific diseases, such as rust diseases in wheat, coffee and soybean, wilt diseases of banana and viral diseases of cassava and maize. These pests and diseases move rapidly to threaten neighbouring countries, regions and continents.

In developing strategies for improved adaptation and resilience to climate change, it is important that both the perspectives of the crop and the pest are considered. For example, cassava is considered a promising crop that could play an important role in making crop production systems more resilient to climate change in tropical environments. However, when taking advantage of this potential, national programmes need to be aware that, with higher temperatures, cassava’s viral diseases may also expand with the greater mobility of its vectors.

7. Conflicts, crises and natural disasters

Conflicts are a major driver of food insecurity and malnutrition. They reduce food availability, disrupt access to food and health care, and undermine social protection systems. Every famine in the modern era has been characterized by conflict (Simmons, 2013).

These conflicts are complex by nature. They can be triggered or amplified by climate-related natural disasters and the impact that these have on poverty eradication and food security. Natural disasters tend to trap vulnerable people, in particular, in a cycle of poverty because they are less resilient and lack coping capacity.

The main drivers of conflicts include ethnic and religious differences, discrimination and marginalization, poor governance, limited state capacity, population pressure, rapid urbanization, poverty and youth unemployment. Drivers of conflict specific to the agriculture and rural sectors include competition for land, water and other natural resources, food insecurity, environmental mismanagement, and government neglect of poor and marginalized areas, such as arid and semi-arid zones essential for livestock-dependent populations and subsistence fishing grounds.

Most conflicts strike hardest in rural areas; with major adverse consequences for survival, agricultural production and rural livelihoods. Conflicts disrupt food production through the physical destruction and plundering of crops, livestock and food reserves. They discourage farming, disrupt food transportation systems, destroy farm assets and capital, force or entice young people to fight, and depress income-earning livelihoods and occupations. They also cause psycho-social traumas and disabilities among survivors. There has been a reported rise in conflict-related sexual violence, with rape used as a weapon of war. As a result, survivors suffer from sexually transmitted diseases, stigmatization and trauma, which affects their health as well as productive capacities (UN Security Council, 2015).

Addressing these emerging challenges calls for prevention through equity, stability and peace building. The Millennium Development Goals neither explicitly nor adequately addressed the rising trend in conflict worldwide. The 2030 Agenda for Sustainable Development does so, by calling for more collaborative approaches to conflict prevention, mitigation, resolution and recovery. It recognizes that peace is a vital threshold condition for development, as well as a development outcome in its own right.

Fostering human rights and greater equity within and between countries is the key to preventing conflicts. Equity in economic development and good governance help address the root causes of violence. The UN system is moving toward an integrated and coherent approach to preventing armed conflicts and crises, predicated on reducing risk, building resilience and sustaining peace. Sustaining peace is expected to be clearly embedded in the 2016 quadrennial comprehensive policy review of the United Nations system. It is important to recognize, however, that conflict-sensitive approaches are needed not only for humanitarian assistance and building resilience, but especially for development support.

8. Poverty, inequality and food insecurity

Changes in population and income, along with new technological processes, both economy-wide and in food systems, are likely to affect poverty, inequality and food security in all its dimensions. Poverty remains highly concentrated in rural areas. Given persistent inequality, current trends indicate that the goal of eradicating hunger by 2030 will not be achieved.

In this context, agricultural policies play an important role in pro-poor growth. They could support increases in productivity and profitability in a number of ways: for example by providing efficient extension and advisory agricultural services, improving coordination along value chains and ensuring that the weaker segments in the chain reap the benefits of the integration of agriculture into markets.

However, pro-poor growth goes beyond agriculture. To date, the ongoing wider process of economic development has led in many instances to a reduction in the number of people engaged in agriculture, with consequent urbanization. Permanently reducing poverty involves actions that cut across both rural and urban areas, such as providing wide access to good quality education, promoting economic diversification in rural non-farm income- generating activities, supporting economy-wide job creation, increasing the saving and investment potential of the poor, and implementing adequate social protection mechanisms

9. Nutrition and Health

Malnutrition comes in a number of forms that not only affect a person's health and well-being, but also place heavy burdens on families, communities and states (FAO and WHO, 2014). Ending hunger, achieving food security and improving nutrition are all key steps toward sustainable development (UN, 2016). Food safety is also a key concern, as unsafe food remains a major cause of disease and death (WHO, 2015). Meanwhile, changes in dietary patterns around the world have consequences for public health and sustainable development. As production systems become increasingly interconnected and the climate changes, the threat of food-borne, vector-borne, and transmissible zoonotic diseases increases.

