

REDUCTION OF CONSTRAINTS IN THE TEACHING OF CROP PROTECTION AT THE NCE LEVEL FOR MANPOWER DEVELOPMENT

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Abstract

There is shortage of trained manpower in agriculture particularly at the intermediate level. Crop protection is an important component of agricultural education curriculum at all levels. At the NCE level it is called principles of crop protection. This paper is focused on crop protection at the NCE level and identified the following as the constraints affecting its teaching for manpower development; curricular provisions - syllabus, absence of crop protection in practical agriculture courses, non - provision of laboratories, shortage of qualified teachers, underfunding, student quality, administration of the Colleges and the implementation of the curriculum. Introduction

Nigeria is blessed with abundant natural resources but the manpower to tap and utilize these resources for national development are limited and therefore scarce, which is perhaps one of the problems of the developing nations. Education and training play a major role in the progression by developing an educated labour force that has a higher productivity than uneducated labour (Coombs, 1968:86). Federal Republic of Nigeria (1998:11) reports the goals of tertiary education and they include:

- contribute to national development through high level manpower training;
- develop the intellectual capability of individuals to understand and appreciate their local and external environments;
- acquire both physical and intellectual skills which will enable individuals to be self-reliant and useful members of the society.

Therefore, Colleges of Education being one of the tertiary institutions in the country can be one of the avenues through which manpower development can be achieved. Equally the other goals of tertiary education can be attained through Colleges of Education in the country.

Manpower Development

Coombs (1968:35) reports that acute shortages of well -qualified teachers have cropped up in the sciences, mathematics and various technical fields where overall manpower shortages have also been- greatest. According to Okorafor and Nwankwo (1985:116) manpower development may be defined as the complexity of processes which aims at transforming human beings so that they can contribute more effectively to economic and social progress. The process of enhancing labour productivity starts with the first aspect of manpower development is concerned with the acquisition of skills and knowledge, while the second relates to the motivation of people to apply the acquired knowledge and skills more effectively (Okorafor and Nwankwo, 1985:116)

Okore (1985:127) states that is widely accepted that education and training are vital instruments by which the stock of the nation's trained manpower can be increased. In appreciating the importance of manpower development, Federal Republic of Nigeria (1981) in Okorafor and Nwankwo (1985:116) reports that accordingly, the main thrust of the policy in recent development plans has been among other things, to increase the nation's stock of trained manpower through the expansion of existing educational and training facilities and the establishment of new ones. Equally the Fourth National Development Plan in Okore (1985:129) envisages that through the expansion of facilities in new and old universities and through the expansion of the curricula of polytechnics, technical colleges and advanced teachers and teacher technical colleges, a lot would be achieved in enhancing enrolment and ensuring subsequent turn ~ out of the desired calibre of manpower.

Therefore, education has important and vital role in the manpower development of any country.

Okunrotia (1978) in Agaba (1996:4) states that it has become clear that national endowment of material resources by itself no longer determines a country's economic development. Availability of natural resources must be supported with appropriate manpower capability in order to achieve the accelerated economic - development of a nation. Pearson, Roberto, Dillon and Gum (196S) in Agaba (1996:4) opined that the over-riding shortage in Africa was still trained manpower. In general, the labour force lacks high skills and is still heavily dependent upon non - African personnel. Ekwunife

(1993) reports that a nation is truly dependent if her productivity level satisfies the needs and demands of her citizens. To achieve this, manpower plays a prominent role, while the lack of these signals a potent of natural resources must be supported with appropriate manpower capability in order to achieve the accelerated economic - development of a nation. Pearson, Roberto, Dillon and Gum (196S) in Agaba (1996:4) opined that the over-riding shortage in Africa was still trained manpower. In general, the labour force lacks high skills and is still heavily dependent upon non - African personnel. Ekwunife doom to the economy. The shortage of this manpower should be addressed to enhance productivity.

Agricultural Education

In agriculture, attempts are usually made to produce enough crop and animal products for man's use. In Nigeria, food - production has been on the decline over the years and now we are facing food production deficit situation, which is reflected by our food importation. One major problem in the food production operations in Nigeria has been the effects of pests and diseases on crops from planting to harvesting and storage.

Muller (1979:626) states that the estimate of damage done to crops by insects, bacteria, fungi and weeds lo be 50% or more and at times amounting to a loss of billions of USA Dollars. Esuruoso (1 983:9) reports that along with insect pests and unfavourable weather, plant diseases were among the greatest hazards to man in his efforts to feed himself and his animals.

Plant diseases have been known to reduce man's food supply as much as 80% they even cause total loss of harvest. An important example is that of potato blight in Ireland between 1845 - 1850 which one million out of population of eight million died from famine and half a million emigrated because potato was wiped out by potato blight caused by *Phytophthora infestans* (Esuruoso, 1983:9).

