

# Environmental Adult Education and Environmentally-Friendly Farming: How Necessary?

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**ABSTRACT:** The work seeks to examine how necessary Environmental Adult Education could promote environmentally-friendly farming in the study area. The concept of farming and environmentally-friendly methods of crop farming were examined, Farming methods that degrade the environment; Nature, features and potentials of environmentally-friendly methods of crop farming were also examined. The work discovered the adults employed environmentally-unfriendly methods crop farming such as slash/burn practice and felling of all the trees on their farm land before planting among other things. It also discovered the adults used the unfriendly methods because they did not have the knowledge of environmentally-friendly methods of crop farming hence they adopted the unfriendly methods. The work discovered that the adults need to be educated to acquire the knowledge of environmental adult education to enable them have the understanding of the environment and their relationship with the environment It was therefore suggested among other things that staff of Rivers State Agricultural Development Programmes (RSADP) should be given environmental adult education to enable them have the knowledge to pass to the crop farmers in their areas of jurisdiction; in order to promote environmentally-friendly methods of crop farming among their clientele.

**KEYWORD:** Farming, Environmentally-Friendly methods of Farming, Environmental Adult Education.

## Introduction

Man's very existence can always be traced back to the environment; thus, man has always relied on the environment for his survival, health, and safety. Man's desire to ensure the survival of his vast population has resulted in a variety of activities that have devastated and destroyed the environment. Clover (2010) confirmed that in a world of food surpluses, the UN estimates that approximately 850 million people are chronically undernourished, with at least 60 million facing acute food shortages due to natural disasters or conflicts.

The aforementioned activities of rural crop farmers among the target population have wreaked havoc on lives and the entire ecosystem over time. They harm the environment and endanger lives because crop farming chemicals pollute the water, air, and land. The use of bush burning lead to extinction of most animals in the bush and some species of economics and medicinal plants. The use of chemicals pollutes the soil, destroys plant nutrients, and poisons the crops and human beings. In the same vein, the process of transformation of farm produce like cassava to the secondary source such as garri, fufu and many more, emit methane which is one of the causes of climate change. Many other dangers posed by these unfriendly activities endanger lives,

property, and the environment. As a result, farmers must be encouraged to use alternative methods to ensure the survival of people and the entire ecosystem.

The crop farmers in the State believe in the use of chemical fertilizers which bring about the destruction of the soil nutrients, the micro-organisms which helps to make the soil fertile for effective crop production. The application of pesticides and herbicides also pollute the environment and cause harm to human lives. Some of the reasons for environmental degradation can be traced back to a lack of environmental awareness/knowledge, a negative attitude toward environmental issues, a lack of appropriate skills to deal with environmental issues, and a lack of participation in solving environmental problems (Apel & Camozzi, 1991). As a result, Environmental Adult Education (EAE) is a critical requirement among crop farmers in order to raise awareness of what the environment is and how man should cooperatively relate with the environment of which they are a part.

As a result, in order to address natural and man-made environmental issues and problems (such as drought, floods, poor sanitation, a lack of clean and safe water, land degradation due to poor agricultural practices, unsustainable methods of harvesting natural resources like mining, logging, and fishing, and loss of biodiversity that endangers the environment's life support system), environmental adult education must be implemented (Ministry of Education and Vocational Training) (URT, 2004). However, some efforts have been made to guide the farmers back to sustainable way of carrying out their occupation hence the office of the Agricultural Development Programme (ADP) at Rumuodumanya, Port Harcourt has testified that instead of the slash and burn practice, they encourage farmers to clear the bush, gather the debris in a particular spot and burn.

In this case, not all the land is set on fire but a portion; and that the ashes got from the spot also serves as pesticide/manure to some crops which are resilient to some form of weather. In a bid to reduce the incessant use of fertilizer, the organization decided to go back to intercropping which allows farmers to add some cover crops to the deep-rooted plants to enable them supply nutrients which chemical fertilizer would have supplied but in a dangerous way (Apapa, 2014). The environmental unit of "Fadama" project of the World Bank also throw more light on their effort to achieve a sustainable farming by organising seminars, workshops to educate the crop farmers on how to exploit the environment without degrading it (Opurum, 2014).

