



## YOUTH PARTICIPATION IN AGROFORESTRY PRACTICES IN NIGERIA: PROBLEMS AND PROSPECTS

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### ABSTRACT

*This paper examines the various types of Agroforestry systems that can be practiced by the youth in Nigeria. However, the paper pinpointed lack of access to knowledge, information and education, poor socio-cultural orientation towards agroforestry technology, limited access to land, lack of capital and financial support as well as poor culture of entrepreneurship as the major problems and challenges that have made the youths to be unable to participate in agroforestry sector as effectively as supposed in Nigeria. Meanwhile, in exploiting the full potential of Agroforestry for youth participation in Nigeria, a range of prospects are inherent which include: (i) increased variety of food (ii) increased variety of farm products (iii) Creating more employment opportunities to absorb an ever increasing labour force and a lot more. The paper concludes on the premise that Nigeria has a great prospect in making the agroforestry sector's ample potential to provide income-generating opportunities for youth if some problems hindering the youth participation are overcome.*

**Keywords:** Prospects; Youth participation; Agroforestry Practices; Nigeria

### INTRODUCTION

Over the past decades, youth empowerment has not only dominated the centerpiece of academics, it is long perceived to be the most serious socio-economic problems confronting the country which has led to increased militancy, violent crimes, kidnappings, restiveness and socially delinquent behaviour. For instance, Ajufo, (2013) and Adejumola and Tayo-Olajubulu (2009) rightly observed that unemployment has been identified as one of the major causes of social vices, including armed robbery, destitution, prostitution, political thuggery, kidnapping and many more.

However, Nwaogwugwu and Obele (2017) observed that youths have been noted for their unique capabilities and they could constitute a formidable force in agricultural production activities in any nation. Nigeria is regarded as the most populous country in Africa. In Nigeria, about 45,400,000 of the estimated 150 million populations are

youths. Onyeoziri (2002) revealed that about 61% of the estimated population of Nigerian youth lives in rural areas while about 39 per cent are in the urban centres.

Agroforestry is the system that combines sustainable agriculture production with trees and have the advantage of assisting in alleviating the negative effects of deforestation by stimulating natural forest cover through the cultivation of trees (Asase and Tetteh, 2010; USDA, 2013). Besides increasing tree cover in agricultural landscapes, a wide variety of products such as timber, firewood, fruits, vegetables, spices, resins, and medicines, can be derived in order to provide rural livelihood sustenance to forest dependent communities, particularly small holder farmers (Roshetko, 2007). If the youths are involved in the ongoing growth process, they need to engage with their basic personal and social needs to be safe, feel cared for, be valued, be useful, be

spiritually grounded, and to build skills and competencies that allow them to function and contribute in their daily lives. Agroforestry was the key development that led to the rise of human civilization; with the husbandry of domesticated animals and plants (crops) creating food surpluses that enabled the development of more densely populated and stratified societies.

According to the World Bank indicator, employment in agroforestry in Myanmar was reported at 49.93 % in 2017. With a world population that is growing exponentially, it is estimated that we will need to produce 70% more food to keep up with the growing demand. Feeding the world will definitely be a daunting task, with the world population projected to swell to over 9 billion people in the next 30 years. A cursory look at agroforestry practices in the world has revealed that the agroforestry sector has ample potential to provide income-generating opportunities for youths if some problems hindering the youth participation are overcome. In a similar contribution by Nair, (1979) forests provide economic, social and environmental benefits and represent significant cultural and human values. The specific nature of particular forest ecosystems is determined by the local, regional and global climate, by different soil properties and water regimes, and by a great diversity and dynamic flux of flora and fauna. Human influence is also a major factor that affects the extent, resilience and biodiversity of forests (Hens, 2006). It determines how close to nature the forests are and what their economic and social potential is at a given time and place. Human beings benefit from protecting and managing the forest sustainability, just as they suffer from its misuse and destruction (Gbadebo, 2012).

Youths are regarded as the future leaders of tomorrow and they should be acknowledged as the bedrock on which the society is anchored. They are possibly and essentially the utmost asset for a country's development (UN: 2007). Therefore, any

society or country that plays with the welfare and development of its youths could be said to be playing with its future and survival (Alanana 2003). Unfortunately, in Nigeria, the youths have not only been abandoned and left to their fate but have been challenged by so many ills, among which are spiral unemployment and abject poverty. Unemployment breeds social alienation and frustration among youths which can become a catalyst for criminality and violence.

