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## **Commercializing Agriculture in Africa: The Environmental, Health and Safety Implications and the Way Forward**

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## 16 Commercializing Agriculture in Africa: The Environmental, Health and Safety Implications and the Way Forward.

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### **Abstract**

Commercialization of agriculture in is a worthy effort in attaining food sufficiency in Africa. However, this needed quest has had an enormous environmental, health and safety implications for the agricultural sector of the continent. This quest has led to intense use of machinery, agrochemicals and other non-environmental friendly methods of farming. This implies there will be greater chances of farm accidents, mishap, fatality, production loss time and other burdens on farmer's wellbeing on one hand and loss of biodiversity, environmental degradation, and unsustainable use of land all leading to climate change on the other hand. Holistically, due to the modus operandi of agricultural work, the workers are exposed to hazard ranging from; chemical, physical, ergonomics, biological and psychosocial hazards thereby leading to disorders and diseases like carcinogenicity (cancer causing), mutagenicity (induce mutations), tetragenicity (affect the fetus), psychiatric disorder and delayed neuropathy (dysfunction of peripheral nerves), and the dusts have been known to cause diseases ranging from byssinosis (lung diseases), occupational asthma, pneumonitis (inflammation o the walls of alveoli) and non-specific chronic obstructive pulmonary disease (COPD) and agriculturally related musculoskeletal disorder. Notwithstanding, a well implemented farm safety programme with massive awareness, more sustainable, environmental friendly method such as conservation agriculture and integration of environmental health impact assessments into African agriculture, research and development on commercialization of agriculture, are workable solutions to the likely health, safety and environmental challenges from the commercialization process.

Key words: Africa, Agriculture, Commercialization, Environment, Health and Safety

## **Introduction**

Agriculture in Africa is predominantly practiced on small scale usually with crude implement and methods. Smallholder farming plays a crucial role in food production for both rural and urban populations and remains a major source of income, employment, and export earnings (Krishna, 1977). Over time more and more people in these economies have shifted from a wholly subsistence farming to commercialized agricultural production (Langat et al 2011). There is a general consensus from research findings and among policy makers that the future of food security and poverty eradication in both the developing and less developed countries is hinged on commercialization of smallholder agricultural production (Govereha and Jayne, 2003). The realization of African food security is threatened by many factors even if the sector is commercialised (Ngigi, 2009). The direct effect of these factors on agricultural production and food security will be exacerbated by greater exposure to occupational diseases and illnesses that reduce labour productivity. Sub-Saharan Africa countries have more than 54,000 fatal occupational accidents annually; approximately 42 million work-related accidents took place that caused at least three days' absence from work; the fatality rate of the region is 21 per 100,000 workers; the accident rate is 16,000 per 100,000 workers; and the fatal accident rate in agriculture is 22.5 per 100,000 (Hämäläinen et.al 2005). On a global scale, agricultural accidents place a great burden on the economy, resulting in reduced return on investment (ROI) in agriculture; moreover, the burden of injuries/illness (BOI) is on the increase with the quest of mechanization and commercialization of the sector. The emergence of these accidents would impede workers' efficiency, decreases agricultural output and weakens productivity. In this regard, productivity is defined as the amount of goods and services produced from each hour of worker's time (Mankiw, 2001). This implies that human capital is a necessity for maximum productivity. Apart from the health and safety implications, land degradation, vegetation degradation, loss of biodiversity and ultimately global warming enhancement are likely effects of commercialization of agriculture as well.

## **Concept of Commercialization in Agriculture**

### **Marketable Surplus of Produce as a Measure of Commercialization**

The term marketable surplus in the context of agricultural produce denotes the quantities of products available for consumption by the non-farming population and also as raw materials for manufacturing and processing industries. This concept helps to measure the extent of commercialization of the production activities of a particular crop. While high proportions of marketable surpluses indicate greater market orientation of the producers, lesser proportions of surpluses mean that the producers are more subsistence-oriented. The Food and Agriculture Organization (FAO) has categorized farmers into three different groups based on the marketable surplus as a percentage of total production in the following manner (FAO, 1989) :

- Subsistence farmers: Marketable surplus under 25% of the total production.
- Transition farmers: Marketable surplus ranging between 25-50% of total production.
- Commercial farmers: Marketable surplus more than 50% of the total production

However, what is ‘commercialization of agricultural production?’ It can be defined as follows according to (Rohana and Bandara 2006).

