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## **USE OF POLYTHENE MATERIALS AND THEIR NEGATIVE IMPACTS ON AGRICULTURAL LAND USE ON BAUCHI TOWN, BAUCHI LOCAL GOVERNMENT AREA OF BAUCHI STATE**

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### **ABSTRACT**

*The work looks examines the possible impact of polythene on agricultural land in Bauchi town, Bauchi local government of Bauchi state. Data was collected using questionnaires. Some of the possible reasons for the spread of polythene in the study area include 'I don't care attitude', poor implementation of laws, ignorance, its' non-recycling nature, easy to get and use etc. Some negative impacts of polythene waste include reduction in yield, destruction of soil fertility, reduction in the rate of plant growth through suffocation, etc. Possible remediation measures include implementation of existing laws, public enlightments, Proper disposal method, self-restraint in our interactions with the environment and undecided etc.*

*Keyword; Polythene, Agriculture, Waste, Laws, Environment*

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### **INTRODUCTION**

Environmental issues received an unprecedented attention at the international level in the 20<sup>th</sup> century. The global waste crises, among

other environmental issues, confronting humanity in the developed and developing countries.

It is an undisputable fact the polythene waste is a visible and environmental problem facing Nigerias urban and semi-urban centres (Oyediran, 1994).

A feature of urban scene in Nigeria in recent years is the gradual take-over of virtually every available open space by refuse, which contain higher percentage of polythene materials. The refuse dump apart from physically abstracting legitimate human activities, have become fertile ground for breeding flies, mosquitoes, rodents among other vectors and pest which have constitute the dumps into grave health hazard (Akintola, 1978; Fulani and Abumere, 1986 and Oyediran, 1994).

According to WRI (1995), Africa has the fastest growing population with an annual growth rate of approximately 3 percent, this resulted in people shifting from the use of leafs, baskets, just sacks and paper to polythene bags because they cannot be produced in good quantity to go round to ever expanding population. Similarly, population explosion, uncontrolled urbanization and rapid industrialization have caused high waste generation quantities and rates, (Oyediran, 1994). He also described that population size of locality; commercial and industrial development, occupational structure and the level of standard of living of people all influence the type of polythene waste. Besides that, the trees which is considered as raw material for paper, basket etc. However, in this region are hard wood, which take several years before regenerated after cutting. Nonetheless the cost of producing polythene bag in cheaper than basket, paper etc which are biodegradable. With this issues many are of the opinion that indiscriminate use of polythene bags is due to economic predicament, most of the house-hold can no longer afford to buy their basic needs that will sustain them at list for a months, as a result, they engaged in buying what they are going to use in a day and which is usually put in a piece of polythene bag.

Moreover, due to higher cost of alternative fuels owing to the people's low purchasing power as a result people shifted to felling of trees as the

only alternative fuel. It is however worthy to note that, using wood to build houses plus other uses such as cutting trees to feed animals from the leaves and partly to be used for medicinal purposes contributed to the shortage. That is why use of polythene has become a part of everyday life for the people. Also market mechanism drives people to use polythenes because it is cheap and easily available. Moreover polythenes are tough water proof and easy to carry and store. People go to market empty handed and return home with a number of polythene bags containing shopping goods. This may have adverse effect on environment and public health, due to indiscriminate disposal of the bags. Also it has the tendency to cause blockage in the drainage facilities leading to water logging, flood, algae, bacteriological growth, and water-borne diseases and also serve as conducive environment for breeding and spreading of mosquitoes and other vectors, it cause bad smell negating the beauty of environment (Mohammad, 2002).

Majority of people in urban and rural Bauchi use organic fertilizer to increase soil fertility, but polythene poses a problem in separating of non-combustible and non-biodegradable substances in the refuse taken to the farm plots. Polythene materials are therefore a disaster to the environment if not well disposed of. Polythene has harmful effect on soil, water and air as well as prevents sunlight exposure and moisture to soil which can lead to human induced draught. Also, it destroys the beneficial bacterial causing loss of soil fertility. Processing or re-processing of polythene materials cause air pollution and when burnt in the open space produce hydrogen cyanide and other poisonous fumes which are very dangerous to human health and contributes to greenhouses gases concentration.

### **AIM AND OBJECTIVES OF STUDY**

The aim of the research is to identify the impact of the polythene bags on Agricultural land in Bauchi town, Bauchi Local Government Area of Bauchi State.

Objectives of the study are:-

- a. To examine the factors leading to spread of polythene bags
- b. To assess the possible amount of polythene disposed on the farmland
- c. To examine the impact of polythene bags on Agricultural land and
- d. To suggest possible measures to reduce the impact of polythene Bags on agricultural land.