Despite all the little efforts put in by the bodies mentioned above and some communities, to minimise the wrong methods used by the crop farmers in the target areas, experience revealed that the problem still persist. It is therefore pertinent to note that Environmental Adult Education (EAE) programmes such as environmental education, environmental basic literacy, seminars, workshops, talks and many more would help in solving these problems because no normal human being would ever want to hurt himself. The power of illiteracy/ignorance should never be underrated because it is indeed very dangerous.

It is clear therefore that the crop farmers in the target areas degrade the environment and this shows that they need environmental adult education that would enable them become aware of issues that affect them and the environment. Environmental adult education is that education that would effect changes in the attitudes of the crop farmers towards the environment and also educate them on sustainable/friendly methods of crop farming. Considering this fact, there is therefore a need to investigate how environmental adult education when adopted would help to re-orientate the crop farmers towards the promotion of environmentally-friendly methods of crop farming.

### Concept of Crop Farming and Environmentally-Friendly Methods of Crop Farming

**Crop Farming:** Crop farming is an aspect of agriculture which concentrates on growing crops either for consistence or commercial level. In the case of this work, it is based on the general approach that the farmers attack the environment while carrying out their activities. Therefore the following will be examined:

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## Farming Methods

Current and General methods of farming are as follows:

**Crop Rotation:** This is a situation where the farm plot is divided into sections and crops of different types like heavy-feeder crops are interchanged with light feeder crops and are rotated from one plot to another after harvesting each other. Crop rotation can be used to suppress weeds, pathogens and insect pests. Also, it can have stabilizing effects on the agro ecosystem by holding soil and nutrients in place, conserving soil moisture with mowed or standing dead mulches, and by increasing the water infiltration rate and soil water holding capacity. Cover crops in orchards and vineyards can buffer the system against pest infestations by increasing beneficial arthropod populations and can therefore reduce the need for chemical inputs (<http://www.sarep.ucdavis.edu/sarep/about/def>).

**Shifting Cultivation:** This method allows the plot of land some years rest in order to regain its lost nutrient before the farmer could return there for another cultivation process.

**Mix Cropping:** This is a system where the farmer cultivates more than one type of crops on the same plot to enable the crops help one another to grow effectively.

**Integrated Farming:** This system is where the farmer cultivates crops and at the same time rear animals on the same plot. This system allows the farmer to use the remains from the crops to service the animals and vice versa. He rarely has the need for chemical fertilizer as he /she gets them from the farm. Some of the advantages of integrated farming involve: growing row crops only on more level land and pasture or forages on steeper slopes will reduce soil erosion. Pasture and forage crops in rotation enhance soil quality and reduce erosion; livestock manure, in turn, contributes to soil fertility.

Livestock can buffer the negative impacts of low rainfall periods by consuming crop residue that in “plants only” system would have been considered crop failures. Feeding and marketing are flexible in animal production systems. This can help cushion farmers against trade and price fluctuations and, in conjunction with cropping operations, make more efficient use of farm labour (<http://www.sarep.ucdavis.edu/sarep/about/def>).

**Cover Cropping:** In this system of farming, cover crops are planted to provide cover for the soil; protect the top soil from being washed away by direct rain drops and also protect the soil from overheat which comes directly from the direct sun rays. Using of variety of cover crops is also important in order to protect against the failure of a particular species to grow and to attract and sustain a wide range of beneficial arthropods. The extension unit of Rivers State Agricultural Development Programme (RSADP) also adopted the method of cover cropping to help the farmers boost their crop production. (<http://www.sarep.ucdavis.edu/sarep/about/def>).

## Methods of Crop Production

These farming are done by **Bush Burning:** This activity is environmentally-unfriendly because it destroys the fauna and flora in the environment; destroys natural nutrients in the soil; kills the living organisms in the soil; destroys the animals’ natural habitat; exposes the land to erosion, drought and causes deforestation and many more harm to the environment.

