



Articulating the Effect of Pesticides Use and Sustainable Development Goals (SDGs): The Science of Improving Lives through Decision Impacts

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ARTICLE INFO

Article history

Received: 1 February 2021

Accepted: 8 February 2021

Published Online: 30 March 2021

Keywords:

Human ingenuity

Decision impacts

Sustainable Development Goals

Planetary health

Pesticides

Dialogue and cooperation

Outreach programs

Nigeria

ABSTRACT

Nothing vast comes into a mortal's life without a curse. Identifying the pathways of pesticide impact can be multifaceted as well as complex, as humankind faces the magnificent challenge of food systems reconfiguration toward providing and delivering healthy foods that individuals can access while protecting planetary health. Ideally, chemical pesticides used inappropriately in agricultural activities has shaped serious health as well as environmental problems in the global south. The United Nations Environment Program (UNEP) as well as World Health Organization (WHO) approximate that the rates of pesticide poisoning occur 2-3 times per minute, having roughly 20,000 employees dying yearly from exposure, mostly in emerging countries. From an environmental point of view, "chemically-polluted runoff" comes through fields that pollute both ground as well as surface waters, destroying freshwater ecosystems, damaged fisheries, as well as creating growing and sustainable "dead zones" in the coastal areas near the river's mouths of the drain agricultural areas. The environmental as well as health hazards resulting from pesticides could remain comparatively avoided through education as the first step towards achieving the SDGs as well as creating sustainable incentives toward curbing the overuse trend. Other important challenges need to be resolved, for example social inclusion; poverty reduction; education, increased equity as well as health care; sustainable energy; conservation of biodiversity; water security; and changing climate adaptation as well as mitigation. These challenges are interlinked as well as embodied in 2030 Agenda for Sustainable Development, which all UN member states have accepted since 2015 as well as built round the 17 Sustainable Development Goals (SDGs). Therefore, managing the rapid accelerators considerably will need negotiation as well as collaboration from a wide range of civil society sector, private as well as public actors. The time has come toward putting the challenge of sociotechnical innovation as well as massive human ingenuity toward usage to safeguard the next generations as well as the planet future. While, the world is not on the pathway toward realizing its global goals come 2030. Prior to the outbreak of COVID-19, uneven progress had been witnessed, as well as more focused considerations was required in many areas. The sudden onset of the pandemic abruptly hampered the SDGs implementation and, in other cases, twisted decades of progress backwards.

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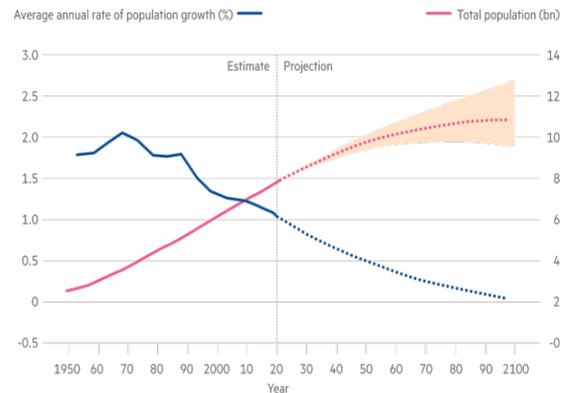
1. Introduction

Just as the year 2020 mark entering of the Decade of Action toward delivering Sustainable Development Goals (SDGs), it is an important moment to spread the shared vision as well as quicken responses toward the world’s momentous challenges by eradicating poverty as well as hunger due to changing climate (Raimi et al., 2018; Olalekan et al., 2020; Morufu et al., 2021). The outbreak of coronavirus disease pandemic (COVID-19) crisis is having an unprecedented disruptions toward global consumer supply chains markets, causing worldwide crude oil prices to drop and a turmoil in worldwide commodities as well as financial markets, wiping out sporting event as well as entertainment activities, shutting down of large swaths of individuals movements in various countries, as well as bans on intercontinental travel/limitations through important air routes across globe and has triggered the largest recession in 90 years and set back hard earned development progress (Gift & Olalekan, 2020; Gift et al., 2020; Samson et al., 2020; Raimi et al., 2020; Raimi & Raimi, 2020; Morufu et al., 2021). Unless we mobilize and equitably allocate resources for a large-scale, sustainable and sustained crisis response, the SDGs may well be beyond reach. As the outcomes have had a major impact on the livelihoods of households’ as well as business activities, driven by global demand drop, resulting in consumer confidence as well as production slowdown.

