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Research Paper

Promoting integrated farming systems and human capacity development for empowering Nigerian youth in sustainable agroforestry

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The study examined skills acquisition training programme of Rubber Research Institute of Nigeria (RRIN), from 2010 to 2015, and the role of RRIN in building capacities for industrial students of higher institutions in Nigeria. Both primary and secondary data were collected and used for the study. Data on students trained by RRIN for 6 years were retrieved from the archives of Extension and Training Division of Research Outreach Department of RRIN. The data collected were analyzed using descriptive statistics such as percentages, frequencies, mean. Findings on human capacity development and capacity building of youth and students in the scheme revealed that OND (30%), HND (18%) and BSc (52%) of the Students developed their skills in rubber-based farming systems. Also, RRIN built capacity for 587 students from 32 higher institutions in Nigeria. Most of the students (52.94%) attributed their preferences for RRIN to development and availability of good training materials, while other students (23.53%) attributed their preferences to dedicated staff of RRIN. These impactful skills' development of industrial training students would prepare men, women and youth entrepreneurially.

Key words: Capacity building, farming systems, human development, industrial Students, rubber.

INTRODUCTION

Mixed farming systems represent an important combination of farm enterprises, cropping systems, livestock, fisheries, forestry, poultry and the resources available to the farmer to raise them for food and/or profitability (Anegbeh *et al.*, 2017). Rubber-based farming systems and mixed farming systems are used interchangeably in this article to mean integrated farming systems.

The economic development of Nigeria depends on the skills, knowledge and capacities of Nigerians. Capacity

building is an integrated approach that is unidirectional i.e. from providers to seekers, is multidirectional and involves the exchange of ideas, best practices, know-how, information and expertise among the range of actors and stakeholders. Capacity building is therefore fundamental to the development of an efficient workforce leading to increased in productivity. The Research Outreach Department of RRIN, which comprises Farming Systems Research, Extension and Training, and Socioeconomic Divisions, plays a major role in increasing food and nutrition security, reducing poverty and malnutrition, improving health and enhancing livelihoods through development of rubber-based farming systems, training of industrial students on integrated farming systems with special focus on integration of high value food crops (cassava, maize, yam, plantain), high-value fruit trees (bush mango, African pear, African Star apple) and medicinal plants with rubber and the production of mini-livestock – snail farming, rabbit farming, beekeeping - under mature rubber plantation). Generally, agricultural sector and the entire supply chain is a complex system that requires meeting the challenges of human development (Akingbade, 2007) as capacity building involves multiple actors such as agricultural researchers and scientists, technical universities, polytechnics, colleges, Non-Governmental Organizations (NGOs), Community Based Organizations (CBOs), government, ministries, departments, agencies, industries, traders and of course the farmers. This paper thus analyzed the capacity building of Industrial Training (IT) students on rubber-based farming system by RRIN between 2010 and 2015 and the efforts of RRIN in human capacity development.

MATERIALS AND METHODS

Requests from higher institutions for training their students industrially were evaluated and Scientists and Technologists of Extension and Training Division of Research Outreach Department of RRIN then developed training schedules which detailed objectives, number of students seeking placements, selection criteria and training modules. The training modules were developed mainly on rubber-based farming systems and also on rubber technologies. Using participatory approaches and the modules developed, RRIN trained the industrial students on rubber-based farming systems, rubber clone development, rubber technologies and value additions.

Primary data collection

The data on the institutions, programmes, frequency of visits and the reasons for visiting RRIN were collected primarily.

Secondary data collection

Information on industrial students trained by RRIN between 2010 and 2015 was purposively gathered and data collected in 32 tertiary institutions (Table 1). Data on the number of students from higher institutions that came to RRIN for Industrial Training between the year 2010 and 2015 were obtained from the Extension and Training Division of Research Outreach Department of RRIN. A structural questionnaire was also developed and administered on a sample of 3 – 10 industrial students in each of the institutions to solicit information on their reasons for choosing RRIN for their Industrial training placements and also their level of satisfaction with the training received in RRIN. The purposive sampling size method was used because of readily availability of data with Extension and Training Division of Research Outreach Department of RRIN.

Data analysis

The primary and secondary data collected were analyzed using descriptive statistics such as percentages, frequencies and means.

