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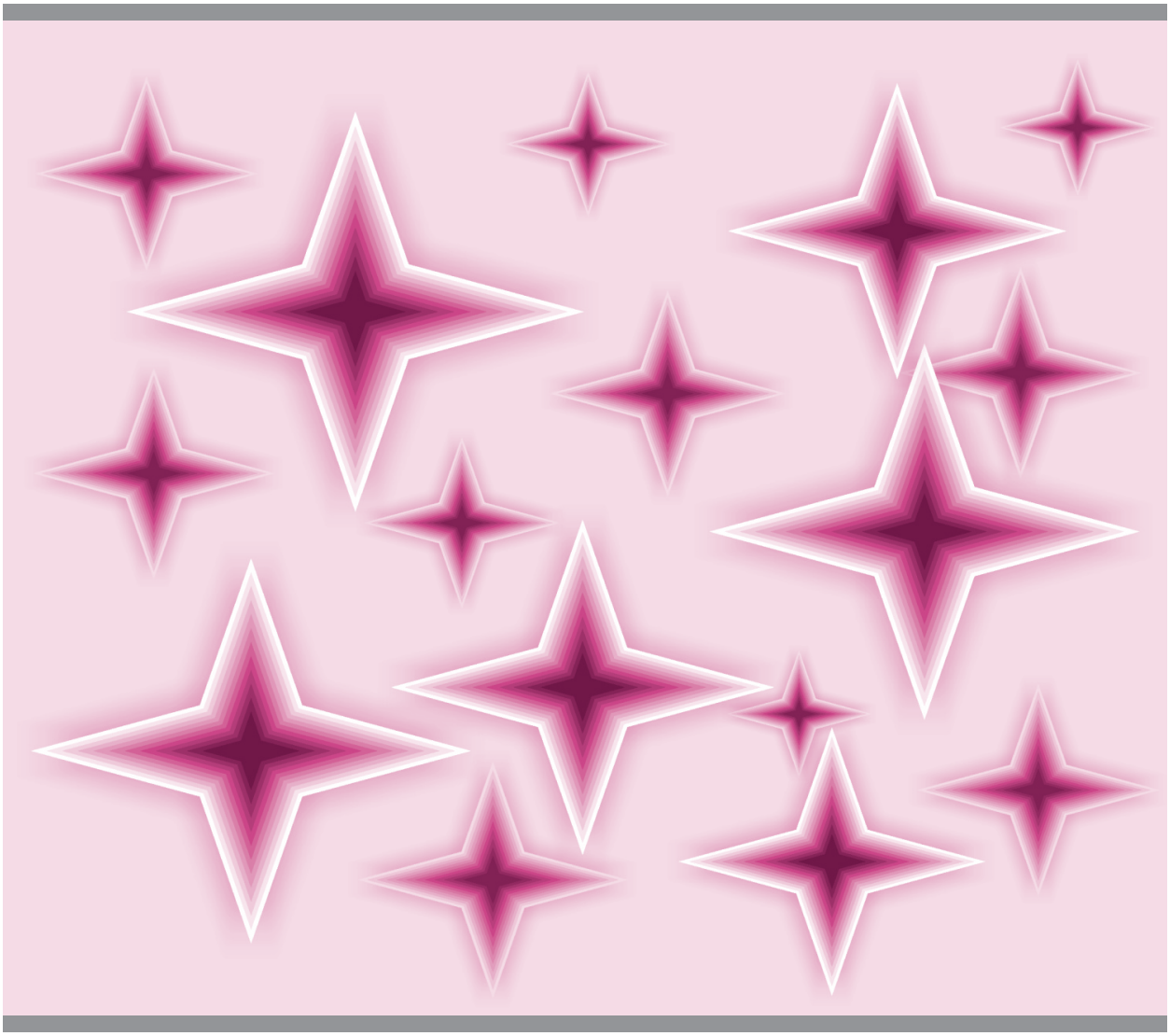

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CONTENTS

Serum IL-10 level and response to combined pegylated interferon and ribavirin therapy in Egyptian patients with chronic hepatitis C virus infection

Amal A. Mohamed [1], Zainab A. Ali-Eldin [2,] Wesam A. Ibrahim [2], Fatma A. Ali-Eldin[3], Ibrahem Siam [4], Khaled M. Abd Elaziz [5], Nehal A. Radwan [6]

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Abstract: Introduction: Hepatitis C virus (HCV) infections is a major health problem. Egypt has the highest prevalence worldwide. Currently, combined pegylated interferon and ribavirin therapy is the standard treatment but the outcome is not satisfactory. It has been reported that patients with chronic HCV infection show enhanced serum IL-10 concentration and it was found to be correlated to the histopathological alterations of the liver. Objectives**:** To assess the possible association of serum IL-10 level and response to combined interferon α-2a and ribavirin therapy for chronic HCV infection. Patients and methods This study was conducted on 50 consecutive patients with chronic HCV infection and 20 healthy controls. All the patients were subjected to clinical and laboratory assessment, abdominal ultrasound, and liver biopsy. All the patients were treated with combined therapy and followed up for end of treatment and sustained virologic response (SVR). Determination of IL-10 serum level using ELISA test were done at the baseline and at the end of treatment. Results: Pre-treatment serum IL-10 was significantly positively correlated with BMI and grade of positivity of HCV RNA PCR. Pre-treatment serum IL-10 levels were significantly lower in responders at the end of treatment and SVR in comparison to non responders ($P<0.001$). There was significant reduction of serum IL-10 level after therapy in comparison to baseline in responders with no significant change in non responders. Conclusions: increased serum levels of IL-10 are a poor prognostic marker of response to combined treatment in patients with chronic HCV infection.
[Amal A. Mohamed, Zainab A. Ali-Eldin, Wesam A. Ibrahim, Fatma A. Ali-Eldin, Ibrahem Siam, Khaled M. Abd Elaziz, Nehal A. Radwan. **Serum IL-10 level and response to combined pegylated interferon and ribavirin therapy in Egyptian patients with chronic hepatitis C virus infection.** Academia Arena, 2011;3(10):1-6] (ISSN 1553-992X). http://www.sciencepub.net.

Key words: hepatitis C, IL10, pegylated interferon, SVR.

Introduction:

Chronic hepatitis C virus (HCV) infection is a significant health problem (1) affecting almost 170 million individuals worldwide. It is the most frequent cause of chronic liver disease (2,3). Egypt has the highest prevalence worldwide (4). Interferon-α monotherapy and, more recently, combination IFN- α and ribavirin therapy are the only treatments for chronic hepatitis C shown to be effective (5). As a result of adverse events, a moderate rate of virologic response and high costs associated with HCV therapy, finding early markers of sustained treatment response is a clinical priority (6).

IL-10 is an anti-inflammatory cytokine involved in T helper2 (Th2) immunity (7). The Th2 profile inhibits the development of effectors mechanisms being involved in the pathogenesis of the chronic C hepatitis, as well as in the severity of the chronic liver disease (8,9). It has been reported that patients with chronic HCV infection show enhanced serum IL-10 concentration (10,11).

IL-10 was found to be correlated to the histopathological alterations of the liver in patients with chronic HCV infection (12). It was found to be correlated with disease progression of chronic liver disease and hepatocellular carcinoma (13). Furthermore, long term IL-10 therapy to treat chronically HCV-infected patients leads to a significant improvement of inflammation and fibrosis (14).

This study was designed to assess the possible association of serum IL-10 level and response to combined interferon α-2a and ribavirin therapy for chronic HCV infection.

Materials and methods

Population samples: This study was conducted on 50 consecutive patients with chronic HCV infection and 20 healthy control subjects. All the included patients were diagnosed as chronic HCV infection with

positive HCV antibody and PCR for HCV RNA and they were candidate for treatment with pegylated interferon α and ribavirin. All the patients were treatment-naïve.

Exclusion criteria: Patients who are younger than 18 years, older than 60 years, have co-infection with hepatitis B virus, alcohol intake, clinically evident liver cirrhosis, esophageal varices, hepatic encephalopathy, hepatocellular carcinoma, any end organ failure, hematological diseases, major psychiatric disorder, pregnant and breast feeding women were excluded from the study. Informed consent was obtained from all participants before enrollment in the study.

Methods:

All the patients were subjected to clinical assessment. Height and weight were determined at baseline and body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared.

Before starting therapy, all patients and controls were subjected to the following: serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), Gamma Glutamyle transferase, albumin, total bilirubin, and kidney function (synchron CX4- clinical system), international normalized ratio (INR), complete blood count, alfa-fetoprotein, HCV antibody (Axyam machine-Ireland) and abdominal ultrasound. Quantitative HCV PCR using Real Time PCR (Stratagene) and liver biopsy were done for all the enrolled patients. Determination of IL-10 serum level was done using ELISA test (Diasorine Catalog Number D1000B). Blood samples were obtained in the morning after 12 hours of fasting. They were centrifuged and serum was separated, and then stored at -20ºC prior to use.

Percutaneous liver biopsy was performed under ultrasound guidance using 16 gauge needles. Specimens of at least 2.5 cm in length, including a minimum of 12 portal tracts were considered reliable for adequate grading and staging using modified Knodell's score (15). Reading of liver biopsies was done by a single pathologist who was blind to the clinical data.

All the patients were treated with pegylated interferon α-2a, 180 µg/week subcutaneously, plus ribavirin (1000-1200 mg orally /day based on body weight) (16).

Quantitative PCR for HCV-RNA after 12 weeks was done to assess early virological response. Those who showed response manifested by negative PCR or decrease of viral load by 2 logs, continued the therapy for 48 weeks. Qualitative PCR for HCV-RNA was repeated at 48 weeks for assessment of end of treatment response (ETR), and 72 weeks for the sustained virologic response (SVR), defined as negative HCV-RNA 6 months after the end of treatment (17).

All the patients were followed up regarding clinical and biochemical parameters every week for 1 month, every 2 weeks during therapy, then every month up to 6 months after end of therapy. Serum IL-10, liver function tests, kidney function test and complete blood count were done at the end of treatment.

Data analysis

Data were expressed as Mean ± SD for quantitative measures and analyzed using SPSS 11 for Windows. Comparison between groups was made by using Student's t-test. Spearman correlation coefficient test was used to study the association between each two variables among each group. A probability of error value of $P < 0.05$ was considered statistically significant while P-value < 0.01 is highly significant.

