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Review Article

Effect of Chemical Farming on Wealth Creation and Food Security among Rural Households in Northwest Nigeria. A Review

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Abstract: This paper reviewed the effect of chemical farming on wealth creation and food security among rural households in northwest Nigeria. Chemical farming has been adopted by many farmers because it's the faster way to get higher yields and create wealth. The paper also conceptualized food security and wealth creation. It also looked at wealth creation strategies and the effects of chemical farming to national development along with reasons why wealth creation is crucial to for rural household development. The article also showcases the role of chemical farming in combating pests, diseases and weeds towards improved food security and animal and wealth creation. Reasons for adoption of chemical farming and its role in food security and wealth creation was extensively discussed in the paper. It as well assessed the disastrous effects of chemical farming to both crops, human and soil health.

Keywords: Effect, Chemical farming, Wealth creation, Food security, Rural household

INTRODUCTION

Agriculture has been known from time to be the major source of wealth, source of food, livelihood and economic growth for any nation and Nigeria is not an exemption. Agriculture can be a very lucrative business for farmers and investors alike as the cash crops, food and fruits produced coupled with fish and snail farming and poultry business will always yield good income as food is a very important commodity which people can never get tired of. However, you can invest in the agricultural process and products and earn money from it without necessarily owning a farm or going to one (Abhilash and Singh 2008). There are a lot of reasons why you can invest in agriculture, one of which is the increase in the value of the business and it is a low-risk investment, high profits and flexible work. Many farmers choose to use chemicals to keep weeds and pests from destroying their crops and to add more nutrients to the soil. There are three different kinds of pesticides; herbicides, insecticides and fungicides. All three of these pesticides are used to kill different kinds of pests that can be found on a farm. Farmers that make the decision not to use any chemicals are called organic farmers. The industrial revolution followed by the green revolution which fulfilled the food demands of the growing population caused an increase in yield per unit area in crop production, but they also increased the use of synthetic fertilizers in agriculture. Less soil fertility is one of the most vital constraints in improving the agricultural production. But the intensive use of chemicals in farming worldwide for ensuring the world food security caused so many health problems and unrecoverable environmental pollution (Agrawal et al., 2010).

A goal of agriculture is to meet the present food need of the society with the surplus amount of availability for exporting and future purposes. For increasing agricultural production and productivity, use of chemical inputs such as herbicides and pesticides has increased. Herbicides and Pesticides are chemical substances that are meant to weeds and kill pests. In general, a pesticide is a chemical or a biological agent such as a virus, bacterium, antimicrobial, or disinfectant that deters, incapacitates, kills, pests (Atafar et al., 2010). It is commonly used to eliminate or control a variety of agricultural pests that can damage crops and livestock and reduce farm productivity. Pesticides have proved to be a boon for the farmers as well as people all around the world by increasing agricultural yield. Basically, the input of pesticides in agriculture increases after the announcement of Green Revolution which in turn helps our country to fight the major problem of food crises. When fertilizers, herbicides and pesticides are used in farmlands, they are transmitted directly or indirectly into the corns and vegetable that affects

the human health. Moreover, as pesticides are applied over the vegetable which are directly entered into human or livestock bodies. Excessive use of chemicals may pollute the land, air and underground water and it is so much hazardous to humans or livestock Atafar et al., 2010).

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Conceptualization of food security

The World Health Organization has defined food security as "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life." Food security is a 'flexible concept' as reflected in the many attempts at definition in research and policy usage. Even as early as the 1980s, there had been around 200 definitions in published writings, according to Bhandari (2014) the continuing evolution of food security as an operational concept in public policy has reflected the wider recognition of the complexities of the technical and policy issues involved. The most recent careful redefinition of food security is that negotiated in the process of international consultation leading to the World Food Summit (WFS) in November 1996. The contrasting definitions of food security adopted in 1974 and 1996, along with those in official FAO and World Bank documents of the mid-1980s, are set out bellow with each substantive change in definition emphasized. A comparison of these definitions highlights the considerable reconstruction of official thinking on food security that has occurred over 35 years. These statements also provide signposts to the policy analyses, which have re-shaped our understanding of food security as a problem of international and national responsibility. Food security was defined in the Proceedings of the 1974 World Food Summit as: 'availability at all times of adequate world food supplies of basic foodstuffs to sustain an expansion of food consumption and to offset fluctuations in production and prices' (UN, 1975). In 1996 FAO expanded its concept to include a third prong: 'Ensuring that all people at all times have both physical and economic access to the basic food that they need (Atafar et al., 2010)..