RESULTS AND DISCUSSION

Five hundred and eighty seven students from 32 tertiary institutions in Nigeria visited RRIN on industrial work experience scheme and were trained on rubber-based farming systems including agronomy and value additions. The process required the collaboration between tertiary institutions and RRIN. Training programmes for specially-funded project of Common Funds for Commodities (CFC) were also developed separately for rural farmers which are a subject for subsequent publication.

Frequency of institutions' visits to RRIN

The results in Table 1 show the frequency of visits, gender and total number of students trained on rubber-based farming systems from the 32 higher institutions in Nigeria between the year 2010 and 2015. Students who were pursuing the Bachelor of Science (BSc.) programme were consistently higher, from 2010 to 2012, than the students of the other two programmes. However, the number of students decreased from 2013 to 2015 compared to the other years (Figure 1). In other words, the number of students pursuing HND programme was similar from 2010 to 2013, but increased slightly in later year (2014). However, the HND programme lagged behind the other two programmes (Figure 1). These trends reflected the students' differences in the programmes of study.

These preliminary results and discussions are based on data generated from study carried out for 6 years (2010 – 2015) and so any conclusions are tentative and serve as a basis for further research. A sample size of 587 students was trained by RRIN and the institutions with the most frequencies of visits are University of Benin (frq.7), Delta State University (frq.7), Federal Polytechnic,

Table 1. Frequencies of Institutions' visits to RRIN, gender and number of IT students trained.

Institutions	Freq. of visit	Gender		Total no. of students trained
		F	M	
University of Benin	7	18	21	39
National Open University	1	1	0	1
Edo State Inst. of Tech	1	1	0	1
Delta State University	7	43	51	94
Federal Polytechnic, Auchi	7	42	61	103
Edo State College of Agric	1	11	6	17
Rufus Giwa Poly	3	8	7	15
College of Agric. Iguoriakhi	1	61	52	113
ESIT&M	1	28	28	56
University of Port Harcourt	1	3	6	9
Western Delta University	7	1	1	2
FUTO Owerri	5	2	1	3
Federal Polytechnic, Nekade	5	1	1	2
Benson Idahosa University	1	1	1	2
FUTA, Akure	1	1	0	1
Shaka Polytechnic	1	0	1	1
IMT Enugu	1	0	2	2
Covenant University	1	0	1	1
Madona University	1	1	0	1
ESU, Enugu	1	1	0	1
Delta State Poly, Ozoro	1	1	2	3
P.T.I. Effurun	1	2	2	4
FUT Minna	1	1	1	2
Nasarawa State University	2	0	1	1
Cross River State University	1	0	1	1
Osisa Tech. Poly	2	1	0	1
Uni-Zik	1	1	0	1
Land Mark University	1	2	0	2
Ebonyi State University	1	1	0	1
Sapele Tech. College	1	1	1	2
Ambros Alli University	7	55	45	90
F.C.E. Akure	2	2	3	5
Total	**73**	**291**	**296**	**587**

Source: Extension and Training Division of Research Outreach Department, RRIN. 2016.

Auchi (frq.7), Western Delta University (frq.7) and Ambrose Alli University (frq.7). Predictably, the institutions in Edo and Delta States visited RRIN frequently. The observed frequencies are related to the quality of trainers at RRIN (teaching skills), which are required in mentoring students, and the proximity of RRIN to these institutions.

Comparatively, students pursuing the BSc. programme had the highest percentage (52%) during the 6 year period (Figure 2). This was followed by students of OND programme (30%) and HND prrogramme (18%). The number of HND students was consistently and numerically lower than that of the other programme. From 2010 to 2013, the total number of students of the BSc programme continued to increase incredibly, but decreased dramatically thereafter. As the number of students of BSc programme varied greatly with year relative to the other programmes, it was difficult to draw conclusion concretely as to why the consistent decrease in number of students in the later years. When the institutions with the highest number of students trained by RRIN were plotted graphically, it was apparent that the top beneficiary institutions are those located near RRIN's Headquarters (Figure 3). College of agriculture, Uguoriaki benefited exceedingly – had higher number of students trained than other institutions - with 110 students trained in 6 years. This institution was followed by Federal Polytechnic, Auchi (105 students), Delta State University, Abraka (90 students), Ambrose Alli University, Ekpoma (85 students), Institute of training and management (56 students) and University of Benin (39 students). Nearness to RRIN could be the reason why many institutions in Edo and Delta States sent their students to RRIN for training in agreement with Anegbeh *et al*. (2017). The total number of students trained by RRIN increased steadily from year 2010 to 2012 (Figure 4). Although, there was a drop in the total number of students trained in 2013, increased number of students

Table 2. Summary of schools that came to RRIN for IT and the Rating of RRIN by the IT students.