10. Structural change and employment

The development of countries may be seen as a process of change that transforms the structure of their economies. The structural change of economies can be measured by the dynamics of key features, such as the relative importance of sectors, the reallocation of factors across sectors and geographic areas, and changes in their productivity, which are associated with changes in consumer preferences, international trade flows and the social and institutional set up.

High-income countries, that once relied on primary production, especially agriculture, progressively shifted their economic systems towards industry and, later, service sectors. During this process, labour was reallocated while productivity increased in each sector and productivity differences among sectors declined. In low- and middle-income countries, income growth over recent decades has been characterized by the mobility of labour across economic sectors, within national territories and across international borders.

Where structural changes in production brought about improvements in income, a modification in consumption patterns occurred as well. This shift has been reflected in a number of ways, including dietary choices, the purchase of manufactured goods and the demand for welfare-related services, such as housing, education, health and security. Demographic trends have determined the paths of structural changes in diverse ways. During the 1980s and 1990s, a range of policies and institutional changes related to infrastructure projects and trade liberalization were also influential. In many instances, these transformation processes brought about significant welfare improvements. However, concerns have arisen over their environmental and social sustainability, as well as the persistent inequalities within and between countries. Awareness of these issues is increasing, and the international community recognizes that there is an urgent need to put global and national development patterns on a sustainable track.

11. Migration and Agriculture

Migration is a growing global phenomenon.1 In 2015, the number of international migrants totalled 244 million, an increase of 41 percent compared to 2000 (UN, 2015). International migrants among the global population increased from 2.8 percent in 2000 to 3.3 per cent in 2015

(UN, 2015). The majority of these migrants, estimated at 150 million, are migrant workers, and about one-third are aged from 15 to 34 years (UN, 2011). Internal migration is even larger in scale. The number of internal migrants in 2013 was estimated at 740 million (IOM, 2013).

That a large proportion of migrants are rural people is revealed by the fact that around 40 percent of international remittances are sent to rural areas (World Bank, 2014).

Male out-migration and the globalization of agrifood systems are among the key drivers of the feminization of agriculture, which is now under way in many low-income countries. The globalization of agrifood systems is also opening up paid employment opportunities for women outside of family farms.

Social challenges can also emerge when populations in destination countries perceive migrants as competitors for jobs and a threat to wage levels. However, given the ageing population and low fertility rates in many high-income countries, migration could provide benefits for both destination and source countries.

Migration brings both opportunities and challenges for the countries of origin, transit and destination. In terms of opportunities, migration can reduce competition over land and water resources, foster a more efficient allocation of rural labour and create higher wages in agriculture.

Depending on the context, women who stay behind may gain greater control over productive resources and services, potentially helping to close the gender gap in agriculture.

Moreover, remittances provide cash and insurance in case of crisis and shocks, and foster investment in agriculture and other economic activities that have potential for job creation. Diaspora organizations and return migrants can also help rural areas in countries of origin through capital investments, skills and technology transfer, know-how and social networks. Remittances also represent an important source of foreign exchange for recipient countries and, potentially, a significant means of development finance in some low and middle-income countries.

12. Changing food systems

Urbanization, the exit of labour from agriculture and a decline in agriculture's contribution to GDP have historically characterized the structural transformation of socio-economic systems. In today's high-income countries, this process led to the emergence of an urban middle class and a massive shift in food preferences towards meat and dairy products. Although evidence is still sparse and studies are ongoing, the same process appears to be occurring in low- and middle-income countries. At the same time, demographic pressure in these countries is increasing. Together, these dynamics change food systems in various ways, and these changes, in turn, drive further structural transformation.

While population growth increases the demand for agricultural products and stimulates farming activities, urbanization requires food to be easily stored and transported. Thus, food processing has become a key factor in the transformation of food systems. It has brought with it the standardization of agricultural output and, in many cases, the concentration of primary production and the consolidation of farmland. Many smallholder farmers have become landless agricultural workers, or have migrated to towns and cities in search of employment, accelerating urbanization.