The exceptional circumstances facing world events in 2020, where we haven’t had a lot of good news, require exceptional approaches, policy as well as decision making in all government spheres, as well as between private sectors and non-profit, remains progressively concentrated on supply chain as well as network issues which exceed governance, disciplinary as well as jurisdictional limits. While, globally, agricultural growth over the next decade is expected to ensure growing food demand as well as increase land competition. Agricultural land remains predictable to increase come 2030 with a decrease in population growth as well as crops continue to improve. Deforestation at present is on the decline and these activities are estimated to linger, particularly from 2030, while additional demand for agricultural land declines (Raimi et al., 2019; Olalekan et al., 2019; Raimi et al., 2019; Isah et al., 2020; Raimi et al., 2020; Morufu, 2021). There are remarkable developments in demographic differences between regions as well as countries. Come 2050, the population of the world is expected to increase from 2.2 billion individuals to around 9.2 billion. Much of this development will take place in the Middle East, South Asia as well as specifically Africa (see figure 1 & 2 below). Similarly, the population of Sub-Saharan Africa’s is expected to increase over the next 30 years, growing by additional 1 billion indi-

viduals as well as kept on track toward overtaking central as well as south Asia, afterward as per the world’s populous largest region. The south of the Sahara indicates high fertility rates meaning such Africa region account for above half of worldwide population growth at present and 2050, according to the United Nations Population Division projections report. The population in the regions will continue to grow towards the century end, as the number of individuals living in Asia as well as beyond decline. This trend reflects the situation in Nigeria, where the population at present surged from 95 million in 1990 to 210 million in 2020 (Olalekan et al., 2018; Olalekan et al., 2019; Olalekan et al., 2020). The population of Nigeria’s will double by 400 million come 2050, then it will have surpassed the United States as the third largest inhabited country in the world. In Niger, where women have around seven children on average, the highest rate of birth in the world, the projected population almost triple to 66million over the same time period. By 2050, Niger is projected to be the only single country in the world having a greater fertility level over a lifetime of four births per woman.

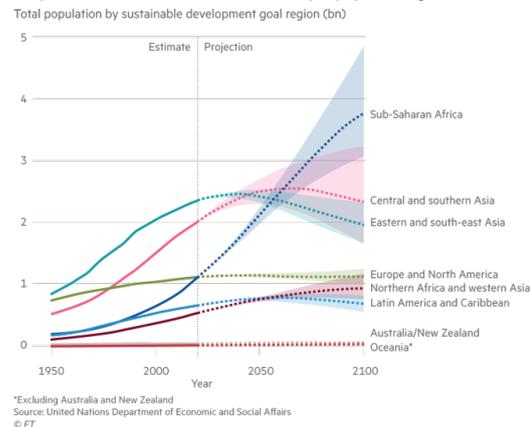
Global population continues to grow but rate of increase slows



Source: United Nations Department of Economic and Social Affairs © FT

Figure 1. Global population continues to grow but rate of increase slows

Only Sub-Saharan Africa set to sustain rapid population growth



*Excluding Australia and New Zealand Source: United Nations Department of Economic and Social Affairs © FT

Figure 2. Only Sub-Saharan Africa set to sustain rapid population growth

2. Pesticide Use, Population And Sustainable Development

The demographics profiles in every region are ageing, particularly in China, Italy as well as countries in the OECD. The populaces are becoming more and more urbanized. Come 2050, an additional 2.8 billion people are expected to live in cities more than today, or approximately 70% of the population of the world. Over the same period, rural population is expected to decline by 0.6 billion individuals. This rapid urban distribution is projected to spread disproportionately all over the globe. The urban population share in OECD countries are expected to reach 86% of the entire population come 2050. In the global south, one of the smallest urban areas, the urban residents have reached almost 37% of the entire population in 2010, but some are expected to reach 60% come 2050. Urban sprawl below 0.5 million populations is expected to grow faster when compared to other urban centers. This will remain a situational change resulting from observation in recent years, as large mega-cities continue to grow at a geometric rate (UN Habitat, 2006; United Nations, 2018). The prompt urbanization growth and industrialization has considerably contributed to pesticides promotion and usage, particularly in emerging countries, which have both the pros as well as cons, even though a population concentration could enable pesticides production as well as usage. As a result, it is often easier for pesticides exposure levels to be higher and could worsen environmental conditions in slums, with serious consequences for human health (Morufu et al., 2021; Morufu, 2021; Isah et al., 2020; Olalekan et al., 2020; Isah et al., 2020; Olalekan et al., 2020; Adedoyin et al., 2020; Olalekan et al., 2020; Sawyerr et al., 2018; Adeolu et al., 2018). Although demographics dynamics is a key driver of local as well as global environmental change. Population growth led to increased natural resources as well as land use consumption, posing additional environmental pressures. Variations in wealth as well as age structure likewise change lifestyle, consumption habits as well as diet, which may have a negative effect on the milieu. The population of the world have increased from below 4 billion in 1970 to 7 billion at the moment. Come 2050, the United Nations estimates the world population to be around 9.2 billion, or 2.2 billion additional individuals (see figure 1 & 2 above).