Adcsiyan, Caveness, Adeniji and Fawole (1990:19) report that the root-knot nematodes are probably the major obstacles to the production of sufficient food and fibre crops in Nigeria and many other developing nations. Insects and micro-organisms are known to be responsible for the destruction of crops in Nigeria (see Tables 1 and 2).

Table 1 : Average Estimates of Crop Losses in Main Crops in Nigeria

Crop	Coverage	Average Loss (%)	Causative Agent
Cereals	All Nigeria	15-25 1	Insect pests
	All Nigeria	0 - 20	Fungi, viruses
	All Nigeria	100	Viruses
Grain Legume	All Nigeria	10-30	Insect pests
Cocoa	Oyo, Ogun	10-20	Insect pests
	Ondo	30-40	Insect pests
	Cross - River	90 50	Blackpod
	All Nigeria		Disease Blackpod Disease
Kola nut	All Nigeria	50-70	Pests
	All Nigeria	4 - 1 8	Fungi
Oil palm	All Nigeria	10-60	Fungi Bacteria,
Cotton	All Nigeria	50	fungi Insect
Coffee	All Nigeria	31 - 78	pests

Source:

Youdewei (1977)

The loss also continues during storage.

Table 2: Estimate of Post- Harvest Losses in Nigeria

Type of Staple	Post-Harvest Loss (%)
Cereals	3-5
Pulses	5-15
Roots & Tubers	20-30
Fruits & Vegetables	30-40

Source: Abu, Ejembi and Hamidu (2000:9). Esuruoso (1983:10) states that the amount of damage (due to pests and diseases) annually is beyond accurate estimation but the total amount must run into billions of naira.

Crop Protection

Agaba and Idoko (1996) in Agaba (2001:86) view crop protection as an interdisciplinary approach carried out with the aim of protecting crops from biological agents like insects, mites, viruses, nematodes, birds, rodents, other mammals, bacteria, fungi, weeds and non - biotic agents. This agricultural discipline draws and applies knowledge from biological sciences of entomology, nematology, virology, bacteriology, animal and plant ecology, genetics and physiology etc and physical sciences like soil sciences, climatology, physics, chemistry etc.

Crop protection is an important part of the curriculum of agricultural education with adequate crop protection from the application of pesticides, 50% of crop losses can be prevented. (Paul 1990 in Olayiwola 1998:3) and Eddowes (1976:64) states that in UK between 1970 - 74, pesticides continued to increase by 10% and in USA, between 1955 - 1975, the sale of herbicides, exceeded 3 billion US dollars. In Nigeria, the domestic importation of insecticides increased from 5,082 tons in 1964 to 13,992 tons in 1974, this represented an import bill of 142,547,680 in 1964 to 147,362,061 in 1974, an increase of 175% (Youdeowei, 1977:16).

At the NCE level, crop protection is designated AGE 223 titled "Principles of Crop Protection", 2 credit hour course with contact of 1 hour of lecture, no tutorials and 3 hours of practicals per week and compulsory (Federal Republic of Nigeria 1996:8)

Federal Republic of Nigeria (1996:14-15) reports that the syllabus of principles of crop protection AGE 223 to cover

- (a) Meaning and scope of crop protection;
- (b) Classification, identification of plant pathogens;
- (c) Disease Development and Effects on crops;
- (d) Principles of disease control, types and major classes of pests;
- (e) Basic morphology and physiology of insect pests;
- (f) Identification of insect pests and their damage to crops;
- (g) Principles of pest control, weed classification, identification and principles of control.

Okoh (1998:36) states that acquisition and development of useful skills in agricultural education is affected by the following factors:

- (i) The curriculum;
- (ii) The teacher;
- (iii) The implementation of the curriculum.

Okorie and Ezeji (1988) in Okoh (1998:36) describe skills as well established habit of doing involving the acquisition of performance capabilities in the most economic way. The acquisition of skills in crop protection for the provision of adequate manpower in this discipline of agriculture is reflected in one of the national education goals which states "the acquisition of appropriate skills and the development of mental, physical and social abilities and competencies as equipment for the individual to live in and contribute to the development of his society" (Federal Republic of Nigeria, 1998:8)

This implies that the acquisition of skills in crop protection is one way of ensuring manpower development in this agricultural discipline as it involves the application of many skills such as identification of pest damages, manipulation of instruments like microscopes, isolation of causative agents etc.