The UN Sustainable Development Goal 2 is to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture." Goal 2 seeks sustainable solutions to end hunger in all its forms by 2030 and to achieve food security (Choudhary et al., 2014). The aim is to ensure that everyone everywhere has enough good-quality food to lead a healthy life. Achieving this Goal will require better access to food and the widespread promotion of sustainable agriculture. This entails improving the productivity and incomes of small-scale farmers by promoting equal access to land, technology and markets, sustainable food production systems and resilient agricultural practices. It also requires increased investments through international cooperation to bolster the productive capacity of agriculture in developing countries. About 800 million people are hungry and another two billion people suffer from life-threatening disease related to under-nutrition and contamination from pesticides. At the same time, 1.9 billion people are overweight, and nearly half of our global food supply is wasted. This situation has not developed in a vacuum. Our food security campaign challenges the policies that have led to this crisis: the policies that subsidize industrial food and agriculture systems (Choudhary et al., 2014)..

The concept of wealth creation

Wealth can be defined in several ways. Wealth is a fundamental concept in economics - indeed, perhaps the conceptual starting point for the discipline. Despite its centrality, however, the concept of wealth has never been a matter of general consensus." As for the term itself, it prominently features in Adam Smith's

work as an inquiry into the nature and causes of the Wealth of Nations. Dasgupta (2007) stated that in order to discuss the concept of wealth we first may concentrate on what is meant by the wealth of a single nation. This approach, though, seems to be outmoded and inappropriate because of the "decline of the nation-state" in present times, the increasing amount of pressing international challenges and the extraordinary power of many transnational corporations. However, it also provides some advantages compared to other approaches. When we ask for the "wealth of a nation," it is difficult to deny that wealth should encompass both private and public goods or assets; that is endowments of two types: those that can be attributed to and controlled by individual actors, be they persons, groups or organizations and those from which no actor - inside the nation. In contrast, when speaking of the wealth of an individual or a company, we usually consider only the assets under their control while ignoring the public goods they also benefit (or suffer) from. We may define the wealth of a nation as the total amount of economically relevant private and public assets including physical, financial, human, and "social" capital. Consequently, the creation of wealth includes the production of public as well as private assets that indicates the important but limited role of the market and price mechanism. According to Natraj and Katyal (2014), wealth is primarily a stock (an economically relevant quantity at a certain point in time); but, in a broader sense, it also includes flows (increasing or decreasing quantities over a certain period of time)

Wealth creation has a lot to do with technological innovation, but is more than that since the innovation is made feasible and successful in economic and financial terms. Aiming at material improvement for the benefit of human lives, wealth creation includes both a material and a spiritual side and goes beyond the mere acquisition and accumulation of wealth. It is a qualitative transformation of wealth. This is to say that any organization that adopts wealth creation as its watchword, its innovative spirit will revolutionize not only its products and services but also its production process, organizational culture and identity while yielding continuous financial success. Rahman and Debnath (2015) assert that wealth creation can be narrowly defined in terms of income generation or more broadly as the creation of assets, both in terms of physical and human capital. Chenga and Narayana (2014) stated that wealth creation in simple terms refers to economic growth and better standard of living for the individual, family or states.

The concepts of wealth and wealth creation apply to individuals, households, businesses, communities, regions, States, and nations. Accumulating net wealth requires net savings and investment across all scales, though the attention devoted to different types of assets will depend on the decision maker involved. For example, an individual is alert to his or her own private physical, financial and human capital assets, while local government leaders may be most directly concerned about investments in local public infrastructure and facilities. Wealth creation concepts apply in all contexts, although rural wealth creation involves opportunities and constraints that are distinct from wealth creation in urban areas. This report focuses on wealth creation in rural areas, particularly the means by which it is created. In part, this is because promoting sustainable rural development is one of the main missions of USDA. Furthermore, the opportunities, constraints, and requirements of wealth creation are often different in rural contexts than in urban ones. For example, natural resources and amenities are generally more important as a form of wealth and as a contributor to economic development in rural areas than in urban areas. On the other hand, many rural areas lack access to infrastructure and facilities that are common in urban areas—such as airports, highways, hospitals, universities, wastewater treatment systems, and high-speed Internet—due to their low population density, distance from population centers, and the fixed costs of such assets. Rural areas often lack other kinds of assets, particularly human capital, for similar reasons (Choudhary et al., 2014).