The population forecast discussed above indicate that the use of pesticides worldwide will increase and will basically stabilize by 2050. Even though dietary variations remain likely to continue to remain a key factor for the growing agricultural demand production. While, 2015 symbolize a significant breakthrough towards the

path to sustainable development. In line with the Millennium Development Goals, a novel cycle of Sustainable Development Goals (SDGs) aims toward guiding national governments as well as international community in their commitment toward achieving a sustainable world, particularly as human activities continue to push earth past its planetary boundaries, the need to accomplish the Sustainable Development Goals (SDGs) becomes more urgent than ever. With more than 800 million individuals remain at present starving, come 2050, worldwide production of food is expected to rise by 50% to feed above 9 billion individuals expected on the planet (Food and Agriculture Organization of the United Nations, 2018). The environmental, economic, as well as social issues of our world affect us all, from how we eat to how we work, how we communicate, and how we learn. There is a firmly believe that education is the first step towards achieving the SDGs. Collective learning and awareness through outreach improves and promotes the science and policies understanding behind sustainable development, and gives policy-makers, researchers, practitioners, and citizens to make informed decisions on how to support more sustainability through delivering courses covering all SDGs, including topics such as health, development, climate change, agriculture, human rights, and sustainable investment (Raimi et al., 2018; Raimi, 2019; Raimi et al., 2019; Omidiji and Raimi, 2019; Suleiman et al., 2019; Olalekan et al., 2019; Olalekan et al., 2020; Adedoyin et al., 2020; Olalekan et al., 2020; Raimi et al., 2020; Morufu et al., 2021). For several years, farmers in Nigerian have remained bedeviled through a cankerworm known as pesticides dependency as one and only veritable source toward increasing yield as well as become an albatross due in the direction of its effects on health. In spite of being miscomprehended as an expression of vulnerability in the face of blistering as well as dangerous times of strangulated economy, as concern around pesticides have become an issue due to the direct humans' actions. Adapting these procedures can remarkably decrease the exposure difficulties farmers faced. The foremost pesticides concerns are the long-term chronic exposure side effects for instance, the altered genetic stability of hormone balance, immune systems suppression as well as the capacity of some pesticides such as Cypermethrin (Raimi et al., 2020) to cause cancer and exposure to it causes toxic effects and it is carcinogenic to humans. Hospitals morbidity data shows that over 70 percent of rural residents who come to the hospitals for health care treatment suffer from typhoid, malaria, as well as other food and water-borne illnesses that the local authorities may perhaps remain empowered to address, prevent and accelerate actions toward

fast-tracking rural development, agricultural support and employment creation (Raimi et al., 2017; Olalekan et al., 2018; Raimi et al., 2019; Raimi, 2019; Raimi et al., 2019; Olalekan et al., 2019; Gift & Olalekan, 2020; Olalekan et al., 2020; Gift et al., 2020). In addition, the identified practices by Nigerian farmers on the use of pesticides has been identified as a major obstacle toward eradicating food contamination which often leads to serious morbidity as well as loss of lives. The Federal Ministry of Science and Technology reported mid-year that more than 200,000 Nigerians die each year before, during and after planting from food-borne diseases and poisoning as a result of contamination. However, the success of the Millennium Development Goals (MDGs), nonetheless relatively distant from the ambitious goals set at the commencement of the millennium have prompted the world toward adopting a novel set of goals that build on these activities called the sustainable development goals (SDGs), this new set of goals aims amongst others put an end to hunger as well as poverty come 2030. Like the Millennium Development Goals (MDGs), the Sustainable Development Goals (SDGs) are designed with evidence that through collaboration on a pre-agreed mission, the world has an advantage in meeting citizens aspirations, including farmers for prosperity, peace as well as progress. While, the sustainable development goals (SDGs) remain an assemblage of 17 global goals and 169 targets set through the United Nations General Assembly in 2015 for the year 2030 (see figure 3 below).



Figure 3. Source adapted from <https://www.un.org/sustainabledevelopment/development-agenda/>

The SDGs are part of the United Nation General Assembly resolution 70/1, the 2030 Agenda. The SDGs goals of No poverty, zero hunger etc. Agricultural development is an important nexus to the achievement of a good number of the SDGs and is a sound and most effective strategy to combat poverty (Goal 1), eradicate hunger (Goal 2), guarantee good health as well as wellbeing (Goal 3), promote industrial growth (Goal 9), reduce inequality (Goal 10) etc. The key objective of the sustainable development