Year	Freq. of Schools for IT in RRIN	Total No. of IT trained by RRIN	Gender		IT students' Programmes			Mean Rating of RRIN by IT Students	% of Programmes		
			F	M	1	2	3		1	2	3
2010	13	65	30	35	3	1	5	5	33.34	17.09	49.57
2011	12	83	32	51	3	1	8	5	27.91	17.09	55.00
2012	15	142	95	47	2	1	9	4.9	22.50	17.10	60.40
2013	12	71	24	47	4	1	7	4.8	33.33	17.09	49.58
2014	7	111	51	60	2	1	4	5	30.24	20.96	48.81
2015	14	115	59	56	6	1	7	5	34.53	16.31	44.17
TOTAL	73	587	291	296	Mean Rating			4.6	30.36	18.00	51.64

Source: Calculated from primary and secondary data. 2016
Note: Programmes: 1 = OND, 2 = HND and 3 = B.Sc.
Mean Rating of RRIN: 1 = poor. 2 = fair. 3 = good. 4 = very good and 5 = excellent.

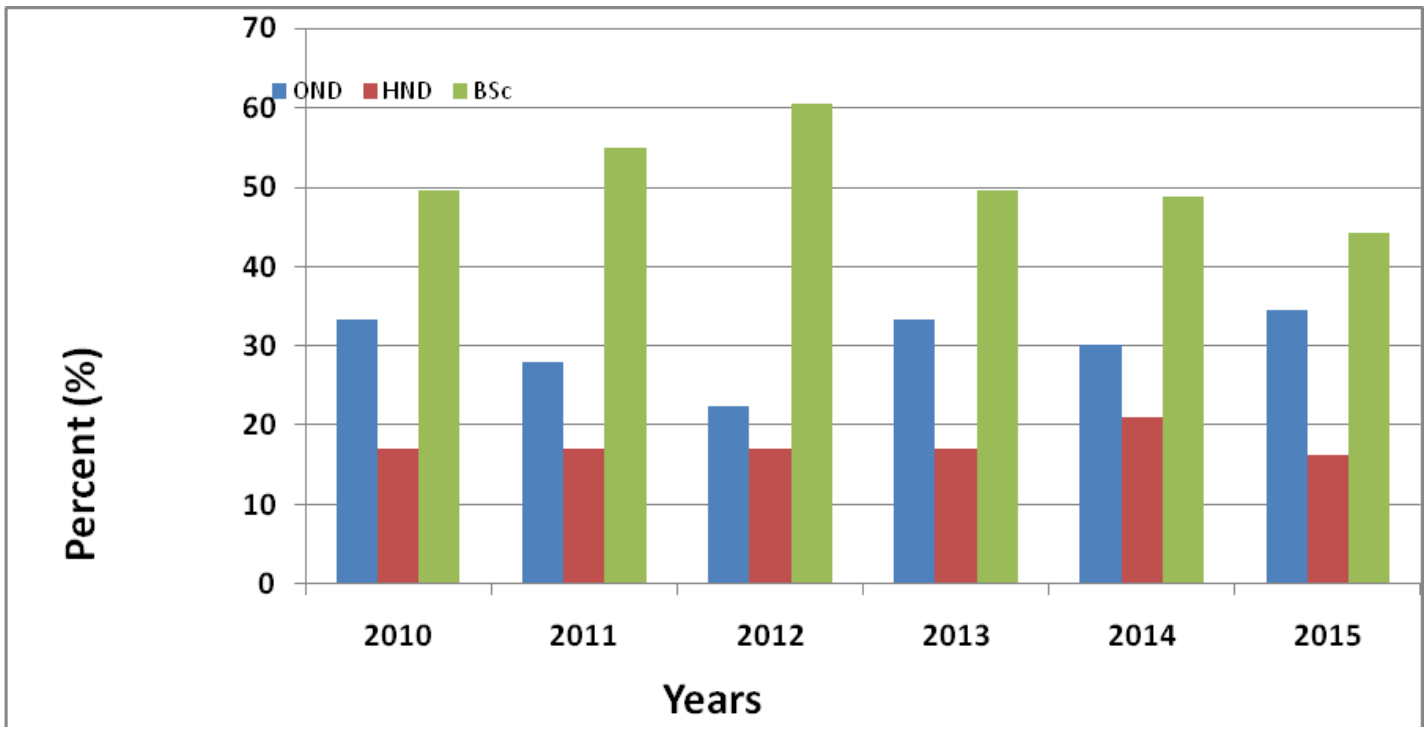

Figure 1. Percentages of Human Development Programmes at RRIN (2010 - 2015).

was again observed marginally from 2014 to 2015 (Figure 4). Remarkably, the year with the highest number of students trained was 2012 (142 students) while the year with the lowest number of students was 2010 (65 students).