Youths are also more likely to live in poverty, considering the situation of unemployment among youths. They continue to face challenges related to unemployment, underemployment and poverty. In many ways the lives of young people are more complex and challenging than ever, in most countries they are also more varied, full of opportunities, than in the past. (Rechel Nugent 2005).

### **The Meaning of Agroforestry**

Agroforestry was formally outlined in the early 20th century by American economic geographer J. Russell Smith in his book "Tree Crops: A Permanent Agriculture" (1929). The concept 'agroforestry' is widely used today. Numerous international organizations and authors have put forward various definitions; for instance, International Council for Research in Agroforestry (1982) defined agroforestry as a collective term for systems and technologies of land use where perennial woody plant (trees, shrubs, scrubs, and by assimilation, plant and bamboos) are deliberately cultivated on ground otherwise used for crops and/or stock rearing in a spatial or temporal arrangement, and where there are interaction at once ecological and economic between the woody plants the other components of the system. Torres (1983) attempted a definition of agroforestry as "a deliberate combination of trees with crop plantation or pasture, or both, in an effort to optimize the use of accessible resources to satisfy the objectives of the producer in a sustainable way".

Gordon *et al.* (199), gave a fairly accurate definition of agroforestry, an approach to land use that incorporates trees into farming systems, and allows for the production of trees and crops or livestock from the same piece of land. However, the term agroforestry for social scientists, represents a combination and interrelationships between people, domestic animals, crops and trees, designed to rehabilitate land or to sustain and increase production of certain desired social benefits ICRAF (2006). Thus, Agroforestry concerns the structure and functioning of the human ecosystem and not merely the biophysical system (Khot, 1999). According to ICRAF (2006), agroforestry presents a dynamic, ecologically based, natural resources management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels.

Agroforestry is a concept which synthesis practical ancestral experience and technical expertise that is why International Council for Research in Agroforestry (1983) ICRAF opined that it is a sort of concept that tackles relationship between the presence of micro-organism in the soil which permits or facilitates mineral activity (domain of physiologist) and influences not only the yield of the perennials (domain of forester) but also often that of crops that are associated with them (domain of agronomist) and possibly their mineral composition, their taste and their market price (domain of economist). Consequently, forest industries form the economic core of the forestry sector and remain the major means of realising the economic value of forest resources. In terms of economic revenue, the leading value chain is timberland management/logging enterprise/forest products industry. Increasingly, however, forests are being managed for their ecological, biological, social and environmental values.

### **Youth Unemployment: A Phenomenon**

Globally, there is a projection of the world population to reach 9 billion by 2050 International Labour Organisation (2010). The number of young people (aged 15 to 24) is also expected to increase to 1.3 billion by 2050, accounting for almost 14 percent of the projected global population (ILO, 2010). Most will be born in developing countries in Africa and Asia, where more than half of the population still live in rural areas (UNDESA, 2011). Youth continue to face challenges related to unemployment, underemployment and poverty. Despite the agroforestry sector's ample potential to provide income-generating opportunities for rural youth, challenges related specifically to youth participation in this sector – and, more importantly, options for overcoming them – are not extensively documented. Furthermore, statistics on rural youth are often lacking, as data are rarely dis-aggregated by important factors such as age, sex and geographical location (Soeze, 2006).

### **Types of Agroforestry Systems that can be Practiced by the Youth in Nigeria**

Basically, there are three types of Agroforestry systems. They include:

**Agrosilviculture**(Combination of Crop and Trees): This is a system that incorporates or manages land for the production of agricultural crops and forest products.

**Silvopastoral** (Combination of Pasture/animal and Trees): It is an agroforestry system that combines together rearing of animals with production of forest product which in turn produces both wood products and livestock.

**Agrosilvopastoral** (Combination of Crops and Pasture and Trees): This agroforestry system involves the mixture of the two systems mentioned above. In essence, it is an agroforestry system that incorporates or utilizes the land for the production of forest product, agricultural crops and animal rearing which then produces tree products, crops, and livestock. However, there are other different systems that can be practiced.

The following agroforestry practices can be ventured in by the youth. The following various Agroforestry that can be practiced by the youth. These include:

### **Taungya Farming**

Taungya is an agroforestry system which originated from Burma in the early 1860s and was introduced in Nigeria at Sapoba in Edo State in 1926 (Adedire, 1992). It involves the cultivation of annual crops among young trees until the tree canopy closes over the crops and deprives them of sufficient sunlight. This is an agroforestry practice the youth can practice which involves planting food crops with trees in a unit area of land for 2-3 years. The system has proved effective in providing food for forestry workers and forage for cutting by cattle rearers (Igugu and Osemeobo, 1995).