**The use of Chemical Fertilizer:** The application of fertilizer to crops is dangerous to human health and the environment. It also destroys the living organisms in the soil among other things. It causes pollution as particles from the chemicals are washed into nearby river or streams. It pollutes the fish itself which in turn poisons human being when they consume them.

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**The use of Chemical Pesticides and Insecticides:** The use of chemical pesticides and insecticides are harmful to human health. This is one of the reasons why Carson (1962) in Cunningham & Cunningham, (2010) advocated for the ban of DDT a pesticide that caused serious damage to human health even to the unborn babies in their mothers' womb.

### Methods of farmer's Waste Disposal

When farmers harvest their crops, the remains or the chaff are always thrown to litter the environment or in most cases thrown into source of drinking water. This unwholesome action of course pollute the water and make it unfit for use. Waste generated from cassava stem can produce methane which is one of the causes of Green House Effect. Processing which entails the change from the raw cassava to 'Garri or Fufu' makes use of the generators which pollute the environment and endanger lives of human through the carbon monoxide emitted into the environment (Eheazu, 2012).

Crops can be preserved by the rural farmers by drying most crops which are perishable like pepper, tomatoes, etc else they get rotten, become poisonous to human health and are wasted. In terms of health and welfare, rural farmers live in remote environment and are exposed to all sorts of hazards which easily endanger their health. The kind of food they eat cannot be over emphasised. They are always left in their world without care and help from the government and companies upon the waste that they incur through the activities of these groups. Most diseases farmers experience is as a result of the activities the carry out in cause of their farming.

### Traditional and Conventional Methods of Farming

Traditional or cultural practices of farming involves

- i. Clearing of farm plot (over clearing)
- ii. Bush burning
- iii. Tillage method

### Environmentally-Unfriendly Methods of Farming

Good (2015) in her bid to describe 5 ways factory farming that kill the environment sees Industrial agriculture as one of the most unsustainable practices of modern civilization (<http://www.onegreenplanet.org/author/kategood>). She says from start to finish, factory farming is responsible for the abuse of land, animals, and natural resources all for the express purpose of providing cheap, unhealthy food to the large amounts of people. A careful look at it, it could be seen that the current global food system is responsible for one-third of global greenhouse emissions and it completely depends on fossil fuels for transportation and synthetic fertilizers and pesticides. Balogun, Aliyu and Musa, (2013) in their study carried out about Integrated Pest Management (IPM), identified that insects and diseases are the most important factors responsible for yield reductions. More of the consequences of such environmentally-unfriendly practices according to Good, (2015) could be listed below:

1. **Air pollution:** Over 37 percent of methane emissions result from factory farming. Methane has a global warming potential 20 times higher than carbon dioxide. But that doesn't make carbon dioxide emissions any less staggering; the fossil fuel used in energy, transportation, and synthetic pesticides/fertilizers emits 90 million tons of carbon dioxide into the atmosphere every year. Factory farming also releases harmful compounds like hydrogen sulphide and ammonia can cause immediate negative health effects in humans.
2. **Deforestation:** Unsustainable agriculture clears natural habitat to displace the inhabitants of the forest and cause deforestation. This is evident in the issue on "Factory the Farming is killing the Environment" which states that in the United States alone, over 260 million acres of forest have been cleared to make room for crop fields, most of which are used to exclusively grow livestock feed. It is also stated that in Brazil, land

clearing to grow chicken feed responsible for the destruction of about 3 million acres of rainforest. Clearing land to grow soybeans in the Amazon rainforest is responsible for clearing 100 million hectares of forest, releasing enough carbon in to the atmosphere to increase the rate of global warming by 50%. (Good, 2015)

**3. Water pollution:** Water pollution has been one of the brain children of unsustainable agriculture; which cause degradation and destruction of the aquatic lives an aquatic ecosystem. The use of chemicals for fishing and the effect of chemical fertilizers pesticides, insecticides and herbicides which are directly and indirectly deposited into the water, pollute the water and apart from destroying aquatic lives, also destroy human beings who consume resources from and the water. In the same vein, the water is made unfit for use by man either for drinking or for any other usefulness. Environmental Protection Agency (EPA) estimates that 75% of all water quality problems in America's rivers and streams. High levels of nitrates in drinking water can cause spontaneous abortions and blue baby syndrome and bacteria outbreak from agricultural pollution is responsible for several disease outbreaks across the United States (One Green Plant, 2015).