Food production is changing along with retail channels; Agriculture and food production are increasingly supplying urban and peri-urban supermarkets. Value chains are progressively characterized by the vertical coordination, and in some instances the integration, of primary production, processing and distribution; the automation of large-scale processing; and higher capital and knowledge intensities. A comprehensive global assessment of these transformations, particularly in the wholesale and retail segments of the value chains, is difficult, owing to the lack of easily accessible and comparable data. However, some trends by groups of countries and regions can be inferred from existing literature.

Between 2001 and 2014, the share of processed food distributed through supermarkets significantly increased in upper middle-income countries, from less than 40 percent to 50 percent. In the same period, it grew from around 72 percent to 75 percent in high-income countries. In lower middle-income countries, it grew from 22 to 27 percent between 2001 and 2008, with no further change between 2008 and 2014 (Global Panel on Agriculture and Food Systems for Nutrition, 2016, p.93).

It is possible that mixed systems will emerge in the years ahead, with some indigenous food producers making more intensive use of technology. Modern communications (e.g. mobile phones, internet and satellites) and self-certification will facilitate market access and reduce the need for intermediaries, thus allowing producers to capture a bigger share of the final product’s added value.

The opportunities for indigenous food producers, processors and suppliers have been amplified by the support of leading international chefs with global followings. Just as former niche markets, such as organic food, zero-kilometre food and family-farmed produce, have expanded exponentially in recent years, so too could the markets for many neglected foods and for the produce of indigenous food systems.

However, indigenous food systems face threats, including the destruction of habitats and the displacement of indigenous peoples from their lands; the loss of languages and culture in indigenous communities; the migration of youth to cities as older generations disappear; the loss of traditional seeds; and the rapid shift in food habits among the young, who are influenced by marketing campaigns for processed foods. Anecdotal evidence indicates that indigenous youth are progressively abandoning their food systems. Knowledge about thousands of edible and medicinal plants, which has been built up over centuries of trial and error, could be lost forever, along with the forests, mangroves, lakes, savannas, pastures and mountain ecosystems that host them.

13. Food losses and waste

Globally, around one-third of all food produced is lost or wasted along the food chain, from production to consumption (HLPE, 2014). In a world where hundreds of millions of people go hungry, that is a stark indication of the inefficiency of current food systems.

Food losses and waste often translate into economic losses for farmers and others stakeholders within the food value chain, and higher prices for consumers, both of which affect food insecurity by making food less accessible for vulnerable groups. Reducing food losses and waste would increase the supply of available food and strengthen global food security.

Food losses and waste also hold back the transition to environmentally sustainable food systems. They represent a considerable waste of land, water, energy and agricultural inputs, and cause the emission of millions of tonnes of greenhouse gases. Future efforts to address climate change will need to find ways to reduce food losses and waste. Because food production is responsible for a large share of GHG emissions, reducing food losses and waste contributes to climate change mitigation. At the same time, because climate change threatens food production in many food insecure areas, reducing food losses and waste can be an important part of climate change adaptation strategies.

Measuring food losses and waste is difficult, in part because food supply chains are long and involve many actors, including small farmers, transporters, processors, retailers and households. FAO defines food losses and waste as a ‘decrease in quantity or quality of food’, i.e. a reduction in the availability of food, a decline in its nutritional and/or economic value, and/or a deterioration in food safety. Food waste results from the ‘discarding or alternative (non-food) use of safe and nutritious food for human consumption all along food supply chains. Although the difference between food loss and food waste is not cut and dry, food loss is seen as accidentally occurring for reasons not under the direct control of the agents concerned, such as inadequate technology, lack of knowledge and skills, poor logistics and malfunctioning markets, while food waste is characterized by an element of intended or unintended behaviour.

Mounting evidence of the extent of food losses and waste has led to calls for global coordinated action to address the problem. ‘Zero food loss and waste’ is one of the pillars of the ‘Zero Hunger Challenge’, which was launched by the UN Secretary General in 2012. In 2015, world leaders committed themselves to addressing this challenge and set out to halve per capita food waste and to reduce food losses by 2030 within the context of the 2030 Agenda on Sustainable Development and as part of Sustainable Development Goal (SDG) 12, which aims to ensure sustainable consumption and production patterns.

The strong focus on reducing food loss and waste in the SDGs has increased the attention being paid to research, measurement, monitoring and actions in this area.

Coordinated efforts to improve reporting are important because studies of global trends in food loss and waste often use different estimation methods.