Wealth creation strategies from chemical farming

1. Investing in a farm: this is one of the major ways you can earn money from agriculture. There are also online farms which makes it easier to invest in a farm without physically been present there. You can also invest in a farm by giving out a spare piece of land to another person who has the time to help in managing its for-profit purposes.
2. Exportation of farm produce: you can also earn money from a farm by been in partnership with farmers to export their produce when harvested to other states and countries where they are in need of them. Exportation of these farm produce such as cotton, cocoa, maize, millet, cowpea etc can be very challenging but also rewarding with great profits (Choudhary et al., 2014).
3. Selling of farm produce: you can also earn money from agriculture by buying and selling farm produce in bulk to consumers. You get these products at a cheaper rate directly from the farm and you can sell it at the price of your choice to retailers and consumers. You can either chose to be a distributor who partners with a farm to sell or be a retailer. In either way, you earn enough income from the business.
4. Farmland yield: farmland investors can make money from agriculture through the harvesting of crops and fruits. These crops are either harvested monthly or annually on the farmland. This farmland yield is beneficial to both the farmers and investors even when there is a loss, the farmer can still start all over again.
5. Packaging and storing of farm produce: if you can do food packaging very well that would be appealing to the consumers, then this is another good way to make money without owning a farm. A good and well packaged product is more attractive to the eye. Packaging and storing of farm produce is also a great way to make money from agriculture.
6. Agronomy consultancy: agronomy provides research background knowledge for farmers. They help to supplement the traditional knowledge of the way farmers do their things with new technologies and tools to increase yields and produce tastier and healthier farm produce. You can earn money from agriculture by rendering advises to farmers on their crops and investments. Agronomy consultants are always in high demand (Tomer et al., 2015).
7. Farm produce transportation: transportation is a major challenge for farmers especially, those on a small scale. Limited access to transportation can affect how a farmer will be able to move his farm products into the market. In order to cut out this hardship, then farm transportation is necessary as it helps to move the products with ease. Transportation can be improved by buying a fleet of trucks and then partnering with farmers. Providing access to transportation for farmers can generate a strong profit.
8. Online farming: this is almost like the investment type of farming. In online farming, all you need to do is spend your money for the planting of a particular type of crop for a duration and at the end of the planting season when the crops have been harvested and sold, you will get both your capital and profits. There are a lot of online farms which are legit and offers good rewards (Tomer et al., 2015).

Effect of chemical farming to national development

Yargholi and Azarneshan (2014) highlighted the effects of chemical farming to national development as shown below:

Source of Livelihood: Most people's main source of livelihood is farming. About 70% of people rely directly on agriculture as a livelihood. The result of the non-development of non-agricultural activities to absorb the fast-growing population is this high percentage in agriculture. Furthermore, many people are not engaged in agriculture in developed countries.

Contribution to National revenue: Agriculture is the main source of national income for most developing countries. However, for developed countries, agriculture contributes a smaller percentage to their national income.

Supply of Food as well as Fodder: The agricultural sector provides fodder for

domestic animals. The cow provides people with milk which is a form of protective food. Moreover, livestock also meets people's food requirements

Significance to the International Trade: Agricultural products like sugar, tea, rice, spices, tobacco, coffee, etc. constitute the major items of exports of countries that rely on agriculture. If there is a smooth development practice of agriculture, imports are reduced while export increases considerably. This helps to reduce countries' unfavorable balance of payments as well as saving foreign exchange. This amount may be well used to import other essential inputs, machinery, raw material, and other infrastructure that is helpful for the support of the country's economic development.

Marketable Surplus: The growth of the agricultural sector contributes to a marketable surplus. Many people engage in manufacturing, mining, as well as another non-agricultural sector as the nation develops. All these individuals rely on food production that they might meet from the nation's marketable surplus. As agricultural sector development takes place, production increases and this leads to the expansion of marketable surplus. This may be exported to other nations.

Source of Raw Material: The main source of raw materials to major industries such as cotton and jute fabric, sugar, tobacco, edible as well as non-edible oils is agriculture. Moreover, many other industries such as the processing of fruits as well as vegetables and rice husking get their raw material mainly from agriculture.

Significance in Transport: The bulk of agricultural products are transported by railways and roadways from farms to factories. Mostly, internal trade is in agricultural products. Moreover, the revenue of the government, to a larger extent, relies on the success of the agricultural sector.