### Environmentally-Friendly Methods of Farming

Environmentally-friendly methods of fishing and farming can be defined as the methods which allow man to earn his living and also allow other living organisms to survive in order to continue to perform their own duties toward man and the entire ecosystem without degrading the environment. COM., 2004; said it is also known as fishermen and farmers friendly because it helps to maintain the necessary environmental balance for stable and predictable economic activity.

This method of farming has to do with the combination of the best out of organic and conventional farming “we take the best things from organic and conventional farming and combine them” (Eriksson & Eriksson, 2013). Erickson is a Swedish farmer who has together with his wife Teri Eriksson own and run Wiggeby Farm in Faringo, 30 km from the capital city of Stockholm. The Ericksons grow grass, cereals, peas and oil seeds on 60 hectares of land. They take precision farming and balanced-fertilization fully into account at Wiggeby farm. They combine modern and traditional techniques that optimize yield and increase earnings. At the same time by using resources more efficiently, they minimize environmental impact, showing that conventional farming can be profitable, sustainable and environmentally friendly.

Over the years, the Erickssons, (2013) have invested in pro-environmental measures to reduce nitrogen and phosphorous losses, they have used a Yara N-Sensor to calculate the nitrogen content of the crops and adjust the application dose of fertilizer. Hakan (2013) said he was the first farmer who has bought the N-Sensor in Sweden. He stated that N-Sensor is not only environmentally friendly but also profitable. To encourage others he stressed, “I cut the rate of nitrogen use by around four percent, and I raise my yields about the same four percent. The environment and your wallet both benefit. It is a win-win situation”. Hakan, (2013) continues by explaining how he collects horse manure for compost. He explains “We compost the manure along with green house material. We spread it on our fields and cover 50% of our phosphorous needs. The Ericksons use the compost along with mineral fertilizers to supply the nutrients the plants require.

The above information has proven to provide both the best yields and the most environmentally friendly solution. To reduce the risk of nutrients leakage, they have also made a pond for phosphorous sedimentation and maintain permanent grass buffer zones along major drainage ditches in order to reduce the risk of nutrients leakage to local waterways. Hakan (2013) added that by combining all these schemes, they develop long-term sustainable agriculture, He said, “We take the best things from organic and conventional farming and combine them”.

Their holistic approach was backed up by thorough documentation. They record everything they do in the farm, from soil cultivation to harvest. This they have been doing since 1995 and currently have one of the largest databases in Europe. Hakan, 2013) is the chairman of the Swedish farmers' organisation Farming in

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Balance. There, farmers share experiences and collect data as they develop and implement new farming methods. The work is done in close cooperation with agricultural universities, linking research and practical use. Hakan (2013) said, they kick new ideas into universities and help take ideas from universities out to the farmers. Then they try to find out what they can do to get more environmentally friendly farming.

The Erickssons said that cooperation is the key; and by this they have won the prestigious WWF Baltic Sea Farmers of the Year Award 2010 in recognition of their success in reducing the nutrients nitrogen and phosphorous leaching from their farm into the Baltic Sea (combating eutrophication). By their methods, they beat out six national winners from Finland, Poland, Russia, Estonia, Latvia and Lithuania (all of who were organic farms, except Wiggeby). Hakan (2013) said, “We have taken some extra steps along the road towards more environmentally friendly farming. Being environmentally friendly usually doesn’t cost anything. It is value added.” He believes that to feed the 9.1 billion people expected in the world in 2050 the farming industry must move forward, and that the sustainable farming system has to embrace the best techniques used on both sides. Cooperation is the key. “I think we have to combine the best of both and to listen to, talk with, and learn from each other.” Talking about environmentally-friendly methods of farming; Organic, ecological and conventional farming will be used interchangeably as they have some common features to be used.