### **PLASTIC SHOPPING BAGS,**

Plastic carrier bags are common type of shopping bags in several countries. Most of these bags are intended for a single use to carry items from stores to homes: reuse for storage of trash is common. Heavier duty plastic shopping bags are suitable for multiple uses as shopping or storages (Selke, 2004).

Oyediran, (1994) defined polythene waste as substances or objects discarded as worthless or unwanted, defective or no further value from manufacturing or production process. Polythene wasters is also said to refer to any discarded materials, which include municipal, industrial and commercial activities. U.N. (2003). Olokesusi, (1996) also defined polythene waste as any materials in the material flow pattern that is discarded as useless or unwanted. Furthermore CIWINB, (1997) described polythene waste as the heterogeneous mass of throw away from residence and commercial activities as well as the more homogeneous accumulation of single industrial activity. A.M. Ibrahim (2002) described polythene waste as the unwanted materials of substances produced in the process of production and consumption of goods Abdulkadir, (2002) concluded that wastes are materials, which are not of immediate use but which could be recycled or reclaimed depending on the scientific and technological development as well as the level of commitment. He also pointed out that waste are materials generated from different processes and actions, that is natural accumulation, artificial reactivity and releases, natural transformation all resulting in the production of substantial and substandard materials of less significant value or high liability but some of which can be reprocessed and gain some new positive value.

WEBSTER'S Family Encyclopaedia (1994) define Plastics as synthetic materials that consist of polymers (Polymerization) and moulded during manufacture. Plastics are made from synthetic Resins. Thermotting plastics harden on heating to give a rigid product that cannot then be softened.

Natural polymers such as SHELLAC and RUBBER have been known for many centuries. The first synthetic materials were celluloid, made in 1870 from cotton and camphor. This highly inflammable substance was replaced during World War 1 by cellulose acetate and casein products. These materials were all based on naturally occurring large molecules. The first polymers to be made by joining together smaller molecules were the phenol formaldehyde resins (Trade name Bakelite) invented in 1908 by Leo Baekeland (1863-1944). Since then a vast number of different resins have synthesized.

The increased use of disposable products is further reflected in the fact that most of the increase in amount of rubbish since 1960 has been in plastics and paper products. Maclaren (1991). L. Smith (2000) high light the contemporary North American society has a dependency upon convenience, which generates enormous amount of waste: The average North American house hold produces 6.73 bags of rubbish in a week or 29 bags every month. In a year, that translates to 350 bags with amount by volume equal to about 17,250 liters of rubbish that weight in the order of 550 kg. Estimates vary but by weight paper product comprise about 40 percent and toxic 1 percent. Similarly, population explosion, uncontrolled urbanization and rapid industrialization have caused high waste generation quantities and rates, Oyediran (1994). He also described that population size locality, commercial industrial development, occupational structure and the level of standard of living of people all influence the type of polythene waste generated. Polythene dumping is the common practice based on the "THROW AWAY CULTURE" or disposal into nearest open space on land or surface water without environmental consideration, Oyediran, (1994). Dumping of generated polythene in inappropriate places as well as on wrong times are the main problems concerning

polythene waste, WRI (2000). Furthermore, the poor management of polythene waste that includes collection, transportation and disposal has negative effects on the environment. They reported that, the dumping up of plastic is hindering the growth and propagation of so many marine lives flora and fauna in general. If left unclear some of these plastics can take a period of over one thousand years to decompose.

### **ENVIRONMENTAL ISSUES ON POLYTHENE**

The wide use of polyethylene makes it an important environmental issue. Though it can be recycled, most of the commercial polyethylene ends up in landfills. Polyethylene is not considered biodegradable, as it takes several centuries until it is efficiently degraded. Daniel B. In 2008, a 16 year old Canadian, won the Canada-Wide Science Fair in Ottawa after discovering the Sphingomonas, a type of bacteria, that can degrade over 40% of the weight of plastic bags in less than three months. The applicability of the finding is still a matter for the future.

Plastics are durable and degrade very slowly. In some cases, burning plastic can release toxic fumes. Also, the manufacturing of plastics often creates large quantities of chemical pollutants.

By 1995, plastic recycling programs were common in the United States and elsewhere. Thermoplastics can be remelted and reused, and thermoset plastics can be ground up and used as filler, through the purity of the materials tends to degrade with each reuse cycle. There are methods by which plastics can be broken back down to a feedstock state.