Foreign exchange resources: The nation's export trade depends largely on the agricultural sector. For example, agricultural commodities such as jute, tobacco, spices, oilseeds, raw cotton, tea as well as coffee accounts for approximately 18% of the entire value of exports of a country. This demonstrates that agricultural products also continue to be an important source of earning for a country's foreign exchange.

Great employment opportunities: Construction of irrigation schemes, drainage system as well as other such activities in the agricultural sector is important as it provides larger employment opportunities. The agriculture sector provides more employment opportunities for the labor force. This, in turn, reduces the high rate of unemployment in developing countries caused by the fast-growing population.

Economic development: Since agriculture employs many people, it contributes to economic development. As a result, the national income level, as well as people's standard of living, is improved. The fast rate of development in the agriculture sector offers progressive outlook as well as increased motivation for development. Hence, it aids to create a good atmosphere for the overall economic development of a country. Therefore, economic development relies on the agricultural growth rate.

Source of saving: Development in agriculture may also increase savings. The rich farmers we see today started saving particularly after the green revolution. This surplus quantity may be invested further in the agriculture sector to develop the sector.

Food security: A stable agricultural sector ensures a nation of food security. The main requirement of any country is food security. Food security prevents malnourishment that has traditionally been believed to be one of the major problems faced by developing countries. Most countries rely on agricultural products as well as associated industries for their main source of income.

It drives innovation in technology: Because healthy agriculture is so essential to a country's well-being, it's been the setting of some of the most exciting innovations in technology. Through artificial intelligence, block chain software, gene manipulation, and more, scientists and farmers have been figuring out ways to increase crop productivity, use less water, and reduce negative impacts on the

environment. For scientists and tech companies, agribusiness is one of the most fascinating and productive fields to work in.

It's crucial to a country's development: Economic development is tied to a country's agriculture sector. When trade, national revenue, and employment are combined in a positive way, a country enjoys reduced poverty and boosted economic growth. Because strong agriculture results in benefits fairly quickly, focusing on it is one of the best ways to speed up development and improve a country's standing in the world.

It can help heal the environment: Agriculture possesses the power to harm or heal. When farmers prioritize biodiversity on their land, it benefits the earth. Having more biodiversity results in healthier soil, less erosion, better water conservation, and healthier pollinators. This is all good news for the environment as a whole, making agriculture an important part of the cycle of life.

It plays a big role in a nation's revenue: Speaking of trade, developing countries still get most of their national income from agricultural exports. While developed countries don't depend on agriculture as much as they used to, their economies would definitely take a hit if all exports suddenly stopped.

The state of chemical farming reflects our future: When it comes to pollution and climate change, the environment and agriculture suffer the quickest and with the clearest consequences. If effective changes aren't made, climate change's impact on agriculture will decimate a country's economy and eventually wipe out the food supply. To get a better idea about where humanity is going to end up, look at agriculture. What's being done to adapt to a rapidly-changing climate? What will our food supply look like? The state of agriculture is a good litmus test of what we can expect the future to look like (Yargholi and Azarneshan 2014)

Why is wealth creation important for rural household development?

Since wealth as we have defined it is the stock of all assets that can contribute to well-being, increasing well-being is almost synonymous with increasing wealth. Indeed, Agrawal et al. (2010) proved that an increase in the concept of comprehensive wealth is necessary and sufficient for an increase in intergenerational well-being. This follows from using "shadow prices" on each asset to measure the value of comprehensive wealth. Our definition avoids this nearly tautological implication by allowing for the possibility that investments in assets may not increase the well-being of some (or any) people. Whether investments in wealth improve the well-being for some or all people in a community depends upon the distribution of costs and benefits among community members and whether the social benefits of the investment exceed the social costs. These effects depend upon many factors, such as uncertainty about the benefits and costs of the investment, who is making the investment, who is entitled to the flow of benefits from it, and the costs and benefits that the investment may impose upon non-investors (Yargholi and Azarneshan, 2014). For example, an investment in a new factory in a community will benefit the owners of the factory if the investment is profitable, and will also benefit people directly employed by the factory and others whose incomes are indirectly increased by the demand generated by the investment. The investment may also increase the wealth of local landowners if it results in increased property values. This, in turn, contributes to increased local government property tax revenue, causing additional benefits and costs to community members depending on how this revenue is used. But business investments also may displace workers, especially if the investments are in labor-saving technology, or may undermine the competitiveness of existing firms and the returns earned by their workers and assets. Increases in property values can impose higher costs on renters. Furthermore, if the owners of the firm making the investment live outside the community, the profits earned do not necessarily benefit the community where the investment is made. Investments can also reduce property values; for example, the investment may cause pollution, noise,