### **Integrated Taungya**

System is similar to Taungya farming, but here, when the tree canopy is closed, grazing of livestock under the tree takes place instead of raising agricultural crops. The integrated approach aims at invoking the idea of land use practice whereby the activities on the land is stretched all the year round (Rander, 1988).

### **Shelterbelts**

Shelterbelts is a form of agroforestry system that strips of vegetation, planted against the wind direction, which help to reduce wind speed, erosion, evaporation, as well as damage to farmlands, livestock and settlements (Ekwebelem, 1988; Oboho and Onyia, 1992). The trees and shrubs are planted in one or more rows at right angles to prevailing winds. The practice often increases crop yield because of their beneficial effects on soil and microclimate. The effect on animals is to reduce stress from heat and wind. This type of agroforestry is also known as parkland farming (Spore, 2000a). This system is mostly practiced in the savannah regions and particularly in Nigeria. It is a common land use system whereby trees are deliberately retained on cultivated or recently followed land.

### **Windbreaks**

Windbreaks are double rows of trees that are planted around the boundary of a food crop farm on the windward side. Each windbreak is 150 m long with 100 trees planted at an escapement of 3m x 3m. The advantage is that windbreaks reduce wind erosion and at the same time produce forest alongside food crops.

### **Home Garden**

Home garden is not a formal practice of Agroforestry but a traditional farming system with an Agroforestry focus. This is a type of agroforestry that involves multiple cropping, or multiple purpose trees planted on permanent compound farms (Gatahum et al, 1987, Okafor and Fernandes, 1987). More than five crop types are often intercropped on a small farmland with some economic trees. This practice has helped in providing not only food, but also vegetables, fruits and medicine.

### **Alley-cropping (hedgerow inter-cropping)**

It involves the cultivation of food crops such as upland rice, maize, yam, cassava and cowpeas, in alleys between rows of fast-growing leguminous trees or shrubs (Ong, 1994). This system recognizes multipurpose use of trees, and tree species are selectively retained, and periodically pruned to prevent shading of the food crops. Oboho *et al.* (1992) noted that the trees supply litter for nutrient recycling, help in suppressing weeds, as well as control of soil erosion. This is a relatively new technique developed by scientists at the International Institute for Tropical Agriculture (IITA) and International Council for Research in Agroforestry in the late 1970s.

### **Alley farming**

Trees, shrubs and other perennials are planted with agricultural crops to supplement the woody plants in the rows. It is focused on livestock production. Alley farming was designed mainly for sheep and goat grazing. The advantages are that the land provides crop residues and controls soil erosion through windbreak. Major

disadvantage is the competition of hedgerows with crops for soil water, which is often limiting crop productivity (Singh et al., 1989).

### **Multipurpose trees on cropland**

(Trees on farmland or farm forestry): In this type of agroforestry system, farmers intentionally leave few trees on farms when clearing the land in the practice. The trees commonly left are those of economic importance to the farmers. There are also deliberate planting of desirable fruit bearing trees (fruit trees) on farmlands where the density of the natural tree is low. Other terms with Forestry endings are community forestry, a form of social forestry which refers to tree planting activities undertaken by a community on communal lands or the so-called common people's direct participation in the process, either by growing trees themselves or by processing the tree products locally.

### **Aquaforestry**

Aquaforestry is a practice that links trees with aquaculture. This is a system whereby trees or woody perennials are planted in or by water bodies such that the leaves of the trees are shedded into the water, for the aquatic animals to feed on. Trees are planted around fishponds to provide fodder for herbivorous fish. Adedire (1992) has done some research work on aquaforestry in different parts of southern Nigeria, and reported that it is practiced mostly by the rural communities around rivers, ponds and pools. He further observed that mangrove plants are used as niches for rearing crabs and prawns. He further noted that this can be extended to other parts of the country, wherever sheets of water exist. By implication, the youth all over the country can practice it.

### **Apiculture (api-silviculture)**

Carefully chosen woody species grown for their nectar-producing flowers and pollen valued by bees can boost wax and honey production. If flowering is staggered, allowing the bees to work as long as there

are flowers instead of only working for a few months in a year.

### **Protein Bank**

Woody perennial vegetation judiciously used helps to supply forage during dry seasons or years of low rainfall. Not only does it provide green forage when the grass cover has withered but it can also supply more protein than grass. The advantage of woody plants in the dry season is therefore both quantitative and qualitative.