### **Organic Farming**

As explained by United States Department of Agriculture (USDA) Study Team (1980 in Ephraim, 2017: 64),

Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulations, and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotations, crop residues, animal manures, legumes, green manures; off-from organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilt, to supply plant nutrient, and to control insects, weeds and other pest.

USDA stated that even though organic farming strives to avoid the use of chemical fertilizers, pesticides, and insecticides, they are not ruled out entirely; this is to say, the practitioners selectively and sparingly use them as a second line of defence. The essence of shifting from chemical farming to organic farming is to protect the soil, human and animal’s health from the potentials hazards of pesticides and other chemical additives. Most organic farmers use crop rotations that include legumes and cover crops to provide an adequate supply of nitrogen for moderate to high yields. Mixed cropping involved in organic farming return manure to the farm. Organic farmers control weeds in crops like corn, soybeans, and cereals without the use of herbicides due to timely tillage and cultivation, delayed planting, and crop rotations. They have also been relatively successful in controlling insect pests. Organic farming is labour intensive but less energy. It is safe on erosion, nutrient, water and soil (USDA, 1980).

### **Ecological Farming**

Ecological farming is the shift from chemical to ecological agriculture. It can be sustainable and profitable. It is a self-reliant method and has to be an integrated system. Since it is a knowledge intensive practice, one has to keep pace with the dynamic of nature to increase the biological productivity of the soil. Since eco-farming uses several farm grown inputs, and less dependent on market purchased inputs, it is economically attractive to the growers ([http://www.eplantscience.com/botanical\\_biotechnology\\_biology\\_chemistry/medicinal...31/05/2013](http://www.eplantscience.com/botanical_biotechnology_biology_chemistry/medicinal...31/05/2013)).

Ecological farming enables communities to produce enough food to feed themselves. This form of agriculture fosters a future of healthy farming, and healthy food, to all people. Ecological farming helps the world’s population to mitigate and adapt to climate change. Analyses according to Greenpeace International, (2012) have shown that ecological farming makes sense economically. This modern farming method leads to

<b>203</b>	<p>ISSN 2690-9626 (online), Published by “Global Research Network LLC” under Volume: 3 Issue: 12 in Dec-2022 <a href="https://grnjournals.us/index.php/AJSHR">https://grnjournals.us/index.php/AJSHR</a></p>
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increased crop yields. Globally, ecological farming can produce an average of approximately 30% more food per hectare than conventional agriculture. In developing countries, ecological farming can produce roughly 80% more food per hectare. Cost efficiency is said to be benefited from the use of natural, locally available fertilizers and organic pest control. This is said to save costs on synthetic chemical inputs that pollute. Evidence indicates that ecologically farmed products taste better and promote better health. According to Greenpeace International, (2012), a recent study carried out in California shows that organically grown strawberries taste sweeter than their conventional, chemically-grown counterparts. The organic variety also contains 10% more dietary antioxidants, which are known to protect against disease.

Biologically diverse farming, also called intercropping, increases plants' resilience to erratic weather changes. Scientists are said to have shown that biodiversity provides a natural insurance policy against major climate changes, both in the wild and in agriculture. Organic pest control is another feature of ecological farming. Instead of using chemical pesticides, ecological farmers use non-polluting, long-term pest protection. One method is to introduce beneficial insects to the field. Another method is to plant crop fields strategically and to use "low-input" technologies that are available locally and as a result, crops are less vulnerable to pest invasion. Natural fertilizers are also keys to ecological farming (Greenpeace International, (2012).

Achieving fertile soil entails growing green manures such as legumes. Adding compost and animal dung can also enrich soil. These are some of the effective ways of boosting the soil's organic matter and fertility without synthetic fertilizers. Using natural fertilizers also saves farmers' costs; it eliminates the need for artificial inputs. With natural fertilizers, soil is richer in organic matter, better able to retain water, and better protected against erosion. Ecological farming involves various levels of intercropping (three crops plus three cover crops). Soil is made richer, stable, greater fertility and higher biodiversity with earth worms and more microbes. Sustainable fertilizers are found in legumes used as green manures which provide enough nitrogen. Disease-susceptible crop (rice) varieties inter-planted with resistant varieties produce greater yield (<http://www.greenpeace.org/international/en/campaigns/agriculture/solut...>).