To overcome these limitations, several development agencies have established the food loss and waste protocol, a multistakeholder effort to develop global accounting and reporting standards.

14. Governance for food and nutrition security

For FAO, the main challenge posed by the 2030 Agenda is that of thinking beyond the resources it uniquely controls and asking hard questions about how it can more effectively catalyse action by others. The Organization is also called upon to help governments and regional and global institutions to cope with the complexity of the new agenda by breaking down the complicated tasks they have set for themselves into discrete, solvable problems. As a first step, FAO must present a simplified, but clear and coherent narrative of its own expected contribution to its Member Countries' achievement of the new goals. The narrative should signal to partners and stakeholders what can be expected from FAO and in what areas of work. The Organization may need to draw more deeply on its own experiences and those of others to ask: how it can become a trusted and effective facilitator and enabler of the ambitious and accountable partnerships that the Agenda for Sustainable Development demands. FAO is asked consider again how best to balance its global role in providing data, norms and standards with its crucial mandate to foster transformational change. Most challenging of all, the Agenda compels FAO to evaluate its contribution to, and collaboration with, the many other actors that constitute the United Nations development system, in particular the Rome-based agencies.

Good governance will give way to a more pragmatic, problem-driven decision-making.

15. Development Finance

Investment in food and agriculture is one of the most effective means of stimulating economic growth and reducing poverty, especially in countries at a low level of economic development. It is also essential for ending hunger and malnutrition in all of their dimensions – by increasing food production to meet growing demand, by improving the access of vulnerable people to food, and by stabilizing markets so that prices are affordable for consumers and remunerative for producers. Food and agricultural investments are also necessary to improve the resilience of rural incomes and livelihoods by addressing climate change, conserving natural resources and facilitating the transition to sustainable agriculture. Implementing the 2030 Agenda for Sustainable Development requires a comprehensive investment approach, one that mobilizes public finance, sets appropriate public policies and regulatory frameworks, unlocks the transformative potential of people and the private sector, and creates incentives for changes in consumption, production and investment patterns (UN, 2015c). While Official Development Assistance will continue to be a critical source of investment in achieving the Sustainable Development Goals in low-income countries, the past decade has seen important changes in the development finance landscape. More funding options have become available from a variety of sources, such as new development banks, the private sector and foundations, non-governmental organizations and specialized funds. However, there is growing awareness that more funds are needed to implement the agenda. Adequate financing is the success for any future agenda.

Agricultural policies and practices are critical for building the resilience of agricultural landscapes and agriculture-based livelihoods to social-ecological shocks and stresses, especially in developing economies such as in sub-Saharan Africa. Factors constraining agricultural development in this region include land degradation, pests and diseases, high input prices and low produce prices, a largely resource-poor agricultural labor force, and postharvest losses (Perrin et al., 2015; Reynolds et al., 2015). Increasing climate variability and climate change pose additional challenges (Abiodun et al., 2013; Abatan et al., 2015; Ifejika Speranza, 2013; Sonwa et al., 2016). It is thus crucial that African agriculture continue to produce food despite these challenges while not increasing adverse effects on the environment such as increasing greenhouse gas emissions.

However, the sector is still to recover from years of neglect. Various sub-Saharan African countries' allocation to the agriculture sector continues to fall short of the Maputo Declaration of 10% of the national budget allocation to the agriculture sector (Africa Union, 2003). To make the most of the available resources, agriculture policies strategically focus on areas that are likely to increase productivity in the short-term.

Moreover, insights are lacking as to the extent to which such policies, and the practices they drive, contribute to building the resilience of agricultural landscapes and agriculture-based livelihoods. In particular, knowledge on how they frame conditions that enable small-scale farmers, who are the major producers, to maintain food production and use emerging opportunities to adapt or transform their agricultural production to more sustainable pathways can be useful for improving policy design and practice. Adequate attention, thus, needs to be focused on the extent to which policies foster resilience in agricultural systems.