Rating of RRIN by the IT students

Table 2 depicts the annual frequency of Industrial Training (IT) students' visits to RRIN and the programmes they pursued in their various institutions. The analysis indicates that a total of 73 visits to RRIN were made between the years 2010 and 2015 by the higher institutions with year 2012 having the highest frequency (15 times), followed by year 2015 (14 times). This high influx of schools to RRIN for industrial training implies that RRIN is a good training Institution for IT students. The least number of visits by the institutions was recorded in 2014 (7 times). Table 2 also indicates the programmes that the students pursued in their different institutions including OND (1), HND (2) and BSc. (3). Outstandingly, the analysis revealed that more than half (51.64%) of the students that came for training at RRIN during the period under review were pursuing their

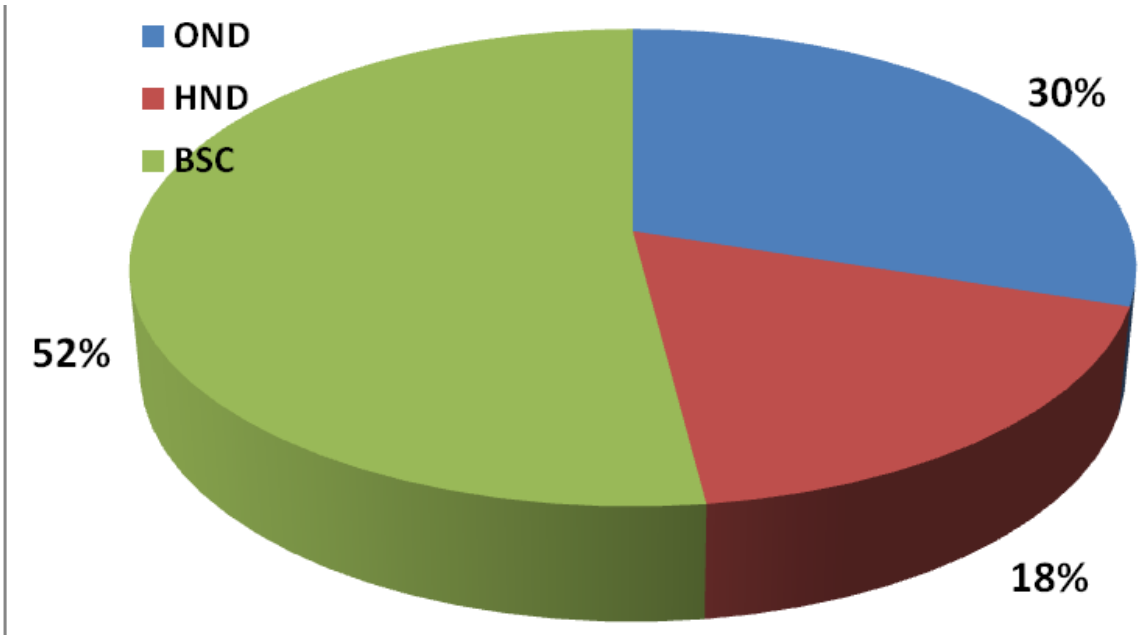

Figure 2. Cumulative Percentages of Human Development Programmes at RRIN in 6 Years (2010 - 2015).