### **Sustainable Agriculture**

Sustainable agriculture is a philosophy based on human goals and on understanding the long term impact of our activities on the environment and on other species. Use of this philosophy guides our application of prior experience and the latest scientific advances to create integrated, resource-conserving, equitable farming systems. These systems reduce environmental degradation, maintain agricultural productivity, promote economic viability in both the short and long term and maintain stable rural communities and quality of life. Sustainable agriculture embraces all agricultural systems, striving to meet these criteria (<http://www.sarep.ucdavis.edu/sarep/about/def>).

Many aspect of modern conventional agriculture are included in sustainable agriculture, just as are many aspects of alternative farming systems. Sustainable agriculture emphasises the conservation of its own resources. For a farm to be sustainable, it must produce adequate amount of high quality foods, be environmentally safe, and where appropriate, be profitable. Sustainable farms minimize their purchased inputs (fertilizers, energy and equipment) and rely, as much as possible on the renewable resources of the farm itself.

This is especially important in the 90 percent of farms that exist in the third world where these inputs are often not available or affordable. Sustainable agriculture is a complex issue associated with producing food. In sustainable systems, the soil is viewed as a fragile and living medium that must be protected and nurtured to ensure its long-term productivity and stability. Methods to protect and enhance the productivity of the soil include using cover crops, compost and/or manures, reducing tillage, avoiding traffic on wet soils, and

maintaining soil cover with plants and/or mulches. Regular additions of organic matter or the use of cover crops can increase soil aggregate stability, soil tilt, and diversity of soil microbial (<http://www.sarep.ucdavis.edu/sarep/about/def>).

### **Integrated Farming**

Farms that aim for high food production using environmentally friendly practices could be better for the environment than both organic and conventional farms. A research carried out by Toumisto, (n.d) proved that integrated farms that maximised crop yields whilst using environmentally-friendly techniques such as crop rotation, organic fertilizers, over winter cover crops, and minimal use of pesticides would use less energy and generate lower greenhouse gas emission per unit of emission than both organic and conventional farms. Tuosmisto says farming in a way that's good for the environment doesn't have to mean accepting a dramatic drop in food production. The research suggests that integrated farming system which combines the best practices for producing high yields with low negative environmental impacts can be more beneficial for the environment than either organic or conventional farming

([http://www.ox.ac.uk//media/news\\_stories/2012/120214\\_1.htm1](http://www.ox.ac.uk//media/news_stories/2012/120214_1.htm1)).

### **Nature of Environmentally-Friendly Methods of Crop Farming**

Environmentally-friendly methods of crop farming encourages intercropping as this increases plant's resilience to erratic weather changes. Scientists have proven that this method of farming (intercropping) provides a natural insurance policy against major climate changes. It uses organic pest control (instead of chemical pesticides) because it is non-polluting, long-term pest protection and this is done either by introducing beneficial insect to the field, planting crop fields strategically or by using "low-input" technologies that are available locally in order to make crops less vulnerable to pest invasion.

It employs the use of green manures (natural fertilizers) such as legumes, adding of compost and animal dung to enrich the soil. This is because soil is better enriched in organic matter, better able to retain water and better protected against erosion with natural fertilizers; and also saves the farmers' cost and eliminates the need for artificial inputs. It involves various levels of intercropping (planting three crops plus three cover crops). In this case soil is made richer, stable, greater fertility and higher biodiversity with earth worms and more microbes.

Sustainable fertilizers are found in legumes used as green manures which provide enough nitrogen to replace the entire amount of synthetic nitrogen fertilizer currently in use without losses in food production. Evidence has also shown that disease-susceptible crop (rice) varieties inter-planted with resistant varieties produce greater yield with reduced incidence of diseases compared to that of conventional monoculture (evidence from scientists and farmers in Europe, Thai, Yunnan, China etc).