### **Problems Associated with Youth**

#### **Participation in Agroforestry Practices in Nigeria**

Agroforestry is an integral part of Nigerian economy and it has been one of the activities that can enhance its development. However, the Nigerian youth participation/involvement in agroforestry practices is relatively low, poorly managed and generally under-utilized; this could be seen as the reason why its enormous resources and benefits are untapped. This is because lots of problems and challenges are standing as stumbling blocks against the participation of the youth in agroforestry practices in Nigeria.

#### **Lack of access to knowledge, information and education**

One of the major challenges militating against youth participation in agroforestry practice is the lack of access to information and education. The problem of lack of access to vital information and knowledge about agroforestry practices is a serious challenge facing youth participation and involvement in various agroforestry practices outlined above. It is important to note that agroforestry practice is an important entrepreneurial endeavour for the youth and as such, its knowledge and education is crucial for addressing the main challenges the youth face in agroforestry. It will be difficult for the youth to key properly in agroforestry practices in a situation where they lack adequate knowledge and information on it.

It is widely documented that education is key to overcoming development challenges in rural areas. It could be rightly said that there is a direct connection between food security and education of rural children, meanwhile it has also been shown that basic numeracy and literacy skills help to improve farmers' livelihoods (FAO, 2007). In order for the youth to participate fully in agroforestry practices affecting them directly, in terms of access to markets and finance as well as green jobs and land, they need to receive appropriate information and education. Agroforestry training and education must also be adapted to ensure that graduates' skills meet the needs of rural labour markets. Case studies from Cambodia, Uganda, Saint Lucia, Pakistan, Madagascar, Brazil, Ghana, Kenya, Rwanda and Zambia illustrate innovative ways of making this happen.

#### **Poor socio-cultural orientation towards agroforestry technology**

Agroforestry has become a global business but the ability to utilize it to affect sustainable development in any country will largely depend on how much the people, particularly the youth, realize the agroforestry potentials in their domain. For instance, various agroforestry initiative technologies such as snail and grasscutter domestication technology, among others have been developed by Forestry Research Institute of Nigeria which can be practiced by the youth. However, the Nigerian youth has a very poor orientation on the agroforestry viability of many of the unique socio-cultural practices. Hence, much attention has not been geared towards the practice of these technologies due to poor orientation youth have about these technologies. In some instances, there are some cultural beliefs and superstitions which hinder the practices of technologies (Banjo *et al.*, 2020).

#### **Limited access to land**

Other noticeable challenges facing the Nigerian youth in participating in agroforestry practices are the problem of limited access to land. Generally, problems

associated with access to land are fundamental to starting an agroforestry business, it can often be difficult for young people to attain. This can be as a result of inheritance laws and customs in many parts of the country that often make the transfer of land to young men and women problematic, and so are in need of amendment. The implication of this is that both male and female agroforestry entrepreneurs are severely affected and would-be agroforestry entrepreneurs will not have the opportunity of venturing into agroforestry practices. Therefore, there is a need to put in place loans and leasing arrangements through which youth gain access to land. Instances from countries of the world namely Philippines, Burkina Faso, Ethiopia, Mexico, Egypt and Uganda have highlighted possible means of improving youth's access to land.

#### **Lack of Capital and Financial Support**

Also connected with limited access to land is lack of capital and finance support. Capital and finance are the backbone of any investment. However, in a situation where this is not available, it will be difficult to practice a viable agroforestry venture. In Nigeria, notwithstanding existing policies on financial support rolled out by the government for small businesses, very few entrepreneurs receive financial help when they need it. This could be the reason why Ikechi and Edward (2009) cited concluded that small business assistance from governments of African countries are weak and inadequate. According to them, most financial service providers are reluctant to provide their services – including credit, savings and insurance – to youth due to their lack of collateral and financial literacy, among other reasons.

#### **Poor Culture of Entrepreneurship**

It is noteworthy that agroforestry is an important entrepreneur endeavour for the youth as such, its development is tantamount to the development of the entrepreneur sector. The culture of entrepreneurship is rather lacking in Nigeria (Olatunji and Ejalonibu, 2014) and

this has been the reason why Nigerian youth are still at the negative end in terms of agroforestry business and practices. There are even new and improved technologies relating to agroforestry business innovated by the Forestry Research Institute of Nigeria (FRIN) that the youth can venturing in as a means of empowerment, livelihood and as well as food security for the country. According to the FRIN Innovative Technologies and Research Breakthrough Guide compiled by Forest Economics and Extension Department (2019), the following are some of innovation the youth can key in: domestication of cane rat, making of wood-plastic interlocking, domestication of snail, production of biofortified African natural black soap, production of moringa soap and oil.