congestion, or otherwise reduce the attractiveness of the community. Although simply increasing the aggregate wealth of a community may not be sufficient to improve the well-being of everyone in the community, wealth creation in a broad sense is necessary to sustain economic development. Without increases in comprehensive wealth, growth in income and consumption cannot be sustained over the long term (Arrow et al., 2010). For example, a community may achieve near-term increases in income by depleting its mineral wealth, but unless the rents received are invested in reproducible capital, such growth will not be sustainable (Atafar et al., 2010).

Chemical farming versus combating pests, disease and weeds for improved food security and wealth creation

According to Dasgupta et al., (2007) many parts of the world are experiencing a decline in yields despite the increased use of chemical inputs. In contrast, organic agriculture has proven to be effective in increasing and stabilizing yields, particularly in marginal lands. This means it is a system that empowers farmers to restore and uphold food security. In addition, “green revolution” agriculture often makes wasteful use of water, destroying soils and leaving the land unsuitable for food production. Chemical Farming can combat desertification by decreasing erosion and improving water uptake and retention.

Chemical farming also helps to decrease resistance to pests and diseases, which is crucial to building food security. Recent analysis suggests that chemical farming offers a way to increase efficiency in the use of synthetic pesticides and herbicides for the management of animal pests, pathogens and weeds by decreasing their levels of infestation (Dasgupta et al., 2007).

Reasons for adoption of chemical farming in Northwestern Nigeria

Chemical farming is simpler, faster and more economical. This could be the reason for its adoption by most farmers in North West rather than the renowned traditional way of farming. Plants need nutrients in order to grow on a farm. Nutrients such as carbon, oxygen and hydrogen are always available to the plants. Unfortunately, nutrients that the plants also need such as nitrogen, phosphorus and potassium can run out. To put more of these nutrients back into the soil many farmers will apply chemicals such as herbicides, pesticides and fertilizers. Replacing these nutrients back into the soil with herbicides, pesticides and fertilizers can help the growth of the plant, which then increases the crop yield on the farm (Dasgupta et al., 2007).

Because insects make up 3/4 of all species on earth, they can be a big problem on a farm. Insects such as worms and beetles can infest a crop and destroy it. To keep this from happening many farmers will spray their crops with insecticides. Insecticides are strong chemicals that will kill the insects that will harm the crop without killing the actual crop. One of the biggest concerns for farmers is weed control. When weeds grow in farmland they can damage the crops and decrease the crop yield of the farm. To get rid of the weeds without killing the crop many farmers spray their fields with herbicides. Herbicides are also made up of strong chemicals. Agriculture remains the principal source of livelihood for majority of the population in Nigeria. The increased use of synthetic chemical such as herbicides, pesticides and fertilizers in agriculture started in India since 1960s as part of the Green Revolution. Over the past five decades. Synthetic chemicals consumption has drastically increased several folds and is now increasing food production. . Many of the chemical can have harmful effects on human beings either as acute or chronic toxicity. Acute exposure to chemicals can lead to death or serious illnesses. About 355,000 people die globally each year due to unintentional acute poisonings. Two-thirds of these deaths occur in developing countries where such poisonings are associated with excessive exposure and or inappropriate use of toxic chemicals in occupational and domestic environments (Rahman and Debnath, 2015).

Rahman and Debnath (2015) posits that chemical farming has been adopted by many farmers because it's the faster way to get yield. Farmers who are concerned of the yield, health is not always their major concern. Farmer's main aim is to provide sufficient food for their household members and dispose surplus to markets. When they work in the farm it is not of their concern to protect themselves from the harmful poisonous chemicals. Farmers who work in inorganic farms breathe in the poison entire day while spraying, unaware of the fact that it's harmful. Most of the farmers suffer with skin allergies, diseases and the most worsening cancer. Due to Lack of awareness and proper guidance they have been losing their lives.