Eco-farming is a self-reliant method of farming, it is a knowledge intensive practice, and it keeps pace with the dynamics of nature to increase the biological productivity of the soil. It uses several farm grown inputs and less dependent on market purchased inputs. It is economically attractive to the growers in the case that its production cost is cheaper than the chemical fertilizer farming. In this case, chemical fertilizer, pesticides and herbicides are not ruled out; that is to say that environmentally-friendly method of farming is free to use chemical fertilizer, pesticides and herbicides in a moderate quantity as a last resort ([http://www.ox.ac.uk//media/news\\_stories/2012/120214\\_1.htm1](http://www.ox.ac.uk//media/news_stories/2012/120214_1.htm1)).

Regarding such importance, it is indeed necessary that farmers be encouraged to adopt the eco-farming system in such a conscientized manner. That is why e plant science in encyclopaedia advice that farmers be allowed some period of transition between the shifts from chemical farming to ecological farming to avoid farmers being discouraged from adopting the idea.

<b>205</b>	<p>ISSN 2690-9626 (online), Published by "Global Research Network LLC" under Volume: 3 Issue: 12 in Dec-2022 <a href="https://grnjournals.us/index.php/AJSHR">https://grnjournals.us/index.php/AJSHR</a></p>
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### Features of Environmentally-Friendly Methods of Crop Farming

Most crop farmers feel that the adoption of environmentally-friendly methods of crop farming will not allow them to produce enough food to sustain the large population they need to cater for but Greenpeace International has proven that 40% of the world population are small scale crop farmers and that these group of farmers produce most of the food we consume. This is to prove how beneficial environmentally-friendly methods of farming are to mankind and the environment. The following features should encourage the promotion of environmentally- friendly methods of farming bearing in mind their unlimited benefits:

- i. It promotes enough food
- ii. It promotes healthy farming
- iii. It promotes healthy food
- iv. It helps population to mitigate and adapt to climate change
- v. It uses compost with green house material along with mineral fertilizers to supply the nutrients the plants need and this has proven to provide the best yields and the most environmentally-friendly solution.
- vi. It involves the combination of modern and traditional techniques and this optimizes yield and increase earnings.
- vii. Farmers take record of everything they do at the farm from soil cultivation to harvest. This helps them to know what progress or loss they make.
- viii. It is value added. It usually does not cost anything.
- ix. It does not work with criticism as it is a system which embraces the best techniques used on both sides (organic and conventional farming).

It believes that cooperation is the key. Ericksson & Ericksson (2013) says “I think we have to combine the best of both and to listen to, talk with, and learn from each other.” The farmers form cooperation between themselves and the university linking research and practical use. The Erickssons claim that they kick new ideas into universities and help take ideas from universities out to the farmers and try to see what they can do to get more environmentally-friendly farming.

The efficient use of the resources involved, minimize environmental impact; this shows that efficient conventional farming can be profitable, sustainable, and environmentally-friendly. The Erickssons (2013) stressed that with environmentally-friendly method of farming, the environment and your wallet both benefit and that it is a ‘win-win’ situation. This he said because he has to cut the rate of the use of nitrogen by about four percent and raise his yield about that same percentage. He is proud of not losing anything at all because he uses environmentally-friendly method of farming.

This method involves integrated method such that the farmers integrate both crops and animals so that the farmer uses what she has from the farm animals to nourish the crop farm. This is so that they take care of each other, nourish each other, and protect each other etc. They complement each other. Here, the integrated technique is applied.

### Potentials of Environmentally-Friendly Methods of Crop Farming

It is very necessary to let the farmers understand what they and their unborn generations stand to gain so as to encourage them to move in line with the directions of environmentally-friendly methods of farming thus:

- i. They will benefit directly from increased crop production, improved income, food security and improved management of their businesses.

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- ii. They will participate in decisions affecting the sustainable exploitation of crops production.
- iii. Some will benefit from employment opportunities. This is because there will be increased demand for processing, marketing and support services, maintenance, enterprises and labourers at the processing plants.
- iv. They will have improved access to farming input and increased income through better training, regular input supply, better processing of their products and improved access to markets.