### **Prospects of Youth Participation on Agroforestry in Nigeria**

Taking into consideration the awareness among farmers on multiple land use management, the need to improve on the existing agroforestry practices becomes necessary in the face of increasing population and limited nature of land (Alao *et al.*, 2013). Agroforestry has a range of benefits that if properly harnessed will not only be beneficial to an individual, organizations, local communities but will also serve as a viable source of economic growth and employment generation of the country. Apart from being a viable economic opportunity for the youth, agroforestry can also be a viable tool in tackling youth restiveness in the country.

### **Increased variety of Food**

One of the benefits of youth participation in agroforestry enterprises is that it leads to an increase in variety of food. This is in agreement with the findings (Arma-Klamesu, 2000) which reported that a total of 12 crop types, and 10 tree types, were cultivated and/or protected by the farmers in Gwagwalada. Moreover, five varieties of local animal species were reared. Unequivocally, the products from all these will further augment the food situation of

the communities. A clue that it could be inherently taken from this is that these different food varieties had been made possible through the involvement of farmers in agroforestry.

### **Increased variety of farm products**

Bearing in mind that agroforestry is the combination of crops and forest, it therefore enables more crops to be cultivated on the same piece of land. Furthermore, since agroforestry should naturally involve two or more species of crops and sometimes combined with animals, the practice would therefore enable the cultivation of many more species, unlike the conventional cropping, and forestry (Raintree *et al.*, 1984; Falconer, 1990; Backes, 1999).

In sum, Nigerian has a great potential for agroforestry enterprise could be used to enhance the development of youth empowerment as this would go a long way in tackling youth restiveness and in making the country reap the gains and experience sustainable development. The following are some prospects opened to the youth in venturing into agroforestry practices, systems or technologies in particular as well as the country in general.

- a) Create more employment opportunities to absorb an ever increasing labour force.
- b) Preserves and conserves the vast forest resources of the country.
- c) Promotes and encourages active private sector participation of the youth.
- d) Revives the development of the art of entrepreneurship in the youth.
- e) Promotes rural-urban integration and redistribution of wealth.

### **CONCLUSION**

In conclusion, this paper has made efforts to describe various types of agroforestry practices that the youth can participate in to the advantage of them in particular and the country at large. While the paper believes that youth participation in the agroforestry sector has not been adequately tapped in

Nigeria despite the availability of potentials due to some problems outlined. This paper however, contends that all hands must be on deck to tackle those problems challenging the youth participation in the agroforestry sector in the country. Nevertheless, making the youth engage in these various

agroforestry practices will not only go a long way in absorbing an ever increasing labour force in the country but also in developing an appropriate culture of entrepreneurship among the teeming young population of the country.