Results

Fifty patients with chronic HCV infection and 20 healthy control subjects were enrolled in this study. The patients were 34 males (68 %) and 16 females (32 %), their ages ranged from 20 to 52 (mean 40.1±7.9 years). The controls were 9 males (45 %) and 11 females (55%), their ages ranged from 18 to 47 (mean 38.9 ± 6.4 years) with no statistically significant difference between cases and controls as regards age and gender. Regarding BMI, there was no statistically significant difference between cases (24.4 ± 7.7) and controls (24.8 ± 8.0) ($P>0.05$).

Laboratory findings in patients before the start of therapy and control subjects are shown in table (1). There were significantly higher mean ALT, AST, total bilirubin and AFP among cases compared to controls ($P<0.01$). Also, pretreatment serum IL-10 levels were significantly higher among cases in comparison to control subjects ($P<0.01$).

All the patients were treated with pegylated interferon α-2a subcutaneously every week plus ribavirin orally. None of our patients required discontinuations of treatment due to adverse effects or laboratory abnormalities. But, four patients required temporary dose reduction due to hematological adverse effects. All the patients were adherent to treatment. Adherence to treatment is defined as taking 80 % of each drug for at least 80 % of the duration of therapy (18).

Regarding the response to therapy, 32 (64%) patients showed negative PCR at the end of therapy (end of treatment response); 3 of them relapsed and 29 (58%) showed SVR; while 18 (36%) patients didn't achieve ETR and were considered non responders.

BMI was significantly lower in responders (21±5.6) in comparison to non responders (30.4±7.2) (t 5, P<0.001)

After completion of therapy, there was a significant reduction of ALT (36.4±9.7), AST (46.3±22.8) and PT (0.9± 0.06) compared to pre-treatment level (P<0.01), while there was no significant difference regarding albumin (3.7±0.4), total bilirubin (0.9± 0.5) or AFP (9.5±3.5) (P>0.05). Also, serum level of IL-10 in cases showed a significant reduction (112.3±17.8) compared to pre treatment level (t 8.5, P<0.0001).

Pre-treatment serum IL-10 levels were significantly lower in responders at the end of treatment and patients who showed SVR in comparison to non responders (P<0.001) (Table 2).

Serum IL-10 levels before and after treatment in responders and non responders to therapy are shown in table 3. In responders, there is significant reduction in serum IL-10 level after therapy in comparison to pretreatment level. While, there was no significant change in serum IL-10 levels before and after treatment in non responders.

Using Spearman correlation test, pre-treatment serum IL-10 was significantly positively correlated with BMI and grade of positivity of HCV RNA by PCR (table 4).

Discussion:

Many cytokines secreted by Th1 and Th2 cells are involved in the immune response to HCV infection and progression of HCV-related liver disease. Th1 cells release TNF-α, INF-γ and IL-2, causing inflammation and necrosis, and Th2 release IL-4 and IL-10, which modulate hepatic injury by suppressing the Th1 response and counteracting the fibrogenic effects of TNF-α, INF-γ and IL-2 (19).

Interferon is still an optimal agent for the treatment of hepatitis C, but the outcomes are not satisfactory in some patients. Various factors were found to contribute to the outcomes (20).

This study was designed to assess the possible association of IL-10 level and response to combined pegylated interferonα-2a and ribavirin therapy in patients with chronic HCV infection.

In the present study, the pre-treatment serum IL-10 levels were significantly higher in chronic HCV patients (124.7 ± 14) compared to control subjects (96.2 ± 21.6), in line with many studies (21, 22, 23,24). It has been reported that patients with chronic HCV infections show enhanced serum IL-10 concentration (25) and T-cells IL-10 production in response to stimulation with HCV Core protein (26).

In this study, a significant positive correlation was found between pretreatment IL-10 and body mass index, in agreement with Reuss et al. (27) who reported that decreasing body mass index appear to decrease IL-10 production.

A highly significant positive correlation was found between IL-10 and HCV viral load and this is constant with Flynn et al. (28) who stated that the magnitude of the HCV viral load correlated with IL-10 production. The direct mechanism linking high HCV replication to increased IL-10 production is not clear, but is may be via inhibition of the induction of HCV-specific effector T-cell responses (28).

In this study there was no correlation between IL-10 levels and the fibrosis stage this was agree with Imbert-Bismut et al. (29) who stated that IL-10 was not correlated with fibrosis stage

Also, we found that pre-treatment IL-10 serum levels were significantly lower in responders (116.7±5.6) compared to non responders (138.7±13.4), in line with Marín-Serrano et al. (24) who reported that baseline levels of IL-10 were significantly higher in patients without any response to treatment compared with those with sustained response. This might be explained by the finding that low IL-10 production may help to establish an effective immune response which helps HCV clearance (30), while the high level IL-10 could not only depress synthesis and secretion of inflammatory factors induced by HCV antigen but also refrain multiplication and differentiation of inflammatory cells such as cytotoxic T lymphocyte cells and NK cells, resulting in lowering of immunoreactive effect and failure of antiviral treatment (31). In contrary, Bozkaya et al. (32); in their study on 37 chronic HCV patients who were treated by IFN-alpha2b for 6 months; found no difference in baseline IL-10 levels in responders and non-responders.

As regarding serum level of IL10 before and after treatment, Bozkaya et al. (32) found that after treatment some patients lost their detectable IL-10 and some patients developed detectable IL-10 levels after treatment irrespective of the treatment response. Also, Marín-Serrano et al. (24) found that the concentration of IL-10 did not change with treatment. While in the present work, serum IL-10 levels showed significant decrease in responders compared to pre-treatment levels, with no significant difference between pre-treatment and post treatment levels in non responders, in accordance with Cacciarelli et al. (33) who reported that treatment with IFN-alpha for 12 weeks decreased the levels of IL- 10. This significant decrease of IL-10 after interferon administration might be explained by the fact that HCV was cleared by interferon through immunomodulation in addition to direct antiviral activity (31).

Table (1): Comparison between cases and controls as regards the laboratory findings before treatment

	Cases (N=50)	Control (N=20)	t	P
ALT (IU/ml)	56.7±15	30±6	7.6	0.000*
AST (IU/ml)	60.7±19.2	32.4±9	6.3	0.000*
Total bilirubin (mg/dl)	1±0.4	0.74±0.2	3.4	0.001*
Albumin(g/dl)	3.8±0.3	3.8±0.2	0.2	0.7
AFP (ng/ml)	9.4±5.2	5.8±2	4.0	0.000*
INR	0.93±0.06	0.93±0.05	0.1	0.8
pre-treatment IL-10 (pg/ml)	124.7±14	96.2±21.6	6.5	0.000*

* highly significant

Table (2) Pre-treatment serum IL-10 levels in responders and non responders

		IL-10 (pg/ml)	t	P
ETR	Responders	116.7±5.6	8.1	0.000*
	Non responders	138.7±13.4		
SVR	SVR	117.4±5.3	5.4	0.000*
	No SVR	134.7±10.1		

* highly significant

Table (3) Serum levels of IL-10 before and after treatment among responders and non responders (at end of therapy).

ETR	IL-10 (pg/ml)		t	P
	Pre-treatment	After treatment		
Responders (N=32)	116.7±5.6	100.5±4.8	14.1	0.000*
Non responders (N=18)	138.7±13.4	133.3±12.2	1.9	0.07

* highly significant

Table (4): Correlation coefficient between pre-treatment serum IL-10 levels and studied parameters

		ALT	AST	T.bilirubin	albumin	AFP	PT	BMI	HAI staging	HAI grading	PCR
IL-10	r	0.018	-0.274	0.042	-0.121	0.034	0.131	0.309	0.135	0.240	0.635
	P	0.09	0.05	0.7	0.4	0.8	0.3	0.02	0.3	0.09	0.000

Conclusion:

As pre-treatment serum IL-10 levels is significantly higher in non responders in comparison to responders with no significant reduction in post-treatment level in non responders, we concluded that increased serum levels of IL-10 are a poor prognostic marker of response to combined treatment in patients with chronic HCV infection.

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Repositioning Tertiary Agriculture Education Curriculum for Sustainable Development in Nigeria: Challenges and Opportunities.

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Abstract: Nigeria's economic growth hinges on the development and promotion of a vibrant and sustainable agricultural production base. The prime movers of sustainable agricultural production include: availability of improved technologies, human capital, sustainable growth of biological and natural resource capital, improvement in performance of supporting institutions and favourable economic policy environment. Curricula and teaching methods and tools developed are not relevant to the development of the country and needs of the farmers and labour management, rather they are curricula adopted from countries that had colonies in Africa. The public sector used to absorb large majority of agricultural graduates, but this is no longer the case. Agriculture graduates are finding it increasingly difficult to become employed. Their education in agriculture has not been oriented to the needs of an increasingly sophisticated commercial sector. Central to solving the above problems is the production of suitable graduates, who are technically competent and relevant; equipped with the necessary skills and business skills; to work with local and especially rural communities. In this paper, we reviewed the challenges of effective teaching of agricultural education in tertiary institutions in Nigeria and also suggest that environmental degradation, rapid changes in scientific and technical knowledge, the changing role of women in society and the increasing marginalization of agriculture and rural life all call for changes in agricultural education, in addition to ICT introduction. Therefore, the tertiary agricultural education curricula must be transformed if agricultural education will be a ready tool for sustainable development.
[Chikaire, J., Orusha, J.O., Onogu, B., Okafor, O.E., Nwoye, E.O., and Okoli, C.F. Repositioning Tertiary Agriculture Education Curriculum for Sustainable Development in Nigeria: Challenges and Opportunities. Academia Arena 2011;3(10):7-14]. (ISSN 1553-992X). http://www.sciencepub.net. 2

Keywords: Agricultural Education, Curriculum, Nigeria, Environment, Development, Sustainability

1. Introduction

The livelihood situation in Africa has been described as dire and deteriorating (Diao *et al.,* 2006). Africa is the only continent where hunger and poverty are projected to get worse. Statistics show that 80% of all Africans live on a daily income of less than two US dollars, while nearly half struggle to survive on one US dollar a day or less. More than 200 million Africans now suffer from malnutrition (Rosegrant *et al.*, 2005).
Food security and its relationship to sustainable agricultural and rural development have increasingly become matters of concern for developing countries and for the international community. While there are many complex factors that influence sustainable development and food security, it is clear that education in agriculture plays an important role in preparing farmers, researchers, educators, extension staff, members of agri-business and others to make productive contributions. A critical issue in the 21st century will be the changes and adaptations required in agricultural education in order for it to move effectively (Crowder *et al.,* 1999), contribute to improved food security, sustainable agricultural production, and rural development. If change is going to be achieved in sub-Saharan Africa in general and Nigeria in particular, then agriculture, particularly small holder agriculture has to be made to work.

