An Assessment of the Interaction between Climate Change and Plastic Products among Agro-Market Owners and Horticultural Farmers in the Southern Agricultural Zone of Cross River State, Nigeria

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Abstract

The study assessed climate change impact on the use of plastic products among agro-marketers and horticultural enterprises in Calabar agricultural zone of Cross River State. A Structured questionnaire was used to collect primary data. The study adopted the multistage sampling procedure to select a total of 200 respondents from agro-market and horticultural enterprises. Results show that climate change influenced the socioeconomic characteristics of respondents by; increasing their labour (= 2.7), enhancing their membership into professional, cooperative, market or farm organization (=2.53) and improved their knowledge through plastic and climate change awareness (= 2.47). Climate change influenced agro-market enterprises through payment of carbon emission tax (= 2.94), increase the cost of packaged goods due to unfavourable plastic policies (2.92) and increase in the release of harmful chemicals from plastic waste due to higher temperature to the environment (2.75). Recommendations advocated improvement in the level of climate change awareness on the use of plastic products for agro-marketers and horticulturists in the study area in order to reduce the severe impact of climate change on products in plastic packages. Also, that the production of plastic products be monitored by government agencies to ensure a total removal or lowest rate of incorporation of hazardous chemicals that are easily influenced by the climate to alter the quality of products in plastics.

Keywords: *Climate Change, Plastic products, Agro-marketers, Horticulture enterprise*

INTRODUCTION

There is an interrelationship between plastic products and climate change. This relativity is a cause and effect relationship. Certain activities in the production of plastic materials have ensued the occurrence of climate change as certain environmental conditions and features of climate change has influence the nature of plastic materials overtime. According to Harrison and Santa (2019), the advent of plastics has a huge contribution to climate change. Plastic have surprisingly carbon intense life cycle, the production of resins from petroleum through extraction, distillation and transportation to the market generate greenhouse gases which

contribute to climate change. Harrison and Santa (2019), also speculated that the emissions from plastic was rated at 1.8bilion metric tons of carbon in 2015. Industry experts on the global demand on plastic in greenhouse, mulching and silage film revealed that there will be a 50% increase in plastic adoption from 6.1million tonnes in the year 2018 to 9.5million tonnes in the year 2030. This projection is important as it balanced the cost and benefits associated with utilization of plastic (Cristina, 2021). According to Cristina (2021), plastic is now so essential in our everyday lives that it is very difficult to eradicate them. If not, the world environmental bodies could have found it very easy to replace the use of plastic. It has been found that the cost of replacing plastic is much higher than the cost of managing it (Trucost, 2016). Plastic have greatly enhanced Agricultural production, serving as pest control nets in small gardens, coatings on fertilizer, container for agro-products, plant cover/mulch for weed and temperature control, control of the utilization of water, fertilizer, and enhance germination, among others. It has helped to reduce food losses and spoilage due to improved packaging. From shifting weather patterns to rising sea levels that threatens food security, increase the risk and incidence of flooding, acid rain, harsh weather, continuous rise in temperature which affect stored products and packaged products, shelf life, durability, degradation and denaturation climate change has caused an adverse impact on plastic packaged products and the environment (Lev, 2021). During recycling, a large amount of heavy metal pollution such as benzene, dioxines and methane gas are released into the environment which influences the climate and cause global warming. Poor disposal mechanism of plastic on the environment has caused severe interference in the soil, water and food, leading to contamination, pollution, entanglement, ingestion, decrease in notification, soil quality degradation, disparity in wildlife flora and fauna. The increased demand and utilization by Agro-Marketing and horticultural enterprises have led to the disruption of the ecosystem.