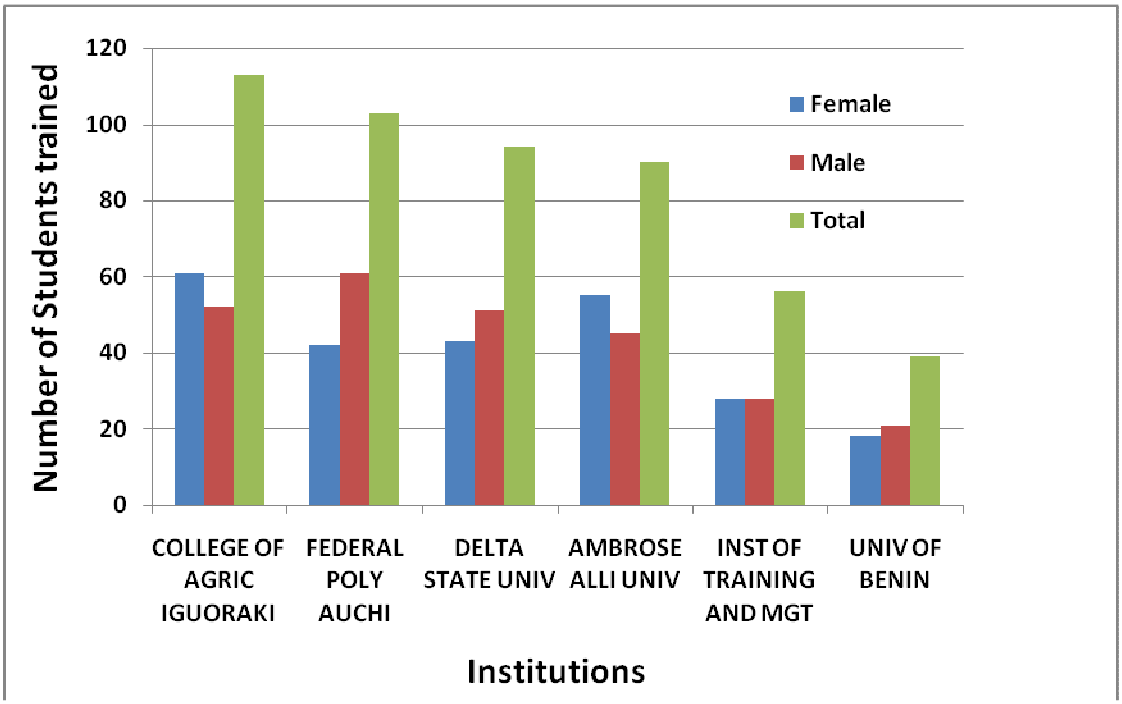

Figure 3. Top beneficiary institutions (2010 -2015).

degree programmes (B.Sc); this was followed by those pursuing OND (30.36%) and HND (18%). The capacity building results were encouraging and suggest that further research be conducted on farmers' training at RRIN. Finally, the study clearly showed the importance of using rubber-based farming systems in the dissemination of agricultural information and consequently in human development in Nigeria. These results are in line with previous authors who advocated rubber production as means of poverty reduction (Etubi, 2015) and rural development (Sam, 2014). However, further studies are needed on boosting innovations in agriculture (Michael,