To assist recycling of disposable items, the Plastic Bottle Institute of the Society of the Plastics Industry devised a now-familiar scheme to mark plastic bottles by plastic type. A plastic container using this scheme is marked with a triangle of three “chasing arrow”, which encloses a number giving the plastic types:

### **BIOPLASTICS AND BIODEGRADABLE PLASTICS**

Research has been done on biodegradable plastics that break down with exposure to sunlight (e.g. ultra-violet radiation), water or dampness,

bacteria, enzymes, wind abrasion and some instances rodent pest or insect attack are also included as forms of biodegradation or environmental degradation. It is clear some of these modes of degradation will only work if the plastic is exposed at the surface, while other modes will only be effective if certain conditions are found in landfill or composting systems. Starch powder has been mixed with plastic as a filler to allow it to degrade more easily, but it still does not lead to complete breakdown of the plastic. Some researchers have actually genetically engineered bacteria that synthesize a completely biodegradable plastic, but this material, such as Biopol, is expensive at present (McRandle, 2004).

A potential disadvantage of biodegradable plastics is that the carbon that is locked up in them is released into the atmosphere as a greenhouse gas carbon dioxide when they degrade, through if they are made from natural materials, such as vegetable crop derivatives or animal products, there is not net gain in carbon dioxide emissions, although concern will be for a worse greenhouse gas, methane release. Of course, incinerating non-biodegradable plastics will release carbon dioxide as well, while disposing of it in landfill will release methane when the plastic does eventually break down.

So far, these plastics have proven too costly and limited for general use, and critics have pointed out that the only real problem they address is roadside litter, which is regarded as a secondary issue. When such plastic materials are dumped into landfills, they can become “mummified” and persist for decades even if they are supposed to be biodegradable.

It is possible that bacteria will eventually develop the ability to degrade plastics. This has already happened with nylon: two types of nylon eating bacteria, Flavobacteria and Pseudomonas, were found in 1975 to possess enzymes (nylonase) capable of breaking down nylon. While not a solution to the disposal problem, it is likely that bacteria will evolve the ability to use other synthetic plastics as well. In 2008, a 16-year-old boy reportedly isolated two plastic-consuming bacteria.

The latter possibility was in fact the subject of a cautionary novel by Kit Pedler and Gerry Davis (screenwriter), the creators of the Cybermen, re-using the plot of the first episode of their Doomwatch series. The novel, “Mutant 59: The Plastic Easter”, written in 1971, is the story of what could happen if a bacterium were to evolve-or be artificially cultured-to eat plastics, and be let loose in a major.

The biggest threat to the conventional plastics industry is most likely to be environmental concerns, including the release of toxic pollutants, greenhouse gas, litter, biodegradable and non-biodegradable landfill impact as a result of the production and disposal of petroleum and petroleum-based plastics. Of particular concern has been the recent accumulation of enormous quantities of plastic trash in ocean gyres, particularly the North Pacific Gyre, now known informally as the Great Pacific Garbage Patch or the Pacific Trash Vortex.

For decades one of the greatest appeals of plastics has been their low price. Yet in recent years the cost of plastics has been rising dramatically. A major cause is the sharply rising cost of petroleum, the raw materials that is chemically altered to form commercial plastics.

### **DATA COLLECTION**

Two methods for generating data were used. These are:

Primary source of data which involve field work i.e visiting the research area and picking pieces of materials and conducting interview by using questionnaires and checklist.

Secondary source of data which comprises of library research, books, journals and other relevant documents.

### **DATA ANALYSIS**

The data collected from the respondent were analysed using simple percentage from the responses of the respondents and chi-square were used in order to assess the impact of polythene on the farm land.

### **RESULT AND DISCUSSION**

Table 1: The factors leading to the spread of polythene waste

Factors	Frequency	Percentage
I don't care attitude	6	15%
Poor implementation of laws	5	12.5%
Ignorance	16	40%
Abundance	1	2%
Lack of disposing ground	4	10%
Undecided	8	20%
Total	40	100%



Source; Field survey, 2020

Table 1 show the factors leading to the spread of polythene in the farmlands; ignorance takes up to 40% of the respondents followed by those who could not decide (20%), about 13% are of the opinion that lack of implementation of laws and the least factor with 2% of the opinion of the respondents believed that abundance of polythene materials is among the factors leading to the spread of polythene waste on the agricultural land.

Table 2 Distribution of amount of polythene disposed on the farmlands

S/N	Type	Pieces	Percentage
1	Pure water sachet	31	16
2	Bread nylon bags	90	47
3	Shopping bags	44	23
4	Yoghurt	13	7
5	Others	14	7