- Farmers’ production is aimed mainly for sales.
- Production should be oriented to profit maximization.
- It should aim at the satisfaction of different needs and interests of consumers.
- It is an agri –business that implies concept of business management.
- It leads to entrepreneurial achievements of farmers.

### **Health and Safety Implications of Commercialization**

If agriculture is to be commercialized workers in the sector will be exposed to more prominent hazards. Recent innovations in agriculture have added drastically to the dangers or hazards faced by farm workers. The use of chemicals can expose them to chemically related toxic material that is dangerous to health. Some equipment, tools and machinery expose them to hazards and excessive noise pollution. The cumulative effect of all these hazards associated with new technologies in the long run affect the well-being of these workers. The following hazards have been identified in agriculture:

### **Physical/Environmental hazards**

These hazards include the following: Excessive noise from machines can cause permanent noise-induced hearing loss or deafness. Prolonged exposure to excessive noise can cause permanent hearing losses unless noise control measures are taken. Farm workers experience one of the highest rates of hearing loss among all occupations. This is caused in part by the many potential sources of loud noise on the farm: tractors, combines, grinders, choppers, shotguns, conveyors, grain dryers, chain saws, etc. Radiation and extreme temperatures, both cold and heat, can have assorted health impacts, such as the following: Excessive cold can lead to hypothermia, frostbite and chilblains. Excessive heat can cause heat cramps, heat exhaustion, heat stroke and heat dermatoses. Vibration from machines can lead to hand-arm vibration syndrome (HAVS), which is four times more prevalent among farm workers (Batami, 2003).

### **Chemical hazards**

In agriculture, the major sources of chemical exposures are pesticides, herbicides and fertilizers, vapours, fumes and some organic dusts from grains and even poultry dusts. Some of these chemicals have been known to have health effects, such as carcinogenicity (the capacity to cause cancer), mutagenicity (the capacity to induce mutations), teratogenicity (the capacity to affect the foetus), psychiatric disorders and delayed neuropathy. The dusts have been known to cause diseases ranging from byssinosis, occupational asthma, and pneumonitis to non-specific chronic obstructive pulmonary disease (COPD) (Batami, 2003; Oluwagbemi, 2007; Ide, 2008).

### **Ergonomic hazards**

The man-machine relationship and other working conditions put cumulative strain on the musculoskeletal system. This has been identified to cause musculoskeletal disorders, including back pain and osteoarthritis of the knee, which is common among agricultural workers.

### **Biological hazards**

Since farmers must come into contact with animals, it is not surprising that some occasionally contract animal diseases that are transmissible to man (zoonoses). Some of the identified diseases include schistosomiasis contracted from snails, ascariasis (ascaris and hook worm infections are endemic among rural populations), rabies, campylobacter bacterial infection

via contaminated food meats (especially chicken), water taken from contaminated sources (streams or rivers near where animals graze), and milk products which are not properly pasteurized, which can lead to food poisoning. Farmers are also vulnerable to epidemic fevers, cholera, diarrhoea and dysentery (Oluwagbemi, 2007; Ide, 2008).

### **Psychosocial hazards**

While ergonomic hazard is about man-machine relationship psychosocial hazard deals with man to man relationship or worker to worker relationship, worker to management relationship or boss –subordinate relationship. This relationship if not properly handled could lead to emotional and psychological stress that could affect job satisfaction, efficiency and productivity. Also high job demand, unreasonable target and fear of termination of appointment and other inter and intra personal conflicts could affect workers holistic performance.

### **Environmental Implications**

Agriculture is now recognised as both contributing to and suffering from the negative effects of climate change. Farming accounts for as much as 32% of greenhouse gas emissions, if deforestation is included.( Chatham, 2009). On the other hand, climate-driven water scarcity and increases in the severity of droughts and floods will affect food production, especially in subsistence sectors. Smallholders, pastoralists and artisanal fisher folk will suffer complex and localised effects of climate change. Yields from rain-fed farming in some African countries could fall by up to 50% by 2020, and by up to 30% in some central and South Asian countries by 2050, according to the Intergovernmental Panel on Climate Change (IPCC), 2007). The IPCC estimates that at least 50 million additional people will be at risk of hunger by 2020 as a result of climate change. This could rise to 132 million additional people by 2050 and 266 Million by 2080. If agriculture is to be commercialised massively on the African continent; this implies that more land and water would be unsustainable used. Mechanization will lead to soil compaction and loss of soil fertility and in the long run land degradation. Vegetation degradation will also be a resultant effect of massive mechanization. Also, massive use of agrochemicals will in no doubt affect environmental sustainability.