Constraints to the Teaching of Crop Protection for Manpower Development at NCE Level

A. Curricular Provisions

(i) Syllabus

Agaba (2001:88) states that the syllabus of crop protection AGE 223 is too scanty and deficient and cannot lead to acquisition of skills in crop protection in order to produce adequate qualified manpower and suggests further that the present course AGE 223 be split and broadened in scope to give two crop protection courses

- (a) "AGE 218 Principles of crop protection I"
- (b) "AGE 223 Principles of crop protection H" which should be two credit hours each.

This split would broaden the scope and the contents that should be taught and learnt by the students.

The minimum standards recommend

- Two standard and Laboratories (one for crops and soils) and the other for livestock. Other materials listed, only sprayers and green houses (Federal Republic of Nigeria 1996:2-6) that are of any bearing with crop protection of all the items listed, no mention of microscopes, slides, slides cover slips, killing bottles, insect sweep nets, dissecting sets, reagents, fixatives, insect boxes, nutrient agar and other basic items of plant pathology-and entomology are made.

In short, no reference is made towards the provision of basic equipment and tools that would enable teaching and learning of crop protection at the NCE level. It also implies that there are no standard laboratories in the Colleges of Education in Nigeria that are built and equipped for the teaching of crop protection including those built and owned by Federal Government.

Therefore, standard laboratories are built in the Colleges of Education for the teaching of crop protection or the basic tools, equipment and other disposables should be among the necessary tools recommended by the minimum standards.

(ii) Practical Agriculture

Akpan (1992) in Okoh (1998:36) sees manipulative skill acquisition as being synonymous with experimentation which could be indoor or outdoor.

Thus, practicals are of great importance in crop protection.

Federal Republic of Nigeria (1996:11-15) reports the practical agriculture courses for the NCE programme to be:

AGE 117 Practical Agriculture I

Identification of simple farm tools, their uses, care and maintenance, keeping of simple records and diaries, land preparation in nursery practices, care of plants before and after transplanting e.g. watering, weeding, mulching etc.

AGE 127 Practical Agriculture II

- Routine maintenance operations on school farm continued. Animal maintenance and care of slaughter slabs, planting, irrigation etc (where applicable) soil testing.

AGE 217 Practical Agriculture III/Field Trip

Identification, collection and preservation of plants, weeds, livestock pests and disease

specimens. Routine farm operations in livestock, identification of feeding stuff. Field trips to agricultural based establishments.

AGE 227 Practical Agriculture IV/Field Trip •

Intensive involvement in school farms, crops management practices (seed bed preparation, planting, thinning, fertilizer application, staking, harvesting and processing). Deworming, castration, dipping etc. Students to have individual farm plots to be graded. Students to keep farm diary. Field trips to agricultural based establishments. Organising and participation in agricultural shows and exhibitions.

Therefore, out of the four practical agricultural courses for the NCE programme it is only AGE 217 that has some reference towards crop protection. This, again implies the curricular provision for crop protection in practical agriculture is scanty and virtually non - existent. And as such cannot lead to skill acquisition that would result to the production of NCE graduates of agricultural education who can be adequate in the aspects of practical crop protection. Agaba (2001:88) suggests the following to be practicals in crop protection.

- (a) Insect collection methods and examination of physical structures and shapes of insects;
- (b) Identification of common insect pests (insect boxes should be purchased or constructed);
- (c) Killing and preservation of insect pests;
- (d) Identification of plant diseases, symptoms, macroscopic examination of diseased specimens;
- (e) Collection, identification and preservation of weeds (weed albums to be made);
- (f) Identification of vertebrate pests (Dry and wet specimens);
- (g) Dry and wet rots of crop produce;
- (h) Sprayers, types, maintenance of sprayers, topical applications of formulation.

The inclusion of the suggested practicals of crop protection in practical agriculture courses, the NCE graduates of agricultural education would acquire more skills in crop protection and improving manpower development in crop protection.

B. Teachers

Federal Republic of Nigeria (1996:6) states that the minimum qualification for any lecturer shall be masters degree. There is the general lack of crop protection specialists to teach this course at the NCE level nationwide. It is only when taught by specialists that any meaningful teaching and learning of crop protection can take place. There is an overall shortage of crop protection specialists in Nigeria (Esuruoso, 1983:20).

NBTE (1990) in Okoh (1998:37) states that if the quality of agricultural education curriculum in schools are assessed against the background of equipping the learners with saleable skills, then it can be stated that the curriculum may have survived this long because it appears to suit the general incompetence and ill - preparedness of many teachers who teach the subject. Haruna, Okeh and Ajayi (1998:12) indicated that instructions 'can be effective only when handled by trained teachers with the right attribute, knowledge and skills. Current experience has shown that there are not enough competent teachers of agriculture in the Nigerian educational system. This is because, most of the available teachers did not receive adequate professional and technical training required for proficiency in the jobs.