Faculties of agriculture and agricultural colleges and universities were first formed in the belief that farm production could be increased as a result of the systematic application of current technology and agricultural research findings. The mission of these early educational institutions was to scientifically study agriculture with the participation of the farming community; to carry the results to a broad range of farmers who could use them; and to train farmers, extension workers, agricultural teachers and researchers so that agricultural production could continue to be increased on a sustained, basis. But according to Rogers, (1996) "poor training of agricultural extension "staff has been identified as part of the problem of the relative ineffectiveness of much of extension in the field". "This applies not only to extension staff but to agricultural professionals in

general. Unfortunately, the training of human resources in agriculture is often not a high priority in the development plans of countries. As a result, curricula and teaching programme are not particularly relevant to the production needs and employment demands of the agricultural sector.

The situation has become more serious in recent years due to the economic crises in the public sector in many developing countries. In the past, the public sector absorbed nearly all agriculture graduates. This is no longer the case, and agriculture graduates are finding it increasingly difficult to find employment. Governments can no longer afford to hire every graduate, and education in agriculture has not kept up with the increasingly sophisticated labour demands of the private sector (Crowder *et al.,* 1999; FAO, 1997). These and other factors, such as environmental degradation, rapid changes in technical knowledge and the increasing marginalization of rural areas, all calls for changes in the current systems of education in agriculture in many developing countries.

2. Role of Agriculture in sub-Saharan African (SSA) Development

Agriculture remains the foundation of SSA's dominant economic activity accounting for 40% of GDP, 15% of exports and to 80% of employment (Diao *et al.,* 2006). Productivity of African agriculture over the last two decades has generally stalled. Per capital output of staple foods continues to fall and the continent is steadily losing its world market shares for major export crops like coffee, tea and cocoa. Improving performance of Africa's stagnating agricultural sector is a key to solving the problems of hunger and poverty. The only way of ensuring improved African agriculture is ensuring that the prime movers for its development are in place.

3. Prime Movers to Agricultural Development

Rukuni (2002) lists prime movers which should work in concerted manner to achieve sustainable agricultural development. These include:

A) New technology produced by public and private investments in agricultural researchers or imported from the global research system and aspect of local conditions.
B) Human capital in the form of professional, managerial and technical kills produced by investments in schools, agricultural colleges, faculties of agriculture and on the job training and experience;
C) Sustained growth of biological capital (genetic and husbandry improvement of livestock herds, crops, forests, plantations and so on) and;
D) Physical capital investments (large and small dams, irrigation, grain stones and roads), improvements in the performance of institutions such as marketing, credit, research, extension and land reform.
E) Favourable economic policy environment. No single prime mover, such as new technology or higher prices can increase agricultural production and sustain it for any period of time.

However, central to making the prime movers operational is the production of necessary human resources to man the different institutions which will get agriculture moving".

4. Tertiary Agricultural Education

Higher education in agriculture and national resource management plays a particularly significant role in national development (Maguire, 2000). The major focus of tertiary agricultural education has been on the production of public sector employees (Muir- Leresche and Scull-Carvalho, 2006). Traditionally, graduates have largely found employment in ministries of agriculture, universities, state operated enterprises and other government functions. Agricultural graduates have worked as policy advisers, lecturers, researches, extension workers, business managers and financial experts.

5. Importance of Teaching Agriculture in Schools

Teaching agriculture to young, students opens them to understand how things grow, live and die. From flowers to potatoes, from cows and pigs to tractors and soil. Teaching students about farming and gardening introduces knowledge about how, for example, food gets onto their tables, clothes get onto store shelves, and seeds germinate. Starting agricultural education at a young age helps children get perspective on their lives and the world around them.

Teaching agriculture introduces young students to basic scientific procedures and shows them how to apply these lessons to daily life. For example, an agriculture instructor can teach students about how bees make honey, how trees grow and make fruit or nuts, and how corn can be made into oil, for example. Agriculture puts chemistry, biology and physics into everyday-life application.

School gardens planted by students serve as environmental and agricultural educational tools. Planting flowers, potatoes, tomatoes and trees teaches elementary school students about how things grow live and die. Gardens also can help young students develop personally and socially by adding a practical dimension to these agricultural subjects.

Agriculture-in-the-classroom initiatives educate students about nutrition, where foods come from, how to nourish themselves, and the importance of nutrition for the rest of the world. In 2004, the United Nations Food and Agriculture Organization of the United Nations and the UN's UNESCO Institute of Education Planning co-published a book on school gardening titled "Revisiting Garden-Based Learning in Basic Education." The book addresses the importance of school gardening and agriculture education to community life.

Students can develop skills in leadership, communication, team building and civic engagement through inter- curricular programs in agricultural education. They learn about the importance of farming to a community, and learn to work together in planting gardens and in discovering how their community provides food to the public (Iwu et al., 2011).

- **Contextual Constraints to the Teaching of Agriculture**

Changing employment opportunities in agriculture reduced government spending as a result of structural adjustment has put pressure on agricultural education institutions to better relate curricula to employment opportunities. The dramatic reduction in employment by Ministries of Agriculture in recent years, in some cases over 50 percent staff reductions, means that students increasingly need to learn knowledge and skills for private-sector employment. It is also likely that employment opportunities outside the agricultural sector will grow at a faster rate than n agriculture. This requires a continuous analysis of job markets and employer's requirements in order to plan and develop appropriate curricula (FAO, 1997; Crowder *et al.,* 1999). Recent changes in employment opportunities mean that the curricula and training programmes in agriculture need to be reoriented to meet the learning requirements of diverse groups Unemployed and under-employed people, dismissed public-sector workers, agricultural professionals seeking career changes and advancement and young graduates seeking employment for the first time. Only by involving potential employers in the curriculum development process will be possible to ensure that agricultural education will result in gainful employment for graduates. (FAO, 1993a).

Improving the employment opportunities for graduates requires that curricula focus less on specific technical knowledge that will quickly become obsolete and more on processes and abilities of students to think and solve problems that are relevant to societal needs. Students should learn skills and abilities that are transferable to a wide range of occupations. For example, excellent communication skills are as needed by agricultural graduates who plan to work in extension as business school graduates who hope for a career in the banking industry. Likewise, teaching methods should be changed to reflect the needs of society, and thus better respond to demands for trained human resources. Teaching with practical, reality-based cases is a good example of how teachers can change methods to meet student needs and those of the larger society (Boeher and Linsky, 1990).

- **Budgeting and Financial Crisis**

In most developing countries, me major source of funding and financial support for agricultural education is the national government, or the provincial/municipal government level where decentralization has been implemented. Generally, agricultural education institutions operate on the basis of an annual budget which depends on the number of students enrolled, previous funding levels and government capacity to support the institutions. Tuition, fees and other possible sources of income, such as donations and institutional revenue from farms or the provision of various kinds of services (e.g., veterinary services) are often of limited significance.

Agricultural education is expensive. It requires teaching aids and materials, scientific and technical experiment as well as adequately equipped training and experimental farm. The initial funds for buildings, teaching equipment, text books, and agricultural machinery have usually been provided in the past by governments and donor assistance. The maintenance and replacement of thee facilities is generally beyond the existing financial resources of many institutions.

The result is that agricultural education institutions face great difficulties in ensuring properly equipped, maintained and functioning laboratories and practice farms. Not surprisingly, the objectives of experimentation, teaching, outreach or agricultural production are inadequately achieved.

Budgeting cutbacks have also made it difficult to maintain teaching standards due to reductions in recruitment and in staff development programmes, especially those involving training abroad. Limited budgetary resources often do not allow teachers to obtain the scientific and technical publications necessary to keep their knowledge current, or to conduct up-to- date research. This has resulted in a decline in the standards of teaching, research and extension in many countries.

- **Marginalization of the Agricultural and Rural Sector**

Due to increasing urbanization, fed by out - migration from rural areas, governments often give priority to urban needs for health, education and social services at the expense of rural areas and the agricultural sector. Such action leads to even greater impoverishment in rural areas and leads to higher levels of migration. It was felt that agricultural institutions are becoming increasingly isolated from the mainstream of national development and need to play a more dynamic role in rural development issues through better links with government and with other institutions. Admission is based solely on academic qualifications which place rural young people in direct competition with better schooled urban youth. The result is a significant waste of human resources, since rural youth possess unique aptitudes and qualities for understanding and working in the rural sector and are well suited for technical work in agriculture (FAO, 1997).

In some cases, the urban origin of agricultural students is now so dominant that it is becoming difficult to teach them about agriculture without special, often expensive, educational efforts. The result is that urban - based graduates, with little practical knowledge of rural development and agricultural production are working as extension agents and agricultural advisers.

The increasing number of students with urban backgrounds has led some institutions to look for ways to ensure that these students gain a practical understanding of the realities of rural and farm life. One way is early integration of students in rural life through practical training before final admission and a series of practical training periods throughout the programme of study. Agricultural universities and colleges need to take into consideration during admission the willingness of student to follow an agricultural career and their ability to adapt to work in rural areas (Crowder *et al.,* 1999).

Students of agricultural faculties are all-two - often not there by choice. Frequently they are there by default after failing to enroll for medicine, veterinary science, business studies, and engineering among other popular programmes (Muir - Leresche and Scull — Carvalho, 2006). This has a bearing on the graduate being produced.

- **Relationship between Agricultural Education and Research and Extension**

With few exceptions, the institutional relationship between agricultural teaching and research and extension services are inadequate. In many countries, this is the result of the deliberate separation of education, research and extension into different ministries and agencies and a lack of functional mechanisms to link them together to solve common problems. (Crowder *et al.,* 1999).

Agricultural research is usually conducted at government research stations and laboratories, the majority of which are not linked with universities. Research activities are often carried out as part of postgraduate programmes of higher agricultural education, but they are seldom directly related to national research priorities and programmes (FAO, 1997).

As with research, close working relationships between agricultural education institutions and extension systems are indispensable in order to ensure the relevant and contributions in extension and community outreach is often limited. Even in those countries where extension and agricultural education are not separated into different ministries, the lack of resources and linking mechanisms greatly limits joint activities.

6. Introducing New Topics Into The Agricultural Education Curriculum For Sustainable Development

Although agriculture education has generally kept pace with scientific progress in the past, the pace of change is much faster today. The extent of scientific advances in the field of biotechnology, computers and communications allows shorter assimilation periods.

In a global economy, food processing, storage and marketing are aspects of the production process that have become increasingly important to agricultural procedures, and thus to agricultural education. Agricultural education and training needs to take into account new subject areas and their socio-economic consequences.