It is very necessary for us to encourage environmentally friendly-methods of farming; mostly now that we are consciously moving beyond oil and gas into agriculture for the survival of Nigerian citizens if not we would not be running away from pollution which oil has over times caused or exposed us to. This was adopted during the Nigerian Guild of Editors Annual Conference, 2013 held in Asaba, Delta State Capital on 22/08/2013; with the Theme- “Nigeria Beyond Oil Initiative”. If Nigeria must invest in agriculture as it was clamoured in that conference among other occasions, it must be environmentally-friendly agriculture which would help man run away from pollution which oil and gas has exposed man to (Senator Ayim Pius Ayim (SGF), Dr Ngozi Iwuala, World Bank Director, Delta State Governor, and Dr. Emmanuel Oduaga).

### **Conclusion**

Based on the finding of the study, the following conclusion was drawn:

The crop farmers dealt very unfriendly with the environment just to be able to provide food for their teaming and large population at all cost; not minding what happens to their health and the environment as a whole.

The study shows that the respondents did not receive environmental adult education for the promotion of environmentally-friendly methods of crop farming; Since there was no relevant education to environmentally-friendly methods of crop farming, there was no effect on environmentally-friendly methods of crop farming among the target population.

The study concluded that the environmentally-unfriendly methods of crop farming among the target population in Rivers State include slash/burn practice, using chemical fertilizers, chemical pesticides, herbicides and insecticides, indiscriminate disposal of chaff/residues from the harvest of their farm produce and many more.

The study concluded that the target populations had no trace to any environmentally-friendly methods of crop farming; that all they are after is how to produce more but unhealthy foods.

Environmentally-friendly methods of crop farming could be traced to what Ericson and Ericson in EETAP (2013) realised as:

1. The combination of organic and conventional farming.
2. The combination of modern and traditional techniques that optimise yield and increase earnings.
3. It was also discovered that another way to maintain environmentally-friendly methods of crop farming is to compost the manure along with green house material. The study also revealed that to go into Environmentally-friendly methods of crop farming, organic, ecological and conventional farming could be used interchangeably as they have some common features.

It therefore concluded that the rural crop farmers do not have the knowledge of environmental adult education so they do not care or bother about the environment, hence the exhibition of environmentally-unfriendly behaviour towards the environment.

To address the above issue, it is very necessary for environmental adult education to be employed as a tool for the promotion of environmentally-friendly methods of crop farming among the target population. To carry out such EAE programmes as listed above with the target populations, seminars, conferences, workshop, talks, town hall meetings among other things could be organised.

## Recommendations

It is on the background of this study that the following recommendations were proffered. This is to enable the stakeholders who are concerned with crop farming in Rivers State to promote environmentally-friendly methods of crop farming among the target populations in Rivers State:

1. Staff of RSADP should be given environmental adult education to enable them have the knowledge to transfer to the crop farmers in their areas of jurisdiction.
2. Crop farmers should be given opportunity to undergo environmental adult education so that they may have full knowledge of the environment and become environmentally-literate.
3. Non-governmental organisations in collaboration with government institutions should sensitise the public about environmentally-friendly methods of crop farming so that they too could guide against consuming poisonous crops.
4. Governmental institutions such as Agricultural Development Programmes, Ministry of Environment and branches of educational institutions concerned with environmental adult education should on a regular basis visit the crop farmers to see what they do and also find out their areas of difficulties for future planning on their strategies to promote environmentally-friendly agriculture.
5. The crop farmers should be encouraged to use environmentally-friendly methods of crop farming with a lot of conscientization and incentives which will enable them take care of their families while adopting the new techniques of environmentally-friendly methods of crop farming.
6. Environmental laws should be enacted with appropriate monitoring system to check adult's environmentally-unfriendly methods of crop farming.
7. The government of Rivers State should provide some funds to the crop farmers to enable them attend environmental adult education through seminars, workshops and so on.
8. Farmers should be introduced to Communal Area Management Programmes For Indigenous Resources (CAMPFIRE) and Conservation programmes in order to imbibe the attitude of conservation towards the natural resources in their communities.
9. Crop farmers should be introduced to other areas of agriculture like poultry farming, piggery and many others to reduce their exploitation of the natural resources.

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