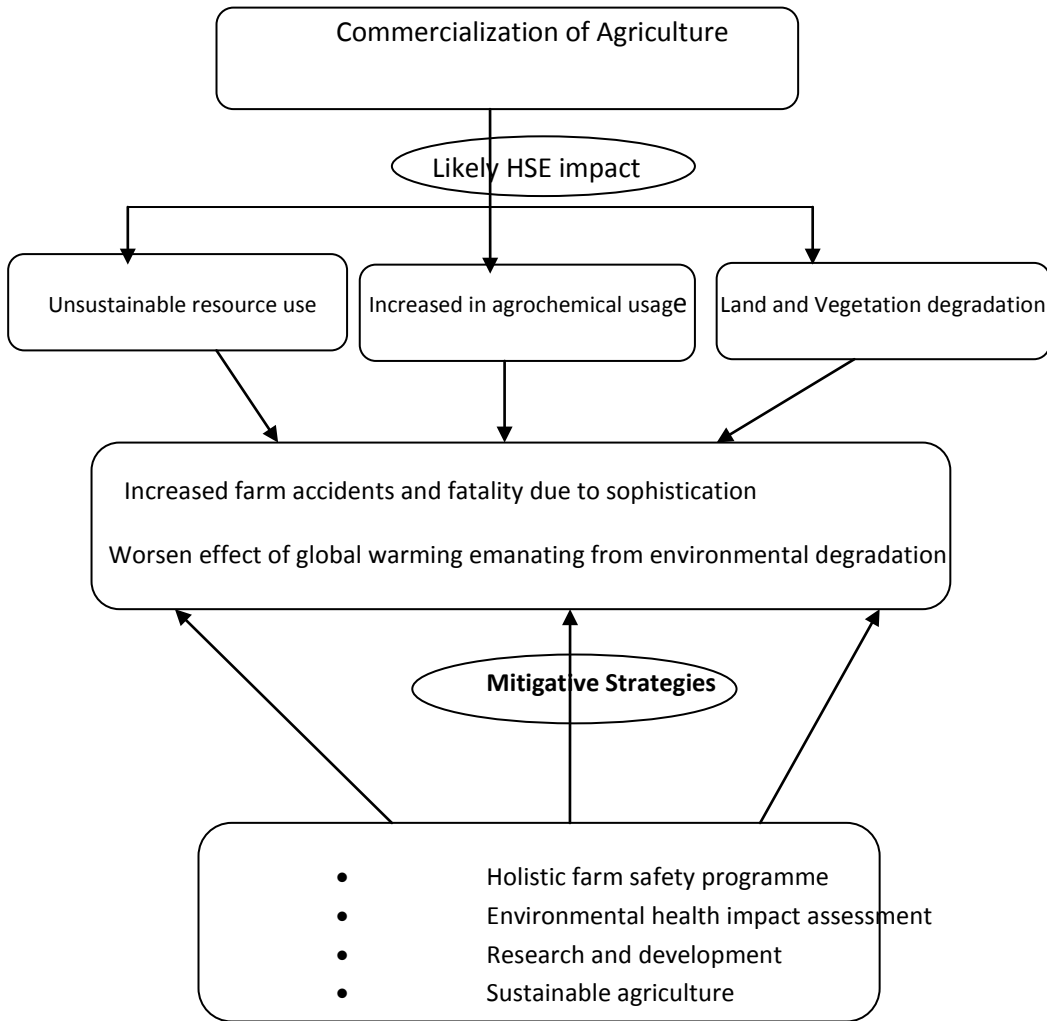


Figure 1: Schematic Illustration of the health, safety and environmental (HSE) implications of agricultural commercialization with mitigative strategies.

### The Way forward

The following strategies are recommended if agriculture is to be commercialised in Africa to mitigate the likely health, safety and environmental challenges that could emanate from the process.

1. Sustainable agriculture methods such as conservation agriculture and organic agriculture that promotes the elimination of agrochemicals, minimum soil tillage, encourages sustainable water management, sustainable land management would be ideal for the commercialisation process.



## 2. Occupational health and safety programme-(Farm safety programme)

Occupational health and safety is a product of collaboration and cooperation among all stakeholders, and it provides a way forward for the elimination or effective control of occupational hazards and the protection of workers against work-related illnesses, injuries and diseases. Health and safety have been identified to have a strong influence on, and to be invaluable to, any sector of the economy. Effective management of health and safety can help to deliver improved productivity and efficiency. It has been tied to positive performance indicators (PPIs) (Smallman and John, 2001). Farm safety programme is therefore necessary for commercialised agriculture to thrive well.