The increasing concern with environmental protection and the preservation of natural resources makes research and teaching on

subjects such as crop protection and integrated pest management, rational use of fertilizers and soil and water conservation more pressing. Programmes of study have been concerned largely with intensive, high - input production techniques. Students need to have knowledge, skills and attitudes required for sustainable agricultural and rural development.

- **Rapid Scientific Progress and Technical Change**

Although agriculture generally kept up with scientific progress in the past, the pace of change is much faster today, requiring continual updating of curricula. Scientific knowledge is changing very quickly as modern communication technologies facilitate the global sharing of information among scientists and educators. Since "new" knowledge becomes "old" knowledge so quickly, it is essential that students develop the skills and attitudes that will allow them to continue to learn and develop their competencies throughout their professional lives. New global developments in science and technology have profound implications for agricultural education institutions. New advances in science and technology influence the subject matter and types of courses students need to understand today's agriculture. Food processing and post-harvest technologies, biotechnology, agri-business management and farming systems development are some of the subject areas which need, to be incorporated into curricula. These subjects will attract increasing numbers of students as new employment opportunities are created which demand expertise in these fields. Advances in biological sciences, increase the complexity of agriculture and compliment access to technology by poor nations. Regional cooperation centers and possible solution partnerships with private companies should also be explored means to improve access to new technologies (FAO, 1997).

In addition to new scientific knowledge, the most important source of knowledge for agricultural development is rural people themselves and the time-tested systems of production that embody their knowledge. An understanding of rural people and their production systems should be integral part of agricultural education.

This requires that agricultural education institutions play not only an academic role, but also a community development or outreach role that allows them to understand local knowledge and combine it with modern agricultural science. Understanding the contributions that local people can make to solving their own problems is the key to sustainable rural development (Crowder *et al.,* 1999).

- **Environmental Issues in Agricultural Education**

In many parts of the world, the increasing needs of growing populations for food, fuel and fibre have led to deforestation, severe soil erosion, loss of water resources, eventually declining crop production. It is clear that the loss of natural resources and environmental degradation affects food security. It is also clear that institutions of education in agriculture need to incorporate environmental and sustainable agricultural development issues into their curricula (FAO, 1997; Crowder *et al.,* 1999).

Environmental and sustainable agricultural development problems require an inter-disciplinary approach to curricula since sustainable development relates only to technological concern, but also to economic, social, cultural, ecological ad public policy matters. Furthermore, curricula need to provide students with opportunities to observe first - hand the physical, technological and social aspects of natural resources uses for agriculture through learning activities that are experiential and problem focused.

Experience shows that institution of agricultural education can play a vital role in bringing about changes in peoples attitudes and practices so that they are more environmentally responsible. Developed countries have for some time included environmental concerns in their teaching curricula, research activities and outreach programmes. Current practice in agricultural education in many developing countries, however, does not demonstrate widespread integration of environmental and sustainable agriculture topic into academic programmes (FAO, 1997).

Environmental issues are related to inappropriate production techniques and farming system. The least developed farming systems often cause deforestation and soil degradation while more advanced systems, which seek productivity at all costs, often result in soil and water pollution through excessive use of fertilizers, pesticides and herbicides. Furthermore, despite the numerous interactions with agriculture, problems of urban and /or industrial pollution often are not included in agricultural education in industrialized countries and are rarely mentioned in developing countries.

- **Integrating population issues into agricultural education**

Population projections suggests that the world population will continue to increase from the

present figure of nearly six billion people to between 11 and 14 billion people by the end of the 21st century. There is a great need in the developing countries to teach agricultural students population issues in relation to development problems. Institutions of agricultural education need to incorporate population education concepts and principles into curricula since many agricultural graduates will become managers, planners, and policy - makers who need to understand the dynamic interrelationship between food, population, the environment and socioeconomic development (FAO, 1996; FAO, 1997; Crowder *et al.,* 1999).

Furthermore, students trained to work as extension agents need to be able to engage farm families in dialogue about sensitive population issues and to effectively communicate population messages to rural people. Population education should develop awareness and understanding of the nature, causes and implications of population growth and distribution as they relate to agricultural productivity and rural development, and how these issues affects, and are affected by farmer, their families and society as a whole. Population education can be integrated into training institutes by creating a separate population education curses; and by integrating population education issues and content into relevant topics in courses of study within existing curricula.

Population issues are good example of how to integrate the teaching of values and attitudes into an agricultural subject area. Educators need to develop teaching strategies that emphasize and help students develop their effective reasoning skills. Since the attitudes and values that people possess are difficult to change, educators need to place greater emphasis on the psychology of the change process, thus improving the likelihood that changes in practice will come as a result of educational efforts (FAO, 1997).

- **Gender Issues in Agricultural Education**

Women play a major role in the world's agricultural production system. In the less developed countries, an estimated one-third of all rural households are managed by women. In sub - Saharan Africa and Caribbean, women produce 60 - 80 percent of basic foodstuffs, while in Asia they perform over 50 percent of the labor involved in intensive rice cultivation (FAO, 1996).

In recent years, there has been widespread recognition of the vital roles played by women in all areas-o1 agriculture and need for women to have access, through formal and non-formal training, to the knowledge and skills needed for improved agricultural production, processing and marketing. Extension gents, researchers, teachers and students all need to be education and informed about rural women's problems, potentials and aspirations.

The 1991 FAO expert consultation urged that special efforts be made to recruit and support female students from rural areas who could become extension agents, agricultural researcher, teachers and policy-workers. One of the reasons why there are few women extension workers, researcher and other agricultural professionals is the small number of female graduates from intermediate and higher-level agricultural education institutions. Yet, there are various countries where the enrollments of women are proportionately high. On average in Africa, FAO data show that there has been 10 percent increase from 1983 to 1993 from about 15 to 25 percent female enrollment in agricultural education institutions (FAO, 1993)

The question of how to attract more female students to agricultural disciplines is linked to the issue of encouraging students from rural areas to enter higher education. As noted above, the number of female students has increased over the past ten years and this trend should be supported and encouraged. Also, more role models from young women to emulate are needed, including teachers in agricultural education institutions. Raising the number of women in agricultural education, both as educators, administrators and students is important as a means of reinforcing a commitment to understanding and changing the status of women in agriculture (Karl, 1997).

Educators need to become more responsive to gender related issues by taking into account women's roles contributions in the total agricultural industry. While there is a trend for increased enrollment of women students in agricultural sciences at the technical or high levels, this has not resulted in the dissemination of improved technology to women farmers because few female graduates are employed in extension work. Agricultural education institution may increasingly have gender -sensitive admittance policies, but due to traditional barriers female graduates continue to have problems finding employment in agriculture (Crowder, 1998). Strategies, curricula, and policy shifts need to emphasize and include women as a role models and leaders in agriculture.

Gender sensitive policies have, at best, resulted in training programmes in which women are treated equally men. However, it is not only the equal treatment of women that is important, it is

equal employment benefits that is important. Equal treatment does not necessarily lead to equal benefits for women; indeed, the treatment may have to be different in order to take into consideration the different need, time constraints and productive activities of women.

Gender sensitive educational policies should be developed with a wide-range of stake holders, including community leaders, politicians, potential employers and especially women themselves. Measures should be put in place to encourage young women and better prepare them to take up agricultural studies. For example, special attention should be paid to revising admission policies that discriminate against women and to the creation of special scholarship for women to study agriculture. There is also a need to provide gender sensitization courses for teaching staff and to eliminate stereotyping of females in agricultural studies. In some cases, professional organizations of women agriculturalists can act as pressure groups for these changes (Crowder *et al.,* 1998).

- **Introduction of ICT**

Today a new paradigm of agricultural development is fast emerging: in both developing and developed countries the overall development of rural areas is expanding in new directions; old ways of delivering important services to citizens are being challenged; and traditional societies are being transformed into knowledge societies all over the world. ICTs play a key role in improving the availability of agricultural production and market information in developing countries. ICT-based market information systems have a proven track record for improving rural livelihoods in middle income developing countries where they have been introduced. However, these systems are generally limited in scale and have not been effectively replicated beyond the local level.

- **An inter-disciplinary systems approach to agricultural education**

At a relatively early stage of their education, students need an overview of the agricultural and rural systems of their countries. Throughout their training, they need not only specialized courses which deal in-depth with specific technical subject-matter, but courses that help them think holistically, or in terms of integrated agricultural systems, so that they can understand the multi-dimension nature of sustainable agricultural production. This requires an inter-disciplinary systems approach to agricultural education.

Training in the systems approach is essential for agricultural education because of the increasing complexity of agriculture, food and rural systems, the problems of environmental protection and management, women farmer and household issues had the needs of small-scale farmer. Even conventional subject-matter teaching should take place with in an inter-disciplinary framework of agricultural systems rather than as isolated subjects.

6. Conclusion

Agriculture will continue to be the driver for economic growth in sub-Saharan Africa and Nigeria in particular. In order to get agriculture moving, a well trained cadre who is technologically competent and relevant equipped with the necessary skills and business skills to generate employment and wealth and able to work particularly with rural communities produced. The curricular should be directed to address the labour demands of the private sector, social and environmental issues for sustainable agricultural development.

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Technical and Vocational Education and Training: Vehicle for Sustainable Development in Nigeria.

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Abstract: Vocational education and training is very cardinal to any economic development of a country. Training in general has potential benefits which accrue to the individual, organization and the nation in general. To the individual training enhances their future earning potentials career progression ad employability. To achieve the above, the paper argues that the individual or groups will need skills to perform competently. With skill the individual can determine their own destiny. Because of the importance of skills to the individual, it is important that every individual access training to contribute to development. Currently Nigeria, not everybody is able to access training with the rise in population growth and economy going down, governments are unable to offer social amenities. Even schools and colleges cannot match the rising population and as a result fewer and fewer people are accessing training. The paper therefore focused on the contribution of a revitalized technical and vocational education and training to improve the economic status of the country and welfare of the people, trigger entrepreneurship which would eventually lead to job creation. The paper concludes that to solve the problem of widespread poverty, unemployment and national food deficit, priority should be giving to revitalized-technical and vocational education.
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Key words: Education, vocational, technical, sustainable development.

1. Introduction

Education of all levels can shape the world of tomorrow, equipping individuals and societies with the skills, perspectives, knowledge and values to live in a sustainable manner. Education for sustainable development (ESD) is a vision of education that seeks to balance human and economic well-being with cultural traditions and respect for the earth's natural resources. ESD applies transdisciplinary educational methods and approaches to develop an ethic for lifelong learning; fosters respect for human needs that are compatible with sustainable use of natural resources and the needs of the planet; and natures a sense of global solidarity (UNESCO, 2005)

Education for sustainable development is a dynamic concept that encompasses a new vision of education that seeks to empower people of all ages to assume responsibility for creating and enjoying a sustainable future". The overall aim of ESD is to empower citizens to act for positive environmental and social change, implying a participatory and action-oriented approach.