goals (SDGs) is to improve as well as promote the health and well-being of all farmers of all ages. Apparently, as a result of some accidental coincidence of sorts, farmer’s profession whose role has conventionally remained toward producing food, has sequel toward a progression in scope over the years, in harmony toward depending on additional complex integration of the sustainable development goals (SDGs). The use of pesticides in farming practice speak to the importance the SDGs place on individuals, their health as well as general wellbeing, including responsible production and consumption. It recognises that pesticides are basically poisoning with a possibility toward wreaking untold harm as well as havoc on farmers, including posing danger to human lives and incomes of farmers as well as subject toward inconvenience and even additional pauperise farmers if the utmost affordable or cost-effective decisions are not conscientiously selected. Most importantly, it is particularly relevant that in the fight against pesticides, government must progressively play the important intercessor role for farmers. Very significantly, this is much in step with the SDGs which emphasise partnership as well as collective corporation towards the achievement of SDGs Goals and to intervene by sustaining efforts to reduce food contamination through collective learning and education of farmers. Also, there is need to embrace pro-private sector policies to improve agricultural practices of small holders’ farmers and by extension, the relationship along the supply chain, increasing their outputs and sales of wholesome foods, as well as to improve the health of rural communities through consumption of safe products. The government need to work with the private sector to support and help stimulate industry innovations for sustainable argic food systems as well as producing better and safer food despite preserving biodiversity and natural resources. Also, empowered participation should be encouraged to opens up spaces for contestation as well as policies cooperation regarding pesticides usage. It is important to take the right decision as well as the right outcomes, and therefore for sustainable development. Growth must be propelled by agriculture prioritisation as a significant contributor toward the development as well as the rapid adoption of novel technologies toward boosting the sector as well as toward reshaping and improving the agriculture and food systems to better feed Nigerians and deliver sustainable development. There is need to be guided by our commitment to providing quality agricultural food systems as an essential tool for achieving a more peaceful, prosperous, and sustainable future. Moreover, “Eco-social policies” aim toward shifting behaviours or providing motivations for additional and advanced sustainable environmental

management or use of resource, while strengthening the adaptive capacities or resilience of communities as well as individuals, hence accomplishing social goals.

3. The Way Forward

Indeed, everyone must work together to achieve the 2030 Agenda for Sustainable Development and Sustainable Development Goals (SDGs). Different sectors as well as actors will need to work collectively in a cohesive manner through merging resources, knowledge as well as expertise. Hence, there is a need for innovative and sectorial multistakeholder collaboration, which is an important key to getting us toward where we need to be in 2030. More than ever, partnerships should continue toward supporting government led activities to achieve sustainable development. Unlocking the immense knowledge as well as experience that these corporations as well as partners collaboratively possess, grips the vital toward efficiently supporting Sustainable Development Goals (SDGs) implementation. The Agenda of the 2030 will necessitate an increased teamwork among all organizations, all States as well as all individuals, so that we can magnificently deliver on the promises of achieving and fulfilling the 17 interconnected Sustainable Development Goals (SDGs). The voyage toward achieving and fulfilling all the 17 Sustainable Development Goals as well as accomplishing a better future for all individuals, which is together filled through opportunity as well as great challenge. It is a problem that is facing all individuals as well as all nations. Nonetheless this problem could be overcome through collaboration in a real-time partnership to design critical as well as outreach programs that are targeted, which address precisely pesticide risk, safe handling as well as forestalling behavior which are critical characteristics aimed at promoting planetary and human health that we all desire. At the same time, investment in the SDGs reduces exposure and vulnerability and is a major driver of resilience. While all actors must understand, manage and ultimately reduce pesticide risks, governments must lead in taking a risk-informed perspective. First, governments are the “risk-bearer of last resort”. When a crisis occurs, private risks often become public liabilities. Thus, policymakers need to mainstream risk considerations in all policies, processes and decisions.

Going forward, there is need to invest in a sustainable, resilient and equitable recovery of safe pesticide use. Rather than trying to restore yesterday’s economy, governments must invest in measures to protect their citizens from pesticide risk, poverty (forecasts designate that the pandemic might likely push 71 million individuals back into extreme poverty by 2020, in what would remain the

first global poverty rise since 1998. Several of these individuals are informal economy employees, whose earnings dropped through 60% in the first calendar month of the disaster. Half of the global employees of about 1.6 billion individuals supporting themselves as well as their families through uncertain as well as frequently unsafe jobs within the informal economy, as well as having been remarkably affected), hunger and existential threats, while sharing the fruits of globalization more equally. New forms of financing, including longer-term instruments spanning 40 - 50 years, may be needed for these investments. Investment alone, however, is not enough. To address the systemic nature of global pesticide risks, there is need to reform our agricultural institutions and policy architecture, strengthen multilateralism, and create new platforms and networks for global cooperation. These views will inform discussions within the United Nations, government and with other partners in 2021 and going forward. It is urged that all governments and other stakeholders to meet the expectations of the citizen they serve with unity, solidarity and coordinated multilateral action. The view underlines the need for policy actions toward ensuring effective support until the recovery is firmly underway.

Competing Interests

We declare that we have no conflict of interest that could be perceived as prejudicing the impartiality of the research reported. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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