Source: Field study survey, 2020

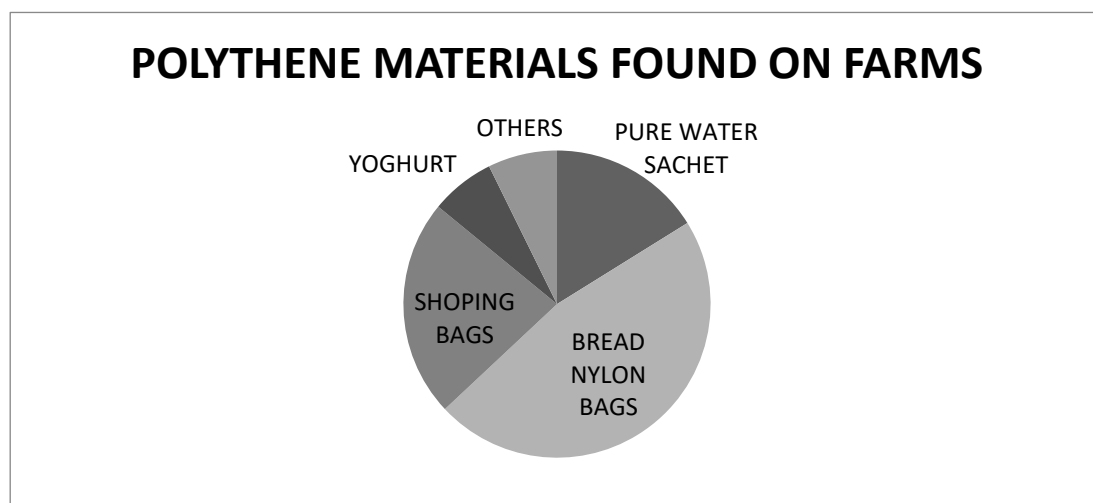


Table 2 and figure 1 shows the amount of polythene materials that are found within 5m<sup>2</sup> radius. It was found 47% of the polythene materials are

made of up bread nylon bags, followed by shopping bags (23%) and yoghurt sachet is the least with (7%).

Table 3: The impact of polythene on agricultural land

Impact	Frequency	Percentage
Reduction in yield	15	37.5
Soil Fertility Destruction	7	17.5
Decomposition rate reduction	3	7.5
Earation reduction	4	10
Reduction in plant growth	6	15
Reduced infiltration capacity	5	12
Total	40	100

Source: Field study survey, 2020

Table 3 shows that majority of the respondents, (56%) believed that polythene waste on the farm lands causes reduction in yield, this is followed by those who perceived it to reduce the rate of crop growth with (15%) and the least think it reduce decomposition rate with (8%). These are all related to reduction in yield.

Table 4: Measures to Reduce Impact of polythene on agricultural land.

Measures	Frequency	Frequency
Alternative Material	4	10
Implimentation of laws	9	22.5
Public enlightment	5	12.5
Proper disposal method	11	27.5
Self control	2	5
Undecided	9	22.5
Total	40	100

Source; Field survey, 2020

Apparently many of the respondents are of the opinion that proper disposal method are better ways of reducing polythene waste, whereas

others though very few (5%) indicate self control being a way of reducing the impact of polythene. 22.5 believed proper implementation of laws can reduce polythene waste on the farms etc.

## **CONCLUSION AND RECOMMENDATIONS**

### **CONCLUSION**

Unfortunately, recycling plastics has proven difficult. The biggest problem with plastic recycling is that it is difficult to automate the sorting of plastic waste, and so it is labor intensive. Typically, workers sort the plastic by looking at the resin identification code, though common containers like soda bottles can be sorted from memory. Other recyclable materials, such as metals, are easier to process mechanically. However, new mechanical sorting processes are being utilized to increase plastic recycling capacity and efficiency.

While containers are usually made from a single type and color of plastic, making them relatively easy to sort out, a consumer product like a cellular phone may have many small parts consisting of over a dozen different types and colors of plastics. In a case like this, the resources it would take to separate the plastics far exceed their value and the item is discarded. However, developments are taking places in the field of Active Disassembly, which may result in more consumer product components being re-used or recycled. Recycling certain types of plastics can be unprofitable, as well. For example, polystyrene is rarely recycled because it is usually not cost effective. These unrecyclable wastes can be disposed of in landfills, incinerate dor used to produce electricity at waste-to-energy plants.

### **RECOMMENDATIONS**

The following recommendations are made for a successful control of the impact of polythene waste on agricultural land.

- \* Public education on the proper disposal of polythene waste;- The public should be enlightened on the dangers of improper polythene waste disposal.

- \* Government policies on polythene waste generation and disposal should be strengthened by providing efficient agencies and inspectors for residential, commercial and industrial areas for periodic or regular check-up, also a powerful tribunal for waste disposal abuses should be established
- \* Government should provide sufficient dumping ground for easy waste Management.
- \* Alternatives to polythene should be utilized eg paper, jute sacs, and textile bags for packaging.
- \* Private sectors and the general public should be encouraged to invest in recycling of polythene waste to improve employment opportunities.
- \* Government should also provide adequate fund to ministries parastatals etc concerned with polythene waste management for the purchase, maintenance and services of equipments and training of personnel for easy operations.

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