Intervention through agricultural policy is a very important phenomenon in the agricultural sector in many countries. Often, the intervention takes place through the market, and the aim is to improve or stabilize the economic conditions. Intervention itself is not an objective, but it is an instrument to achieve the overall objectives and aims set by society. Before the examination of the different instruments, it will be valuable to expose the underlying factors that legitimize those instruments, including support and price policy, of agricultural policy. There is a close correlation between the objectives and the instruments in agricultural policy. Basically, society has set up a number of objectives, which lay down guidelines and directions for the development of agricultural policy. These objectives, which to a large degree are similar from country to country, explain and set the grounds for the instruments in agricultural policy. There are a number of common features in the objectives that are found in agricultural policy in developed countries. In general, agricultural policy in developed countries aims at improving:

- income in agriculture,
- income distribution among farmers,
- productivity in agriculture,
- efficiency in the processing and marketing chain,
- supply and price stability,
- rural development and the demographic situation,
- environmental status, and
- export, employment, production, added value, etc.

Many different types of instruments can be used to achieve the given objectives, and it is a very complicated relationship. Some instruments can be used to achieve several different objectives, whereas other instruments benefit the achievement of some and limit the achievement of others. Finally, important differences with respect to financing, effect on production and trade, dead weight losses, transparency, and other elements are observed. Some of these policies include;

- National Accelerated Food Production Programme (NAFPP) 1972-1973,
- Operation Feed the Nation (OFN) 1976-1980,
- Green Revolution Programme (GRP) 1981-1983,
- Go Back to Land Programme 1983-1985,
- A restoration of the elements of NAFPP after the military coup in 1985.

3

The first National Development Plan (1962 – 1968): as soon as Nigeria gained independence in 1960, the First National Development Plan was immediately lunched. The plan was seen a clear-cut plan that will ensure and bring about an all-round development in Nigeria based on it objectives which includes among others; to bring about equal distributions of national income, to speed-up the rate of economic growth; to generate savings for investments to ensure a reduction on the external sector; to bring about enough capital for manpower development; to increase the standard of living for Nigerians particularly in the areas of food, housing, health and clothing and to develop the infrastructure of the nation (Onyenwigwe, 2009; Iheanacho, 2014). The plan appeared comprehensive and impressive in the nature but the political crises in the country that culminated into the 30 months civil war made the plan to become almost redundant. As Nnadozie (2014) noted, the objectives and targets of the first national development plan of 1962 – 68 were too large and somewhat over ambitious in nature and therefore out of time with realities on grand in the aspects of financial, technical and managerial capabilities of Nigerians. As noted by Onah (2010) the above challenges made the plan to lack clarity and precision in the formulations of objectivities/targets and even its implementation. However, Iheanacho (2014) observed that despite the numerous challenges and weaknesses of the plan, it recorded the execution of some major projects in the country. But it is noteworthy to point to that the successes recorded from the plan were far below its expectations. Obikezie and Obi (2004) blamed the failure of the plan to the civil war which meant that distortions was as a result of channelling resources towards keeping Nigeria together.

The Second National Development Plan (1970 – 1974) immediately after the civil war, the second national development plan was lunched and it was called the plan for Reconciliation, Reconstruction and Rehabilitation (3R). As noted by Ohale and Agbarakwe (2009), in this plan period, the Federal Government was billed to "occupy the commanding heights of the economy in the quest for purposeful national development." There was a consensus that Nigeria's lacked a national sense of purpose mostly in economic matters and there was a determined effort to correct the situation. The plan was meant to cover the four-year period, 1970 – 1974, but it was later extended to cover the 1974 – 75 fiscal years (Iheanacho, 2014). The plan was built upon five principal objectives that it was meant to pursue and they are as follows: a united, strong and self-reliant nation; a great and dynamic economy; a just and egalitarian society; a land of bright and full opportunities for all citizens; and a free and democratic society (Onyenwigwe, 2009; Second National Plan, p. 32; Ohale and Agbarakwe, 2009). The objectives of the plan were considered to be so relevant that they were included in the 1979 constitution. Yet their inclusion in the constitution did not materialize into plan implementation but they were considered as ordinary directives that are fundamental and not legally enforceable (Abasili, 2004). Ikeanyibe (2009) recorded that the guiding principles that became increasingly recognized from the second national plan could not correct plan distortions and slippages. He noted that apart from its vagueness, that it did not in actuality achieve its rationale of directing the programmes and budgets of various administrations. The major drawbacks of the second national plan were issues bordering on lack of will to perform, lack of finance, corruption, monocultural oil economy, etc. In spite of its challenges, the second national plan recorded some significant improvements and they were mainly in the areas of manufacturing, transport, education, health, social welfare, communication, mining, etc (Ohale and Agbarakwe, 2009). It is equally pertinent to point out that the achievements recorded from this plan was mainly a function of the unprecedented inflow of crude oil revenue that accrued to the country in this period than of any inherent strengths of the plan itself (Awoseyila, 1996). In essence, much could not have been achieved from the plan if not for the oil boom that occurred during the plan period.