ESD integrates concepts and analytical tools from a variety of disciplines to help people better understand the world in which they live. Pursing sustainable development through education

people who provide the goods and services required by society. Calhoun and Finch requires educators and learners to reflect critically on their own communities, identify non-viable elements in their lives; and explore tension among conflicting values and goals. ESD brings a new motivation to learning as pupils become empowered to develop and evaluate alternative visions of a sustainable future and to work to collectively fulfill these visions.

The Four Major Thrusts of Education for Sustainable Development

- Promotion and improvement of sic education: Access to basic education remains a problem for many especially girl children and illiterate adults. Simply increasing basic literacy and nurmeracy, as currently taught, will not significantly advance sustainable societies. Instead, basic education must focus on imparting knowledge, skills, values, and perspectives that encourage and support citizens to lead sustainable lives.

2. Why Refocus Vocational Education in the 21st Century Nigeria?

According to Calhoun and Finch (1982), vocational education has always been refocused by the changing needs of people and society. The basic concern of vocational education is for the further explain that, vocational education should satisfy the needs of society to fill required positions

necessary for the efficient operation of the economic system as well as the needs of individuals to find personally satisfying positions in the occupational structure.

Nigeria as a nation presently has many social and economic problems to handle in the twenty- first (21st) century. Most Nigerians are just recovering from chronic case of negative attitude towards vocational, technical and technological education. Nigeria is similarly just awakening from her long sleep of negligence of these aspects of education in her educational system (Apagu and Andural, 2007). The nation and her citizens are in the twenty-first century questioning the quantity and quality of these aspects of education in the nations system of education and among Nigerians, especially among the youths.

Another problem necessitating refocusing of Nigeria's vocational education in this 21st century is youth unemployment which appears to be accelerating every year. According to Adefaye (2004, p.30), the neglect of vocational and technical education in the country has increased youth unemployment. Adefaye explains that, in 2003, primary school leavers accounted for 14% unemployment, secondary school leavers accounted for 53.6% while tertiary education graduates shared 12.4%. From this data on unemployment situation among school graduates, there is a clear indication that the primary and secondary school leavers have total unemployment of 67.76%. Presently, about seventy -five (75) percent of secondary school leavers in Nigeria do not go further in higher academic pursuit, It is therefore, disturbing to have a situation where many youths who are most physically able to render services towards national development are highly unemployed.

Public education does not have the right to throw its rejects into the ranks of the unemployed in the community". Rhodes' statement implies that, public education system should find a way of making all citizens capable of contributing to the economy of the nation. If public education that is meant for everybody cannot prepare citizens for work, who else can do it? It is worth mentioning here that the problem of Nigerian youths' unemployment can be reduced to a very large scale through relevant vocational education programmes. Unfortunately, it appears the Nigerian system of education is more interested in sieving the academically talented youths from the non-academically-talented, and then allowing the non-academically talented human resources to waste away (Apagu and Andural, 2007).

According to Tommy (as reported in Adefaye, 2005):Despite the country's abundant resources, Nigeria had continued to manifest abysmal industrial performance record over the years because of the country's inability to synergies its resources to spawn an organic productive sector capable of engendering sustainable development and alleviate wide spread poverty.

The nation's predicament is heavily dependent on her ability to come up with a competent and dedicated workforce. The lack of dedicated and competent workforce is Nigeria's headache and the most militating force against the nation's technological, industrial and any type of national development. Vocational and technical education at this point stand very tall in helping the nation get out of the problem of lack of appropriate manpower and therefore, needs just refocusing to produce the desired result.

Nigeria's current efforts at educational reforms and restructuring are aimed at focusing issues: redesigning curriculum, increasing funding, refocusing monitoring process, accountability and transparency. Nigeria's present predicament was similarly experienced long ago by USA and the country's Advisory Council on Vocational Education. Vocational education which faces a unique challenge in the years ahead-a challenge rooted in the social and economic welfare of people. In the contemporary social scene with its large city problems, the ghettos, school dropouts, and variety of disadvantaged groups, the need for vocational education stands out clearly.

Calhoun and Finch (1982), in same vein emphasize that: Vocational education through the years has been responsive to the needs of society. When geographic and occupational mobility of workers, accelerated and improved technology required a higher degree of trained skills, society turned to the schools to supply its need for trained workers.

Calhoun and Finch further explain that because society currently insists that everyone leaving the public school system should have some type of occupational skill appropriate to earn a living, new importance has been attached to vocational education. Nigeria therefore, stands to gain from the longstanding experience of USA. There is therefore, no doubt that the Nigerian vocational education needs to be refocused for effectiveness and sustainable national development.

3. Reorienting existing education at all levels to address sustainable development

Rethinking and revising education from nursery school through university to include more principles, skills, perspectives, and values related to sustainability in each of the three - social, environmental, and economic-is important to our current and future societies.

Developing Public Understanding and Awareness of Sustainability

Making progress towards more sustainable societies requires a population that is aware of the goals of sustainable societies and has the knowledge and skills to contribute toward those objectives. Informed voting citizenry and knowledgeable consumers can help communities and governments enact sustainability measures and move toward more sustainable societies.

Training

All sectors of the workforce can contribute to local, regional, and national, sustainability. The development of specialized training programmes to ensure that all sectors of the workforce have the knowledge and skills necessary to perform their work in a sustainable manner has been identified as a critical component of ESD.

4. The Concept of Vocation Education

Vocational education is education and training for work. It is an education where skills are taught for the purpose of gaining employment through exposure to practical experience for self-actualization. Vocational education is education designed to prepare skill workers for industries, agriculture, commerce etc. Vocational education can be regarded as experience gained directly or indirectly that enables one to participate in a socially useful occupation either in or out of school, at various levels and to be sufficiently equipped to become an intelligent creator of goods and services. The continued deterioration of the national economy is a clear signal to every Nigerian try hard for a reliable and independent means of survival. This can only be realized through improved vocational training programmes with emphasis on functional agricultural education.

5. Vocational Education and the rural poor

Technical and vocational education and training plays an essential role in improving the wellbeing of rural families and communities. It increases productivity, empowers individual to become self-reliant and stimulates entrepreneurship. Businesses are more willing to invest in a community with strong human resources. Skills development can therefore contribute to strengthening the social links of a community by promoting local employment, creativity and sustainable means of subsistence. Since there is a strong link between poverty and rurality, in Nigeria over 70% of poor people in rural areas where enrolment rates in all types of education are low, reducing poverty therefore will entail increasing rural educational opportunities as part of an overall development strategy. Here WET becomes a handy tool, as it can be both formal and informal. Such skill development of the rural poor must take into account:

- skills to diversity the rural economy rather than reliance on agriculture alone;
- equipping the people to add value to agriculture based product;
- training in basic literacy, numeracy and life skills should be In an integral part of the whole program;
- the promotion of the growth and profitability f local traditional crafts and industries.

However statistics as cited by Biakpara (2004) reveals that agriculture contributes about 41% to GDP and remains the lead sector for providing income and employment for the rural poor people. According to him, it employs 90% of the rural poor, nearly 70% of the total labour force and provides 90% of non-oil export revenue. Therefore a functional agricultural education through a well designed vocational programme remain one of the major key to alleviating poverty among the rural poor for sustainable development.

6. Technical and Vocational Education for Sustainable Development

Edition in whatever form is aimed at modeling a child or the individual into a better person relevant to his immediate environment. Sustainable development cannot be achieved without education. Development is a process where an economy undergoes social and economic transformation leading to a rise in the standard of living, access to basic amenities for all through knowledge.

It is in recognition of the above concept of development that technical and vocational education and training for poverty alleviation should be given utmost priority by government, having in mind the future consequence and task ahead for sustainable development. The future prospect and success of the WET would depend on the continuation and expansion of the existing cooperation both with national and international, as

well as by starting non formal training programmes for the unemployed and the community at large as part of the government poverty alleviation efforts toward sustaining welfare of the people and development (Hamza, 2005).

Women Empowerment and Agricultural Education

Though WET can be a decisive instrument in increasing opportunities for women to participate in the workforce and to improve their living conditions and social status through agricultural education, gender disparities still persist in many countries including Nigeria. Efforts should therefore be geared towards ensuring equal access to and participation in WET programmes for girls and women especially those who are marginalized. Women are responsible for half of the world food production and between 60% and 80% of the food in most developing countries. Not only are women the mainstay of the agricultural food sector, labour force, and food systems, they are also largely responsible for post harvest activities. However women fundamental contribution is continually under-appreciated and under-supported, and is often adversely affected by prevailing economic policies and other development conditions. This situation must be given serious attention by government, since sustainable rural development through agriculture cannot be achieved without the full participation of women. Agricultural education is therefore a sure means through which gender equality and women empowerment can be achieved, as a greater number of the rural poor are made up of women and children (Hamza, 2004; Hamza, 2005)

Integrating skill development in Education for all (EFA)

Ensuring that all learning needs of young people and adults are met through equitable access to appropriate learning and life skills programmes is one of the six educations for all (EFA) goals established at the world education forum in Dakar 2000. So the provision of the vocational skills training on agricultural education should therefore constitute an important component in national strategies if the EFA goal is to be achieved. But developing countries including Nigeria tend to concentrate on universal primary education and literacy, but do not pay sufficient attention to skill training for youths and adults, even though there are numerous initiatives focusing on providing education and training people from marginalized group. This in most case are often small in scale and are not always recognized as part of a comprehensive national education strategy. There is the need for government to urgently consider redesigning the curricula with emphasis on skill acquisition, especially agricultural education, if the government target of reducing or eradicating poverty by the year 2020 is to be achieved.

In 2003, existing skills training programmes for the disadvantage groups were reviewed, and policies and institutional environment were analyzed in four countries in Africa and Asia (Mali, Senegal, Laos and Nepal). The experience of these selected countries was shared with other developing countries at an inter-regional seminar held at the international institute for education planning (Paris 22-23, January 2004). Suggestion to a more comprehensive approach to EFA was discussed and all stakeholders to EFA are to implement some of the policies and strategies for efficient result and feedback.

Incorporating WET in the EFA programme is a necessity in all developing countries because it advocates for flexible access to learning and training throughout life while down playing the short coming of the beneficiary in other to accommodate a larger group for sustainable development and improve / enhance productivity (Hamza, 2005).