## REFERENCES

- Alanana, O.O. (2003) Youth Unemployment in Nigeria: Some Implications for the Third Millennium. *Global Journal of Social Sciences*, 2, 21-26.  
<https://doi.org/10.4314/gjss.v2i1.22763>
- Ajufo, B.I, Asase A, Tetteh DA (2010). The role of complex agroforestry systems in the conservation of forest tree diversity and structure in southeastern Ghana. *Agroforestry Systems* 79:355-368.
- Alao, J. S. and Shuaibu, R. B. (2013). Agroforestry practices and concepts in sustainable land use systems in Nigeria. Department of Social and Environmental Forestry, College of Forestry and Fisheries, University of Agriculture, Makurdi, P. M. B. 2373, Makurdi, Nigeria.
- Atangana, A., Khasa, D., Chang, S., & Degrande, A. (2014). Tropical agroforestry. Dordrecht: Springer Science+Business Media.
- Clark, K.H.; Nicholas, K.A. (2013). Introducing urban food forestry: a multifunctional approach to increase food security and provide ecosystem services. *Landscape Ecology*, 28(9): 1649–1669. doi:10.1007/s109800139903z.
- FAO. (2003). Forestry outlook study for Africa: regional report for opportunities and challenges towards 2020. FAO Forestry Paper 141. FAO, Rome.
- Gbadebo J. Osemeobo. (2012). An Analysis of Farmers' Participation in Agroforestry Under Traditional Land Use Systems in Nigeria Pages 223-234 | Published online: 05 Apr 2012
- Grenier, L. (1998). Working with Indigenous Knowledge: A Guide for Researchers. International Development Research Centre, Ottawa, Canada, 82 p.
- Hens, L. (2006). Indigenous knowledge and biodiversity conservation and management in Ghana.
- ICRAF (1997): International Centre for Research in Agroforestry. (ICRAF) Medium Term Plan 1998-2000, 1- 5pp.
- ILO (International Labour Organisation). (2010). Global Employment Trends for Youth - 2010
- Jeffrey, C. (2008). 'Generation Nowhere': rethinking youth through the lens of unemployed young men. *Progress in Human Geography*, 32(6): 739-758.
- Kathleen L. Wolf, (2007). Trees and Youth in the City: Research on Urban Forest Stewardship & Positive Youth Development. University of Washington, Forest Resources; Seattle, WA kwolf@u.washington.edu
- Lepofsky, D. (2009). The past, present, and future of traditional resource and environmental management. *Journal of Ethnobiology*. 29(2): 161–166.
- Nugent, Rachel (2005). Youth in a Global World. Washington, DC: Population Reference Bureau.
- Nwaogwugwu O.N, and Obele K.N. (2017) Factors limiting youth participation in agriculture-based livelihoods in Eleme local government area of the niger delta, Nigeria
- Onyeoziri, F. (2002), Alternative Policy Options for Managing the National Question in Nigeria. Ibadan: John Archers Ltd.



- Otegbeye GO (2002). Report on Agroforestry and Land Management Practices, Diagnostics Survey of Katsina State of Nigeria. May 2000, Katsina State Agricultural and Rural Development Authority. Katsina. P. 89.
- Oyewole S. O., Dahunsi O. M. and Akintola A. L. (2015). Socio-economic assessment of farmers' participation in agroforestry system in Ekiti State, Nigeria Forestry Research Institute of Nigeria, Federal Ministry of Environment, Forest Hill, Jericho, Ibadan, Nigeria.
- Onyeoziri ICC. (2000). Empowering the Youth. Omega Ex 1 Consults Publishers, Maiduguri. Pp. 5-6
- National Planning Commission. 2012. National Economic Empowerment and Development Strategy (NEEDS). Abuja, National Planning Commission. Pp.1-47
- Punch, S. (2015). Youth transitions and migration: negotiated and constrained interdependencies within and across generations, *Journal of Youth Studies*, 18(2): 262-276.
- Soeze S. (2006). The Youth and National Building. The Daily Independent, Thursday, February 16th. P.35
- Torres, F., (1983). Agroforestry: Concepts and Practices. In: Agroforestry Systems for Smallscale Farmers, Hoekstra, D.A. and F.M. Kuguru (Eds.). ICRAF/BAT, Nairobi, Kenya, pp: 27-30.
- Roshetko, J.M., Nugraha, E., Tukan, J.C.M., Manurung, G., Fay, C., van Noordwijk, M., (2007). Agroforestry for livelihood enhancement and enterprise development. In: Djoeroemana, S., Myers, B., Russell-Smith, J., Blyth, M., Salean, I.E.T. (Eds.), Integrated Rural Development in East Nusa Tenggara, Indonesia (ACIAR Proceedings NO. 126). Pp. 137-148.
- Manurung. (2004). Agroforestry Innovations and Livelihood Enhancement in West Java. Final Report January 2003- September 2004. The World Agroforestry Centre (ICRAF), Winrock International and the Indonesia Institute for Forest and Environment (RMI). Bogor, Indonesia.
- Rossier, C. and Lake, F. (2014) Indigenous Traditional Ecological Knowledge in Agroforestry. USDA National Agroforestry Center and US Forest Service, S.W, Washington DC.
- UN (United Nations), (2007). Young People's Transition to Adulthood: Progress and Challenges. Department of Economic and Social Affairs Youth World Youth Report 2007.
- UNDP (2014). Empowered Youth, Sustainable Future. UNDP Youth Strategy 2014-2017. New York: United Nations Development Programme.
- UNFPA (2014). State of World Population: The power of 1.8 billion: Adolescents, youth and the transformation of the future. New York: United Nations Population Fund.
- United Nation, (2008). "Youth and Climate Change: Time for Action". International Youth Day 2008. Department of Economic and Social Affairs Youth.
- USDA (United States Department of Agriculture), 2011. Agroforestry Strategic.