The role of chemical farming to food security and wealth creation

The practical goal is to determine how much nutrient material to add. Since the farmer wants to know how much profit to expect if he buys extra chemicals, the tests are interpreted as an estimation of increased crop production that will result from chemical use. Quantity of chemicals must be balanced against value of crop or even against alternative procedures, such as investing the money in something else with a greater potential return. The law of diminishing returns is well exemplified in chemical technology. Past a certain point, equal inputs of chemicals produce less and less yield increase (Tomer et al., 2015). The goal of the farmer is to use chemicals in such a way that the most profitable rate is employed. Chemicals can aid in making profitable changes in farming. Operators can reduce costs per unit of production and increase the margin of return over total cost by increasing rates of application of chemicals on principal cash and food crops. They are then in a position to invest in soil conservation and other improvements that are needed when shifting acreage from surplus crops to other uses (Tomer et al., 2015).

Disastrous effects of chemical farming to crops and soil health

Natraj and Katyal (2014) found out the following effects of chemical farming:

1. Excessive use of chemicals, especially Nitrogen, can contribute to crop tip browning, lower leaf yellowing, wilting and crop lodging. When fertilizer scorches roots, the root may blacken and go limp. All these symptoms occur due to salt accumulation in the soil which would cause difficulty in water absorption by plants.
2. Using higher doses of chemicals in malt barley may cause undesirable effect on quality of the beer.
3. Over-application of chemicals to plants may cause the leaves to turn yellow or brown, damaging the plant and reducing the crop yield.
4. The excessive accumulation of nitrate or nitrite in plant parts consumed by humans or animals is likely to cause the same detrimental effects associated with nitrate contamination of water sources.
5. Over-fertilization can reduce the biodiversity resulting from ammonia deposition in forests and waters.
6. They reduce the mycorrhizal root colonization and inhibit symbiotic Nitrogen fixation by rhizobia due to high Nitrogenous fertilization.
7. Nutrients are easily lost from soils through fixation, leaching or gas emission and can lead to reduced chemical efficiency
8. Excessive use of the chemicals for a long time on the same soil may lead to soil degradation, loss of beneficial soil microorganisms, and many other losses as discussed above
9. The use of organic fertilizers together with other chemicals can have a higher positive effect on microbial biomass and hence soil health

Effects of agricultural chemicals on human health

Bhandari (2014) lamented that health effect of chemicals may be acute or delayed in

those who are exposed. Strong evidence also exists for other negative effect from chemicals exposure including neurological problems, birth defect, fatal death and neutron developmental disorder. Acute health problem may occur in workers that handle chemicals such as abdominal pain, distress, headaches, nausea, vomiting as well as skin and eye problems. Many student have examined the effect of insecticides exposure on the risk of cancer association have been found with leukemia, lymphoma, brain, kidney, breast, prostate, pancreases, liver, and lung and skin cancer. This increased risk occurs with both residential and exposure (Tomer et al., 2015).Evidence link chemical exposure to worsened neurological out comes strong evidence link babies exposed to insecticide with a low birth weight and had development defect, May be acute or delayed in those who are exposed. Many studies have examined the effect of chemicals exposure on the risk of cancer (Agrawal et al., 2010) Association have been found north leukemia, brain, kidney, breast, prostate pancreases, liver, lung, and skin cancer. This risk occurs with both

Residential and occupational exposure. Highly hazardous chemicals may have acute and chronic toxic effect, and pose particular risk to children. Their wide spread use has caused health problems and often as a result of occupation exposure and accident or intentioned poisoning, however, the global impact of self-poisoning (suicide) from preventable chemicals ingestion has how ever been estimated to amount to 186,000 death and 4,420,000 disability adjusted life years (Tomer et al., 2015)

Conclusion and Recommendations

It is essential to educate farmers about the use of chemical farming for wealth creation and food security. They should also be enlightened on other benefits they get apart from money, most of them use chemicals just for money ignoring their health, they are also aware that due to these chemicals they are being sick. Government should have control over the private shop and should see that they do not give in excess to the farmers and government should ensure that private shop owners sell only the approved brand. Local NGO's should keep a track and encourage farmers to use protective clothing when using chemicals on farms. They should also train them seriously on their health status and about future generation and also considering the ecological factors. Should set up long term goal with farmers and involve them in chemical farming for improved food production and income. This will obviously improve wellbeing and general standard of living of the rural households in northwest Nigeria and off course the country and the world over. Government should encourage farmers by giving them loans and subsidy if they shift to chemical farming farming so as to enable them boost agricultural productivity.

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