The value of technical and Vocational Training

Skills are essential to the development of any economy. It is through skills that products in the form of goods and services are produced to the requirements of customers. With the skills an individual will be employable and participate in the production of goods and services. The reward to this participation is income that will be earned. Now when one is skilled, the rewards in terms of whatever income will be grater than one who is not skilled. With skills, the individual is able to perform a basic confidently and is able to sell himself or herself with less difficulty. With these capacities developed, one is able to earn a livelihood- regardless of whatever form it may come (Kombe, 2003)

Tevet contribution to sustainable development

Brundtland report of 1987 defines sustainable development as development that meets the needs of the present without compromising the ability of the future to generations to meet their own needs.

The Contribution of TEVET to sustainable development and improved livelihoods are:

- Tevet prepares people for the world of work.
- Through TEVET people acquire skills0 knowledge, attitudes and values.

- Skills, knowledge, attitudes and values help people participate in production of goods and services.
- Through TEVET people can acquire skills, knowledge values and attitudes that can help them use natural resources optimally.

For example, in Zambia these are people who cut trees in forests and make charcoal for sell. Since this is their livelihood, these people do not anything wrong in the cutting of trees indiscriminately. Instead of stopping them from carrying out the activity from which they are earning a livelihood, the people are given business management courses to enhance their business. This kind of programme therefore require a component of environmental issues. Therefore there will be need to redesign curriculum to take care of sustainable development issues. For example a business management course for this group of people would require to include say a business management course for charcoal burners. The implementation of the sustainable development mission statement also represent a major challenge for vocational education and training stakeholders. In scarcely any other field of education does the acquisition of competences for sustainable employability skills exert such a major effect on the future viability of economic, technical, social and ecological developments than is the case in companies involved in trade and industry. For this reason, the task vocational education and training is to provide people at all levels from skilled worker to management with the ability to assume responsibility and conduct economic activity in a resource-efficient and sustainable manner whist also shaping globalization in a just and socially acceptable way. Both the inherent insecurities and contradictions involved and the increasing attendant complexity and networking require an expert approach to be adopted (Dettrich, *et al.,* 2009).

7. Strategies for Refocusing Vocational Education in Nigeria in the 21st Century

Ensuring Equality of Access to Vocational Education by all Nigerians

The National Board for Technical Education [NBTE] and the National Business and Technical Examination Board [NABTEB] have already started the process of refocusing vocational education in terms of providing equality of access to all Nigerians. NBTE has done a good job of coming up with a modular curriculum for this aspect of education in Nigeria. The modular curriculum is to make vocational education affordable by all Nigerians irrespective of academic standing. The academically strong persons can go ahead and take all the prescribed modules in an occupational area of interest, sit for the NTC or NBC examinations and head for technical education or higher training at a tertiary education institution, then become professionals later in life. This cadre of personnel will grow up to occupy leadership positions in their chosen occupations.

The academically weak persons are in no way kept out of the programmes. They are free to take as many modules of the curriculum and practice to the level that their abilities may lead them without necessarily taking the NTC or NBC examinations or heading to the challenge of tertiary education. This situation will thereby, ensure an array of categories of workforce for national development. What is left undone here is public enlightenment by NBTE and NABTEB. These bodies need full government support to that effect.

Coping with Possible Enrolment Explosion in Vocational Education Programmes in Nigeria

The question that may readily come to mind in a situation whereby all Nigerians are to have equality of access to vocational education in the country may be "how can the few vocational education institutions in the country cope with the enrolment explosion?" One way of coping with the possible enrolment explosion will therefore, be to allocate more money to the area and have more vocational education institutions established, even though these schools are capital intensive. What is worth doing is worth doing well.

The second way to cope with possible enrolment explosion is to improve the introductory technology education facilities available in the secondary schools to enable the vocational education programmes take-off at the senior secondary schools with the determination to improve the facilities gradually with time. The third way out is to admit students in streams (A, B, C,) and run shifting system at the presently available science and technical colleges in the country, especially in the urban areas where electrical power sources may be readily available to improve lighting at night as well as power machineries and other appliances/equipment. In this way, it is advisable that non-boarding system be employed with morning and afternoon sessions.

Relevant Curricula in Vocational Education

Another way of refocusing vocational education for sustainable national development is to reengineer the curricular offering in vocational education institutions in the country. According to

World Bank and the Nigerian Institute of Social and Economic Research [NISER] (as cited in Ajala, 2002), one of the major causes of declining quality of university education in Nigeria is irrelevant curriculum and poor preparation and presentation of lesson notes by teachers. This point also applies to vocational and technical education. Nigerian educational system has for too long looked at curriculum development as a global project and consequently, almost ignoring her needs. Nigerians can do better at curriculum development if they consider it as a curriculum to first prepare Nigerians to live a happy and satisfying life in Nigeria using Nigerian indigenous technologies and materials; secondly, to prepare Nigerians to live in other parts of the world if they so wish. This situation will make Nigerian vocational education more relevant to the needs of the majority of Nigerians who may be even in the rural areas. There is nothing wrong with learning basket weaving along side the use and maintenance of computers, television, automobiles and so on, provided there is demand for the weaving and use of baskets in Nigeria. Vocational education is expected to prepare people to come up with products or render services in areas of local needs, not only in modem imported technologies.

Relevant curriculum may attract even adult Nigerians who live in rural areas, have less formal education, are unemployed and can benefit from such curricula/training to get enrolled in these programmes. This situation will allow the use of local ideas, tools/equipment and materials which will definitely minimize the nation's dependence on imported modem technologies and products. The situation will challenge the intellect of Nigerians and cause them to reason out ways of improvement on the indigenous materials and technologies and eventually evolve industrialization and sustainable development. This is truly a sign of sustainable development because the local raw materials/tools and equipment can always be made available or sustained. This situation will provide more employment outside farming for our rural populace. The nation's over dependence on imported vocational education curricula has resulted to the present high rate of unemployment even among the vocational education programme graduates. This is so because what is needed by society is not taught/learnt. The time for the re-engineering of the nation's vocational education curriculum is now for tomorrow will definitely be late.

Reviving Handicrafts Subject at the Primary School Level

There is need to revive the handicrafts subject in the primary school curriculum and monitor its teaching/learning. Many Nigerian primary school teachers at present do collect money from the pupils in place of physical handicrafts produced by the pupils. The teachers do so because they (teachers) lack the skills and knowledge regarding the handicrafts and consequently, cannot teach the subjects. They therefore, tend to hide their ignorance and find it very difficult to challenge students. The question is, "should students be given more marks for the demonstration of their ability to perform some skills or for paying more money, which might have not even been earned by them?" The Nigerian primary education system needs to include the study of handicrafts in its curriculum because these aspects of education mark the introduction of the teaching of Nigerian indigenous technologies in the formal school system.

The primary school teachers lack the knowledge and skills in the handicrafts subject because the curriculum used in preparing them lacks these aspects of education. Therefore, just as a bank cannot give out money which is more than what is available in the strong room, the teacher finds it difficult to teach what he did not learn/cover during the teacher education process. There is therefore, need to include this aspect of education in the primary teacher education curriculum to equip the teacher adequately and enable him face the challenge on the field effectively. There is also the need to include effective vocational guidance and counseling using vocational aptitude lessons in the handicrafts lessons. This situation will help inculcate positive attitude towards vocational/technical and Nigerian indigenous technological education among the Nigerian youths during the early part of their formal education.

The inculcation of appropriate attitude towards vocational/technical and Nigerian indigenous technological education in the youths is very important. A battle in which people are being forced to accept training against their wish cannot be won. The Nigerian youths therefore have to be nurtured early in life towards the creation of good society and capacity to compete globally and successfully.

8. Conclusion

The ideal of sustainable development and poverty alleviation, although broad and tinged with ambiguity in its understanding and application, it is still palatable to everybody as it forms the bedrock of government socioeconomic policies and

programmes. For government to solve the problem of widespread poverty, national food deficits, and unemployment, technical and vocational education and training be giving top priority.

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Effects of HIV/AIDS on Smallholder Agriculture and Food Security in Imo State, Nigeria

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Abstract: The HIV/AIDS epidemic is challenging all aspects of the development agenda. The disease has decimated sub-Saharan Africa's agricultural labour force and will continue to do so for generations, depleting the region of its food producers and farmers. Not only is the epidemic causing severe reversals in development gains, but it is making development interventions impractical. Communities livelihoods are being permanently eroded and assets depleted with the reoccurring periods of sickness and deaths that the epidemic brings. Inspite of its incapacitating effects on agricultural production and rural livelihoods, and of the fact that up to 80% of the people-in the most affected countries depend on agriculture for their subsistence, the agricultural sector has not been as forthcoming and as innovative in its response, as the situation requires. Labour, a much valued human asset and the foundation of development interventions, is becoming scare and this lack of labour strains traditional coping mechanisms and increase vulnerability. This paper thus investigation the areas HIV/AIDS has affected food production, and rural livelihood such as depletion of labour, loss of generational knowledge and skills, loss of income, land inheritance rights of women and youth and decreasing nutritional status of households. It also reveals extension role in HIV/AIDS mitigation.
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1. Introduction

Human Immunodeficiency Virus (H1V) which causes Acquired Immune Deficiency Syndrome (AIDS) has emerged as a major problem facing humanity today. It is a wide spread virus that confers stigmatization upon millions of people already infected by it. The cumulative death toll estimates in Nigeria for 2006 stood at 1.7 million. It is a serious health, economic and rural development threatening scourge. Risky lifestyles such as unprotected sex indulgence, that are common among itinerant workers, who spend nights away from homes, endanger and predispose many to this HIV/AIDS infection. There is a linkage between health status of a people upon the emergence of HIV/AIDS, rural development index and the productivity of farm labour (Munonye and Okoli, 2009).

HIV/AIDS is a major threat to rural development and food security because its menace reduces active work force and productivity through diminished and or demise of human labour force. The pandemic has registered a negative impact on economic development through: overwhelmed healthcare system, decreasing life expectancy, deteriorating child survival rate, increasing the number of orphans and the marginalization of surviving widows from land ownership through inaccessibility to land based on local culture and inheritance practices. Thus HIV/AIDS epidemic affects the most active segment of the population between ages 15-49 years, causing great losses to a nation's unrealized economic growth and development potentials in all facets of human endeavour. One of the major issues in rural development is poverty eradication and the fight against hunger. A large proportion of the African population has a lower nutrition status resulting in a higher susceptibility to HIV/AIDS infection. For rural development strategies to be relevant and on course, the role of nutrition and food security in combating the negative effects of the epidemic needs to be addressed effectively. HIV is retrovirus that infects cells of the human immune system and destroy or impairs their function. Infection with this virus results in the progressive depletion of the immune system leading to immune deficiency. The immune system is considered deficient when it can no longer fulfill its role of fighting-off infection and diseases. Immunodeficiency people are much more vulnerable to wide range of infections, most of which are very rare among people without immune deficiency. Diseases associated with severe immunodeficiency are known as opportunistic infections, because they take advantage of a weakened immune system (Munonye and Okoli, 2009).