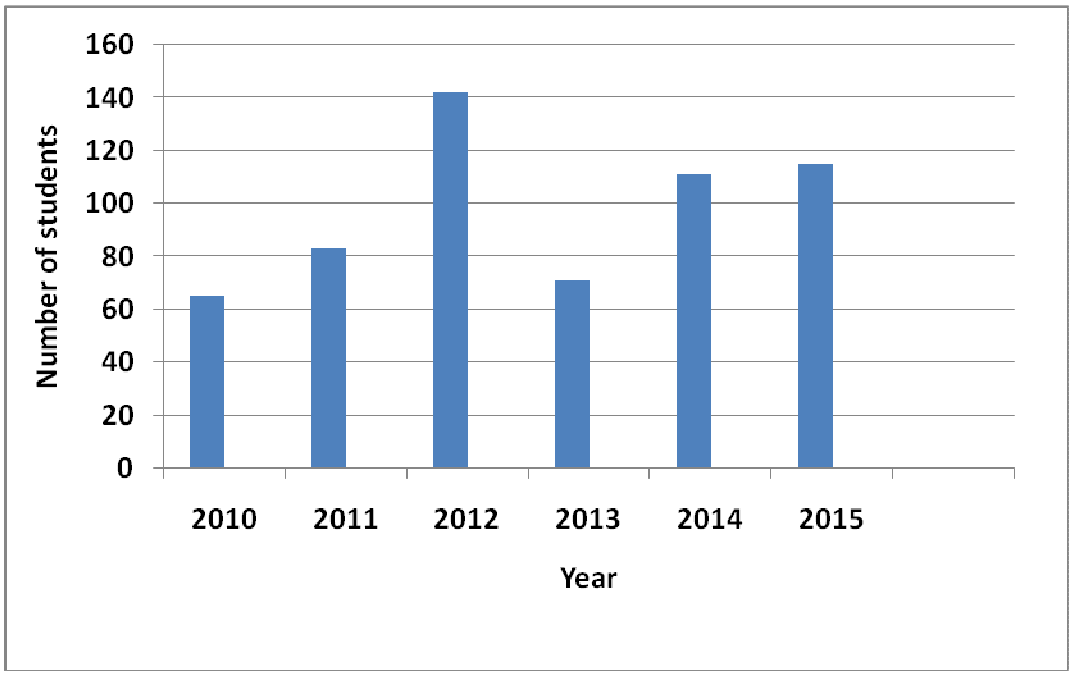

Figure 4. Total number of Industrial students trained by RRIN in six years (2010-2015).

2011), Improving dissemination methods of information to farmers (Orojobi, 1980), through Extension and Outreach Programmes (Linder and Dolly, 2012) of knowledgeable and practicable means (Davis, 2008) and through volunteer farmer trainers (Lukuyu *et al*., 2012).

Conclusion

Human resources are an important part of the entire cycle of sustainable development, from the establishment and maintenance of high-value food and tree crops to the proper harvesting, processing and marketing of their products and services. Capacity building and skills development is relevant to all our stakeholders, individually and as groups, from poor communities that live in rural area, to scientists, private sector businesses, and policy makers at all levels. Rubber Research Institute of Nigeria offered enormous and tremendous training on rubber-based farming systems, rubber technologies and value addition to industrial students from higher institutions in Nigeria. The results of these studies have greatly indicated and confirmed the role of RRIN in human capacity development with special emphasis on rubber-based farming systems. Although these results are very preliminary, they afford an interesting insight into training of manpower and the roles of RRIN in human capacity development. Clearly, this training has added a new depth of understanding to some fundamental principles of mixed farming systems. It is the expectation of the trained students that participating institutions continue to collaborate with RRIN for training on rubber-based farming system as a key to human and economic development. Future collaboration is therefore planned and would build on the existing strong links between RRIN and Higher institutions in Nigeria in rubber-based and integrated farming systems. This collaboration is appropriate since rubber-based farming systems have not been taught, and a vacuum in knowledge exists in this area, in higher institutions. Also, gender and farmers are important considerations in future work. The trained students will in future lead efforts to enhance food security and increase rubber raw materials production, value additions and reduce poverty and hunger in Nigeria.

Recommendations

(1) Identification of training needs should continue to be carried out professionally in line with the attainable and measurable objectives of the training.
(2) Training of manpower in rubber-based farming systems should be given priority by the Federal Government in view of the numerous applications of rubber in Nigeria.
(3) Teaching of rubber-based farming systems in higher institutions, as Nigeria has focused on agriculture as sustainable measures to economic growth, should be emphasized.
(4) Essential tools and equipment should be procured for Extension and Training Division of Research Outreach

Department of RRIN in line with modern trends.
(5) Adequate infrastructure, with special focus on good access road, stable water and power supply, should be provided in order to achieve success in vestibule training.
(6) RRIN should be empowered to provide comprehensive training in order to produce knowledgeable and skill manpower in the area of rubber-based farming systems.
(7) Adequate budgetary allocations for Extension and Training Division of RRIN and the appropriation and release of such funds should correspond with the way it is orchestrated.
(8) Consistent efforts for sustainability should be ensured.

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