- (a) Farm safety awareness: In getting the goals of farm safety achieved by providing safe work environment for farmers, the needed awareness must be created using different platforms such as mass media, social networks, authors with the expertise should be encouraged to write on farm safety especially in the developing countries, social capital platforms such as cooperatives, farm association etc
- (b) Farm safety policy: A concretised section of the occupational health and safety policies should address farm safety. Also the agricultural policies of African countries should have a section on farm safety with details of hazards and control. This also implies that an arm of the ministry of labour and productivity should also have a section for farm workers safety legislation.
- (c) Farm (HSE) training for agro extension agent: Agricultural professionals should be trained on health, safety and environment courses as it relates to agriculture, with emphasis on farm safety and health. This training should also include the appropriate selection and use of personal protective equipment (PPE) for farming activities for the identified hazards.
- (d) Farm safety reporting system and record keeping: There is still a dearth of information on farm accident in Africa. Farmers and extension agent should be sensitised on the importance of safety reporting and recording to enhance accident and fatality prevention.

3. Integrating the environmental health impact assessment (EHIA) concept to agriculture  
The identified impact of agricultural activities on the environment and the health of the people are enormous in some context. Activities ranging from waste disposal, tillage practices, milling, pesticides and fertilizer usage, crop planting and some other forestry practices leading to global warming, changes in biodiversity, chemical poisoning, destruction of aquatic life are prominent in this consideration e.tc. Introducing EHIA into agricultural activities is therefore a necessity.

According to British Medical Association (1999), environmental health impact assessment (EHIA) is an integrated framework for checking the likely effects of some activities (agricultural activities) on the environment as well as the direct health effect on the people. EHIA is necessary for some agricultural activities for sustainability of the environment and reduced negative impact of such activities on the health of the host community. Proper EHIA for agricultural project would not just lead to natural resources conservation and biodiversity protection but also help in controlling global warming and provide healthy environment for humans. Agriculturalist should be environmental health conscious, before commencing any agricultural project.

### **EHIA Process**

**How to carryout EHIA:** The EHIA components is subdivided to various processes though the preparation of EHIS i.e Environmental health Impact statement is to be prepared by well trained professionals. However, this attempt is to intimate farm workers, managers and agro professionals on the procedures involved in carrying out the impact assessment. The aim of EHIS is predict and mitigate the likely impact (positive and negative) in terms of health and environment of a proposed project on the community.

- (a) **Screening:** This the process of determining the need for EHIA and this step often result in the categorization of the project and from this a decision is made on a need for EHIA based on environmental and health sensitivity.
- (b) **Scoping:** Once a decision has been made from the screening process and a need for EHIA has been established from the proposal it is necessary to determine the scope of the EHIA which entails outlined planning and feasibility studies
- (c) **Terms of reference (TOR):** This is stipulating the contents of the EHIS which will be submitted with the planning application to the appropriate authority for approval. This is usually referred to as instruction on EHIS

- (d) **Preparing EHIS:** After stipulating the contents of the EHIS the next thing is to prepare the EHIS which would be done with the collaborative efforts of the community, consultants and the project proponents.
  - (e) **Submission and Appraisal:** After a succinct preparation of EHIS you are expected to submit to the appropriate government authority for appraisal and approval before the project could be carried out.
  - (f) **Negotiation and Risk management:** After approval also included in the EHIA procedure is negotiations with the relevant community and authority with adequate provision for risk management techniques both in terms of health and environment.
  - (g) **Monitoring and Surveillance:** item (f) is not the end of the procedure but a well detailed monitoring plan and surveillance strategy is done in preparing a robust EHIA and in meeting the goals and objective of carrying out EHIA.
4. **Research and development:** There is a need for more research in agriculture on the common hazards for both conventional agriculture and conservation agriculture and research on the occupational safety and health implications of production, handling, processing and storage agro-products.

## **Conclusion**

In the pursuit of commercialised agriculture in Africa it is wise for the process to be economically efficient, socially just, environmentally sustainable and friendly as well as safe and healthy for human. In achieving this feat therefore, there is a need to examine the likely emanating challenges and hazards from the process and a well develop a mitigation procedure. For an environmentally sustainable commercialised agriculture in Africa; the safety and health of workers are indispensable while promoting environmentally best practices.

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