AIDS emerged against a backdrop of poverty, conflict and inadequate infrastructure. By eroding social capital, its effect has been to make those problems and their consequences far worse. HIV/AIDS has decimated the young generation of young adults poised to take Africa's future into their own hands. There are over 25 million people living with HIV/AIDS. AIDS is not a disease of poverty, and often those first affected by the epidemic are the better educated and more mobile sections of the population. However over time, AIDS and poverty cemented their relationship.

In Nigeria, an estimated 3.6-percent of the population are living with HIV and AIDS. Although HIV prevalence is much lower in Nigeria than in other African countries such as South Africa and Zambia. The size of Nigeria's population (around 149 million) meant that by the end of 2010, there were almost 3 million people living with HIV. Approximately 192,000 people died from AIDS in 2009.With AIDS claiming so many lives, Nigeria's life expectancy has declined significantly. In 1991 the average life expectancy was 54 years for women and 53 years for men. In 2009 these figures had fallen to 48 for women and 46 for men (NACA, 2010).

The first two cases of HIV and AIDS in Nigeria were identified in 1985 and were reported at an international AIDS conference in 1986. In 1987 t
he Nigerian health sector established the National AIDS Advisory Committee, which was shortly followed by the establishment of the National Expert Advisory Committee on AIDS (NEACA) (Adeyi, 2006; WHO, 2008). At first the Nigerian government was slow to respond to the increasing rates of HIV transmission and it was only in 1991 that the Federal Ministry of Health made their first attempt to assess Nigeria's AIDS situation. The results showed that around 1.8 percent of the population of Nigeria were infected with HIV. Subsequent surveillance reports revealed that during the 1990s HIV prevalence rose from 3.8% in 1993 to 4.5% in l998 (Kanki, 2006).

When Olusegun Obasanjo became the president of Nigeria in 1999, HIV prevention, treatment and care became one of the government's primary concerns. The President's Committee on AIDS and the National Action Committee on AIDS (NACA) were created, and in 2001, the government set up a three-year HIV/AIDS Emergency Action Plan (HEAP). In the same year, Obasanjo hosted the Organization of African Unity's first African Summit on HIV/AIDS, Tuberculosis, and Other Related Infectious Diseases (Sofo, *et al.,* 2003). In 2005 a new framework was developed covering the period from 2005 to 2009. Despite increased efforts to control the epidemic, by 2006 it was estimated that just 10 percent of HIV-infected women and men were receiving antiretroviral therapy and only 7 percent of pregnant women were receiving treatment to reduce the risk of mother-to-child transmission of HIV (All Africa 2010).

In 2010 NACA launched -its comprehensive National Strategic Framework to cover 2010 to 2015, which requires an estimated N756 billion to implement. Some of the main aims included in the framework are to reach 80 percent of sexually active adults and 80 percent of most at-risk populations with HIV counseling and testing by 2015; ensure 80 percent of eligible adults and 100 percent of eligible children are receiving ART by 2015; and to improve access to quality care and support services to at least 50 percent of people living with HIV by 2015 (UNAIDS, 2008). Despite being the largest oil producer in Africa and the 12th largest in the world, Nigeria is ranked 158 out of 177 on the United Nations Development Programme (UNDP) Human Poverty Index. This poor economic position has meant that Nigeria is faced with huge challenges in fighting its HIV and AIDS epidemic (UNDP, 2008).

HIV/AIDS has added significantly to the problems of agriculture and food security in Africa by severely affecting subsistence agriculture, where production depends very heavily on labour. Africa is currently experiencing high mortality and morbidity as a result of the HIV/AIDS epidemic. In poor rural households, cause severe labour and economic constraints that disrupt agricultural activities, aggravate food insecurity, and undermine the prospects of rural development (ECA, 2006). The overall result of the impact of HIV/AIDS is a decline in agricultural production and off farm sources of livelihood. There is increasing evidence that all dimensions of food security-availability, stability, access and use of food are affected where the prevalence and impact of HIV/AIDS is high. Food shortages across the sub-region, in 2002 and 2003 resulted in a humanitarian crisis. The main cause of food shortages in the sub-region has been widely identified to be the recurrent drought, but the HIV/AIDS, pandemic was singled out to have exacerbated the situation. HIV/AIDS is rapidly eroding the coping strategies used by communities to survive and recover from frequent drought and natural disasters (All Africa, 2010).

More than 70 percent of people in Africa reside in the rural areas and depend on rain fed smallholder agriculture as the main source of

livelihood. Access to food at household level depends on own production, the availability of income to purchase food and the availability of both formal and informal sources of food transfers. This production or ability to purchase food is made possible by utilizing the livelihood assets essential to their livelihood strategies: human, natural, financial, social and physical capital (Jayne *et al.,* 2004). HIV/AIDS affects the household through its impact on the availability of these assets that are required to undertake agricultural production, the household's ability to generate income and the ability of social support system to meet the household's needs (CHGA 2004).

There exist linkages between HIV/AIDS and smallholder household agricultural production. The household's consistent goal is to maximize well-being in the absence of shocks and stresses such as HIV/AIDS. The standard of living is relatively high given available household resources and an environment conducive to production. Morbidity and mortality of one or more household members can affect each of the livelihood assets resulting in a reduction in the ability of the household to produce and adjust to future shocks. This can result in a multitude of adverse consequences such as lower nutritional status, poorer health, reduced schooling of children, as well as depletion of the productive asset base. The following sub-sections provide more details on the impact of HIV/AIDs on smallholder households.

2. Methodology

The study was conducted in Ezinihitte Mbaise local government area in Imo State. Imo state is in the South-east zone of Nigeria. The state is made up of twenty-seven local government areas out of which Ezinihitte Mbaise is chosen as the study area. Ezinihitte Mbaise was chosen because of the already existing community self help projects in the area. Ezinihitte Mbaise has a total population of about 190,767 persons in 2011. Ezinihitte has fifteen autonomous communities which are Oboama, Akpodim, Owuahia Eziudo, Umuore Eziudo, Ife, Amumara Ihitfe, Obizi, ltu, Chokoneze, Okpofe, Eziagbogu, Udo, Onicha and Umunama. Imo state occupies a land mass of about 5,530squàre kilometers with a total population of about 4,500 987 million persons in 2011. The state shares boundaries in the north with Anambra state, South and West with Rivers state while to the east, it shares boundary with Abia state (IMSG, 2001). Imo state lies between the latitude 5°12' and 5°56North of the equator and between longitudes 6°38' and 7°25' east of the Greenwich meridian. If is located within the south-east zone of Nigeria. The location of Imo State in this zone makes it a strategic commercial center. The people are known for their traditional hospitality, revered as the cradle of peaceful co-existence and famed for their cultural affinity.' lmo state is endowed with abundant human resources. With her central location and abundant resources, the state is an attractive investment center for various types of industries including agro-allied petro-chemical mineral based tourism. Education is the biggest industry in the state (IMSG, 200l). The state has two dominant seasons; rainy and dry seasons. Rain falls between April and October while the dry season starts from November to early March, though rain starts by March. The lbos form the major ethnic groups in the state, Christianity and traditional African. religions are beliefs professed by the people in the state. Imo state falls within the tropical rain forest zone with dense forest in the south and rich savannah in the north (FGN, 2004). Three communities were purposively selected from the study area. The reason for the selection of these communities was because of the existing HIV/AIDS campaign going on in these communities. Thirty respondents were selected from these communities each; giving a sample size of ninety farmers (90). This study made use of primary and secondary data. The primary data were collected by administering questionnaire to the farmers in the selected villages. Oral interview with the informants was also held especially where the information so required did not fit into the questionnaire. The secondary data were collected from journals, magazines, gazette and other relevant materials. Data collected were analyzed using descriptive statistics these include frequency counts and percentages presented in tabular form. These were used to achieve all the objective of the study.

3. Socio-economic characteristics of respondents

Table 1 shows the socio-economic characteristics of the respondents in the study area. About 16.6% are within the age bracket of 41 – 50 years, 11.1% are between 30-40, while 22.2% are within the ages of 61 and years. Then 50% are within 51 – 60 years. This is in fact the active farming age in the study area. They are the majority who are involved in agricultural production. Again, 58.8% have a large family size of between 7-10 members. They are followed by 16.6% who have from 10 members and above. Only about 8.8% have from 1 to 3 individuals in their families. The high number of individuals in a family join hands in working on the farm, this makes for higher productivity as family labour here

is readily available. Furthermore, 54.4% have secondary education, with 25.5% attending terrier education. Only 12.2% and 7.7% have primary school education and adult education respectively. The high number of respondents with formal education (54.4% and 25.5%) secondary and tertiary could be reason for their high level of awareness of HIV/AIDS epidemic in the area. Then 72.2% of the respondents have stayed in the villages for more than 10 years, this could be reason for their knwoeldge of the farming system in the area and changes that takes place over time. Majority (55.5%) are married, while 27.7% are widows, whose spouses may have died of HIV/AIDS related diseases or illness. Greater percentage (52.2%) have no leadership status, while 31.1% and 16.6% have between 1-2, 3 titles. One extension visits, only about 22.6% agreed to have been contacted weekly or forthnightly respectively. These visits explain, why greater number of the respondents are aware of the spread of HIV/AIDS among farming populations. Finally, 80% belonged to social organizations, with 11.1% not belonging. Social organization are agents of socialization through such individuals become fully aware of events in the society. These are in line with Akubuilo (2008) and Mgbada, (2010) who said that a farmer who belongs to many social organizations will tend to adopt innovations more than his counterpart who belongs to few social organizations. Social organizations provide forums where a wide range of topics are discussed. A member of a social organization could have an agricultural problem which he can feely dices with other members of the group. Another may have other interesting experiences about farming which he may wish to share with other members of the group. Furthermore, formal years of schooling are associated with adoption. Farmers who have had formal education are more reception to new ideas than those who are illiterate. They also support the fact that extension agents are the most important source of information to farmers on agricultural innovations and agricultural-related information.