Therefore, crop protection specialists should be employed to teach this course at the NCE level in order to produce skilled and trained manpower for this agricultural discipline.

C. Inadequate Funding

Most of the Colleges of Education in Nigeria are underfunded, particularly the state - owned ones. This, affects the provision of the much needed materials for effective teaching of the courses. Esuruoso (1983:20) reports that one important constraint in plant pathology in Nigeria is the question of finance. Certain aspects of plant pathology require relatively simple items of equipment, others require complex and more expensive equipment. All aspects require funds for replenishing the stock of disposable materials. Idriss (1994) in Ngada (2001:34) reports that insufficient funds has resulted into production of half- baked graduands at every level of our school system. Ngada (2001:34) states that other factors are of inadequacy in the supply of equipment and materials, sub - standard infrastructure, dearth of qualified teachers, laboratories facilities, technical machines and gadgets,

scarcity of hostels and classroom furniture and lack of monitoring and logistics that influence teaching.

The Colleges of Education in Nigeria should be adequately funded in order for acquisition of laboratories, equipment and other materials that are used in the teaching and learning of crop protection.

D. Students' Quality

Ogunwole (1999:104) reports that the quality of students admitted into technical agricultural programmes in Nigeria are poor. Students admission requirements state that students seeking admission into Colleges must have a sound background in core subjects like mathematics, physics, biology and chemistry because agriculture itself is an applied science. These students because of their poor background in the sciences find it hard to comprehend the scientific basis of agriculture including crop protection.

Thus, the students admitted to read agricultural education must have credit passes in the core science subjects of Mathematics, Physics, Chemistry and Biology.

E. Administration of Colleges

Colleges of Agriculture and Colleges of Education in the country including the state owned ones were established by the law but they are still weighed down by the administrative bottlenecks inherited from the states ministry. The Colleges are denied administrative autonomy as required by the edicts that established them, thereby making development difficult (Ogunwole, 1999:103).

These make request and acquisition of materials necessary for teaching difficult, particularly those for crop protection in which large disposables are used. The state - owned Colleges of Education are totally dependent on their proprietors for the management of the Colleges, which makes the running hard and difficult.

The state governments and the Federal Government should grant the colleges autonomy in order to make their managements easier to ensure provision of conducive environment for teaching and learning.

F. Implementation of the Curriculum

Okoh (1998:38) states that implementation of the curriculum is dependent on many factors and which include:

- (i) The learning environment (classroom, farm and laboratory);
- (ii) The teacher (his emotion, competence and temperament);
- (iii) The objectives as the subject matter; (iv) The learner (maturity, motivation, readiness and others).

From, the foregoing, where there are no laboratories for this specialized discipline to be held in ordinary classrooms give no room for the practicals which would enable the students develop and acquire skills that would make them more productive. Equally, when the teachers are non-specialists, the students being of poor quality and the very little curricular provisions for crop protection at the NCE level, the implementation of the crop protection curriculum at the NCE level is farfetched.

Okoh (1998:39) opines that the consequences of low provisions of the minimum standards are:

- (a) Little or no facilities are available for the teaching of the skill content of practical agriculture at the NCE level;
- (b) Students lack the necessary practical skills they need to be self- employed;
- (c) Practical skill classes are conducted in the classroom under an alternative to practical arrangements and marks awarded accordingly;
- (d) Most teachers no longer take up practical skill lessons competently.

Conclusion

The constraints to the teaching of crop protection at the NCE level for manpower development are curricular provisions - the syllabus, non - inclusion of crop protection into practical

agriculture courses, non - provision of laboratories and materials and equipment; teachers who are non - specialists of crop protection; underfunding of the colleges; the admission of students with poor background of the basic sciences; the administration of the colleges and the implementation of

the curriculum.

These constraints can be reduced by having improved curricular provisions that involve broadening the scope and contents of the syllabus and inclusion of crop protection practicals in practical agriculture, employment of crop protection specialists to teach this discipline, adequate funding of the colleges, admission of only students with strong background in the basic sciences, better administration of the colleges of education and proper implementation of the curriculum.

Recommendations

1. The current AGE 223 should be split into two, AGE 218 and AGE 223 in order to broaden the scope as suggested by Agaba (2001:88).
2. The crop protection practicals should be included in practical agriculture as put forward by Agaba (2001:88).
3. The Colleges of Education nationwide should acquire standard equipment necessary for the teaching of crop protection and provision of standard laboratories.
4. The Colleges of Education should have potable water supply and regular supply of electricity as crop protection demands the use of these facilities.
5. At least one qualified teacher, a specialist in crop protection should be recruited by each College of Education in the country.

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