The third National Development Plan (1975 – 1980) was also launched during the oil boom years and this led to a jumbo investment that was ten times of that of the second plan and about 15 times of the first plan (Iheanacho, 2014; Ekhosuch and Ibietan, 2013). The objectives stated in the third national plan were similar to that of the second plan objectives as they were seen as being long-term in nature. The objectives outlined in the third plan include; increase in per capita income, even distribution of income, reduction of unemployment level, increased in the level of the supply of higher-level manpower, diversification of the economy, balanced development and indigenization of economic activities (Obi, 2006). The main approach of the plan was to utilize the proceeds of the oil boom to develop the productive base of the economy that can permanently lead to the improved standard of living of the populace. As Egonmwan and Ibodje (2001) put it, the plan was premised on the need for the public factor to provide facilities for the poorer sections of the population including electrification, water supply, health services, urban housing and education. A clear assessment of the plan points to the fact that it actually focused in giving priority to projects and programmes that could have direct positive impact on the rural dwellers but suffix it to say that the meagre allocations to agriculture and social development scheme that should have direct impact and improvement in the wellbeing of the masses received only 5% and 11.5% respectively of the total huge financial outlay of the plan (Okigbo, 1989; Iheanacho, 2014). Based on this, it is obvious that this meagre finance allocated to these priority areas is a clear demonstration of "lack of focus of the planners" (Onah, 2010). Like the previous plans, the third plan did not actually achieve its set targets and stated objectives but to an extent, there were reasonable achievement in some areas. Okowa (1991) noted that in terms of achievement, the manufacturing sector witnessed a very fast rate of growth with an average of 18.1% per annum. It equally recorded higher growth in other areas like building and constituencies and government services (Iheanacho, 2014).

The fourth National Plan (1981 – 1985) was the first plan that was prepared by a civilian administration since after military intervention in 1966. In its part, the plan tailored the way of the previous plan in its targets and policy formulations. As Ijaiyaa and Ilsman (2002:2) noted, it was lunched simply to consolidate the third national development plan and it placed much emphases on revenue from petroleum resources. On its part, the plan had some lofty objectives which includes:

increases in the real-income of the average citizen; more even distribution of income among individuals and socio-economic groups; reduction in the level of unemployment and underdevelopment; increase in the supply of skilled manpower; broadening of the economic base; increased indigenization programmes; development of high technological base; the promotion of a new national orientation and discipline among the citizens; better attitude to work and cleaner environment (Obi, 2006).

REFERENCES

[1]. AAIN (2005). Fighting poverty together in the mist of plenty, 2005 Annual Report., Abuja. Action Aid International.

[2]. Abu, B. D. (2008). From the editorial suite. Newswatch Magazine, November, pp: 13.

[3]. Adedeji, A. (1989). Towards a dynamic African economy; selected speeches and lectures. Great Britain:Frank Cass and Company Limited.

[4]. Adubi, A. A. (2002). Plan-budget link in Nigeria. An exploratory investigations. NCEMA Policy Analysis Series, 8(2): 1-17.

[5]. Ake, C. (1996). Democracy and development in Africa. Ibadan, Oyo, Spectrum Books Limited.

[6]. Alao, D. O. & Alao, I. O. (2013). A mid-term evaluation of President Goodluck Jonathan Transformation Agenda. Journal of Research and Development

[7]. Alapiki, H. (2009). Politics and Governance in Nigeria. Owerri,Corporate Impressions.

[8]. Awojobi, O. N. (2015). Cultivating policy for development in Nigeria: An appraisal of President Goodluck Jonathan's Transformation Agenda (2011 – 2014). International Journal of Humanities, Engineering and Pharmaceutical Sciences 1(9)1-11

[9]. Ayo, E. J. (1998). Development Planning in Nigeria. Ibadan: University Press Ltd.

[10]. Central Bank of Nigeria (2005). CBN Briefs (2004-2005 Edition). Abuja: Research and Statistics Department of Central Bank of Nigeria.

[11]. Daggash, M. S. (2008). Why Nigeria needs a national development master plan. Vanguard (October 14) page 35-36.