4. Awareness of HIV/AIDS Epidemic among farming population

Table 2 shows that the respondents are aware of the HIV/AIDS scourge n the study area. It could be said that the awareness level of the respondents is very high as indicated by their responses. HIV/AIDS is real has a response percentage of 88.8%, followed by 94.4% who agreed that. It could be gotten sexually response percentage of 88.8%, followed by 94.4% who agreed that. It could be gotten sexually. The respondents agreed that HIV/AIDS campaign is going on using various media. They also agreed that people go for screening on their area. On whether HIV/AIDS is no longer a killer disease, they (88.8%) said that it is false. The above finding is in line with Goe (2005); and Topouzis (1998) who said that the AIDS epidemic is affecting women and girls in increasing numbers. Women and girls make up almost 57% of adults living with HIV in sub-Saharan Africa and are disproportionately affected by HIV across the region. In the past, rates of HIV/AIDS in urban populations were greatly than in rural areas.

Rural areas are considered to be far removed from the epicenter of the epidemic of the epidemic, as they tend to have lower HIV prevalence rates than urban areas. In actual fact, the number of possible people living with HIV may, in absolute numbers, predominate in rural areas. The truth remains that HIV/AIDS is no longer an urban centered or western disease. Finally, Ijioma *et al.,* (2011) showed that Nigerian youths have positive benefit towards the existence of HIV/AIDS in the society. The youths are fully aware that unprotected sex facilitate the spread of HIV/AIDS, and that it is real and a killer disease.

6. Effect on Smallholder Agriculture

Table 3 reveals that HIV/AIDS has serious effect on smallholder agriculture and livelihoods. The table reveals that the greatest effect is that of low yield/productivity with 100% response. This is followed by damaging rural livelihoods with 94.4%, increase work load for healthy member (88.8%), exacerbating poverty (88.8%), loss of physical/financial assets (86.6%) and decrease in area of land cultivated (81.1%). Other effects are decrease in nutritional level or status with 83.3%, reduced time for farm activities, (75.5%), increased demand for casual labour 77.1%, reduced skill labour, 72.2%, less access to food 76.6%, and landlessness with 65.8%. HIV/AIDS also erode farm management skills as shown, by 64.4%, and leads to gender inequality with 55.5%. It also reduces income of farmers.

It is now widely understood that the HIV/AIDS epidemic has a debilitating impact on rural farming households and their livelihoods is developing countries. HIV/AIDS prevalence rates continue to be high in developing countries, especially sub-Saharan Africa. This epidemic has been singled out to be aggravating food insecurity and negatively impact rural livelihood. The above findings are on line with Munonye and Okoli (2009) who posited that the impact of HIV/AIDS now cuts across all sectors of human development

and it poses serious challenge to the survival of several vulnerable poor, whose livelihood depends solely on agriculture. According to FAO (2004), up to 80% of the population in most African countries reside in rural areas and depend on agriculture (crops and livestock) and other natural resource products as a source of livelihood. HIV/AIDS in Nigeria has led to the emergence of health challenges such as the prevalent opportunistic infections associated with it like tuberculosis (21.3%), Cetaceous mycosis (14.6%), candidacies (12.3%), Herpes zoster (7.7%), Herpes simplex (7.5%). Other opportunistic infections include pneumonia (6.5%), urinary tract infection (5.8%), gastroenteritis (5.7%), meningitis (0.7%), lymphoma (0.6%) and others (6.5%). The inception of HTV infection is usually associated with diarrhea (19.3%), weight loss (18.9%), prolonged fever (15.8%), skin rashes (13.3%), loss of appetite (3,8%), lumphadenopathy (3.3%), body weakness (2,9%), anemia (1.5%), vomiting (1.4%), body pains (0.9%), and night sweats (0.7%). The rural and urban communities in Nigeria are now exposed to the danger of HIV (Idigbe *et al.,* 2000), with its attendant socio-economic implications. The socio-economic impact of the disease will be quite enormous in the country if urgent efforts are not put in place now to halt the trend. Idigbe *et al.,* (2000) noted that sero positive rates were highest in the age group 20-49 years followed by the age group 10-19 years, Ninety six percent of all AIDS related deaths occurred in the age group of 20-49 years, and 1.63% in the age group of 1 to 19 years. This result indicated that the epidemic strikes adolescents who are economically and sexually active groups.

In Imo State, the trend is similar. Results showed that those aged between 10 and 6o years constituted 94% HW positive group in the surveyed hospital. These are men (53%) and women (41%) who are in their adolescence and adult age and active in the economy and procreation. About 6.7% of the total number screened for HIV in, Owerri was found to be sero positive and this figure is not significantly different from the national figure of 5.4%. The vulnerability of adults to HIV/AIDS is also buttressed by the facts that the number of new HIV infection estimate for 2006 was 379,600. The infection estimate for children less than 15 years of age was 19.6% while 80.4% represents adults. Thus the active and productive segment of the population was weakened and wasted. This has the consequence on developmental issues. As regards the number requiring antiretroviral therapy (ART) for the year 2006, 17.67% represents children of less than 15 years in age while the productive adult age represents 81.25%. This increasing percentage for adults underscores the need for overhauling Nigeria's healthcare system to contain antiretroviral therapy. HIV/AIDS impact negatively on economic development of a nation coupled with decreasing life expectancy. Studies reveal that for the succeeding generation of children, there is a deteriorating child survival rate. The cumulative death estimates for 2006 was 1.7million, while the number of children orphaned by HIV/AIDS stood at 1,500,000. These orphans with no productive skills will remain liabilities to economic growth and rural development (Hospital Records, 2000).

HIV infections have diminished the resources available for expanding agricultural production and rural livelihoods occasioned by less labour, less capital, lost traditional knowledge, weakened informal institutions and shrunken formal institutions. Agriculture as the largest employer of labour in sub-Saharan Africa, is particularly affected by the HIV/AIDS pandemic. About 70% of Africans and nearly 90% of poor people work primarily in agriculture. HIV/AIDS is depleting the region of its food producers, hitting those who are least equipped to deal with its consequences. The pandemic has become a determining factor of, food insecurity as well as a consequence of food and nutrition insecurity in the region. With the reduction in agricultural labour force in HI1V/AIDS communities, only the elderly and children are often left to carry on with farming. As a consequence, less land is cropped, farmers switch to crops easier to grow, traditional farming knowledge and skills are lost, seasonal crop deadlines are missed, overall production is reduced and farmers' income fall (Hope World Wide Nigeria, 2007).

7. Role of Agricultural Extension in addressing HIV/AIDS

Table 4 shows the roles of extensions in addressing the impact of Technical messages to address specific needs scourge in the study area. Extension will play numerous roles addressing the scourge. Extension will identify and work households living with Technical messages to address specific needs with a mean score of 2.77. Assisting men and women farmers get skills and knowledge with X = 3.11. Share technical advice and information regarding Technical messages to address specific needs (x=2.83), supporting women and men farmers from groups (x=2.66), encourage men and women farmers work together (x=2.88), facilitation of behaviour change in rural areas

(x=3.1), support the families with Technical messages to address specific needs (x=3.11). Encourage income generating activities (3.15), support poverty relief effort with mean score of 2.77, staff training on Technical messages to address specific needs awareness (x=3.22) incorporating Technical messages to address specific needs messages into extension education campaign with x=3.0 as well involving rural youths in extension programmes.

Table 1: Socio-economic characteristics of respondents

Attribute	Frequency	Percentage
30 – 40	10	11.1
41 – 50	15	16.6
51 – 60	45	50.0
61 and above	20	22.2
Household size		
1 – 3	8	8.8
4 – 6	14	15.5
7 – 10	53	58.5
10 and above	15	16.6
Education level		
Primary	11	12.2
Secondary	49	54.4
Tertiary	23	25.5
Adult education	7	7.7
Years in village		
1 – 5	5	5.5
6 – 10	20	22.2
10 and above	65	72.2
Marital status		
Married	50	55.5
Widow	25	27.7
Widower	15	16.6
Leadership status		
Non	47	52.2
1 – 2	28	31.1
3 and above	15	16.6
Extension visits		
Weekly	15	16.6
Forthnightly	20	22.6
Monthly	55	61.1
Membership or organization		
Yes	80	88.8
No	10	11.1

Table 2: Farmers Awareness of HIV/AIDS Epidemic

Statement	True	Percentage	False	Percentage
HIV/AIDS is real	80	88.8	10	11.1
Farmers dead of HIV/AIDS	60	66.6	30	33.3
There are HIV/AIDS victims here	50	55.5	40	44.4
People go for HIV/AIDS counseling	57	63.3	33	36.6
People collect drug free from government	63	70	27	30.0
People haere go for screening	70	77.7	20	22.2
HIV/AIDS is no longer a killer disease	10	11.1	80	88.8
HIV/AIDS only exist in western lands	20	22.2	70	77.7
HIV/AIDS could be gotten sexually	85	94.4	5	5.5
HIV/AIDS campaign is for everyone to listen	74	82.2	16	17.7

Table 3: Effects of HIV/AIDS on Smallholder Agriculture N = 90

Effects	Frequency	Percentage
Reduced income	67	74.4
Increased workload on healthy members	80	88.8
Reduced time for farm activities	68	75.5
Reduced skilled labour	65	72.2
Increased demand for causal labour	70	77.7
Decrease in area cultivated	73	81.1
Leads to less access to food	69	76.6
Erosion of farm management skills	58	64.4
Leads to landlessness	62	68.8
Results in low yield/productivity	90	100
Loss of physical/financial assets	78	86.6
Leads to gender inequality	50	55.5
Decrease nutritional level	75	83.3
Exacerbating poverty	80	88.8
Damages rural livelihoods	85	94.4
Erosion of food security	60	66.6

Table 4: Role of Extension in HIV/AIDS mitigation

Roles	Mean
Identify and work with households living with HIV/AIDS	2.77
Assist men and women farmers get skills and knowledge	3.11
Share technical advice and information regarding HIV/AIDS	2.83
Support women and men farmers form groups	2.66
Encourage men and women farmers to work together	2.88
Staff training of HIV/AIDS awareness and counseling	3.22
Facilitation of behaviour change in rural areas	3.40
Support to families with HIV/AIDS infect members	3.11
Enhance income generating activities	3.45
Support poverty relief efforts	2.77
Technical messages to address specific needs	3.0
Involving rural youth in extension programme	3.5

8. Conclusion

The findings revealed that the respondents make up an active farming population ranging from ages 51-60 with large family size, receive the visits of extension agents. They are aware of the spread and scourge of Technical messages to address specific needs as shown by their responses. The main pathway of impact is through morbidity and mortality-induced loss of labour, loss of income and assets, loss of tenure of land and loss of traditional skills and knowledge. Extension can play important roles in addressing Technical messages to address specific needs by identify an working with households living with Technical messages to address specific needs, encourage men and women farmer to form groups and work together, tailor messages to suit infected household and other measures.

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