The adoption of plasticulture as a form of agriculture unveils environmental impacts which influences a variety of factors and operations involving the soil, water, air, people, plants, animals and food. This form of agriculture contributes to a greater amount of environmental problems that causes environmental degradation which include; loss of biodiversity, climate change, deforestation, dead zones, genetic engineering, waste and pollution, among others (Wikipedia, 2021). The effect of plastic use in horticulture and agro-enterprise have impacted the environment by modifying the ecosystem by the level of plastic presence, accumulation, chemistry, interaction, production/extraction, recycling, incineration and disposal, which also have climate change affect the quality and functionality of plastic materials.

According to Karen (2021), greenhouse production of healthy sunflowers and horticultural practices require a careful control of factors such as nutrients, water and temperature including pest and disease control and management. These factors and practices utilizes the use of plastic to meet this requirement. This influences the ability of horticultural farmers to produce more food because of the use of plastic materials in greenhouses which is known to improve and double yield, extend the growing season, control the temperature of plants to reduce harsh weather and by these, farmers are able to produce more food on less land. However, the prolonged exposure of these plastic to ultraviolet light starts to disintegrate and breakdown the plastic materials, thus releasing the particles of resins from petrochemical processes into the environment. These pollutants or debris cause climate change because it destroys microbial life, interfere with microbial/biotic activities and their ability to synthesize carbon-dioxide. This further leads to excess accumulation of Carbon-dioxide in the atmosphere which causes climate change. It also produces greenhouse gases which causes a shredding and flaking of plastic debris from thin degenerated mulch and plastic materials which finds itself in the soil, washes into

streams of water and the ocean thereby causing different degree or level of interference with biotic forms.

Also, Sheeraz and Sharma (2016) revealed that climate change has become a most pressing issue as green house gas emissions have been accelerated through the use of farm practices which are unsustainable to the ecosystem such as the problem of plasticulture and incineration. According to his study, emissions of greenhouse gases emanate from industries, burning of fossil fuel, farm activities such as deforestation, bush burning, among others have increased global warming. Agricultural plastic has brought a great transformation to agriculture and the lives of farmers and their agro-enterprise such that it is most unlikely that these farmers will abandon this beneficial plastic product (Karen, 2021). The production, marketing and consumption of home-made brewed farm products from fruits and vegetables, oil and nuts have also made many to own business firms, improved value addition, improved handling of packaged products and safety for food items and market products. This on the other hand have increased the accumulation of plastic materials, waste and a resultant increment in the labour and man-power for waste evacuation. Most plastic products are thin, and melts easily when exposed to heat. This affect the stored product which becomes tainted with the smell, chemical or resin emanating from the plastic package, which affect human health.

STAMEN OF THE PROBLEM

The production of plastic has contributed immensely to climate change through numerous activities which includes: extraction, polymer casting, molding, vacuum forming, extrusion recycling, incineration and disposal. Several authors have opined that the production and utilization of plastic products contribute to climate change and causes global warming (Harrison and Santa (2019) and Lev (2021)). Other researchers have also stressed the beneficial impact of the utilization of plastic products in agriculture (Cristina, (2021); Trucost, (2016) and Karen (2021). Climate change has impacted plastic use and efficiency to store food, farm produce and other products since the inclement rise in temperature is known to alter product quality. The role of plastic in contributing to climate change has received so much condemnation (Harrison and Santa, 2019). It is on this premise that this study investigates the impact of climate change on the use of plastic products among agro-marketers and horticultural enterprises in the Calabar agricultural zone of Cross River State, Nigeria.

OBJECTIVES OF THE STUDY

1. ascertain the contribution of plastic materials/products to climate change by agro-marketers
2. determine the contribution of plastic materials/products to climate change by horticultural farmers
3. assess climate change influence on the use of plastic products in agro-marketing
4. ascertained climate change influence on the use of plastic products in and horticultural enterprises
5. evaluate the role of plastic in mitigating the effects of climate change in Horticultural Enterprises

MATERIALS AND METHODS

The study area was the seven blocks of the Southern Agricultural Zone in Cross River State, which consist of Akamkpa, Biase, Odukpani, Calabar South, Calabar Municipality, Bakassi and

Akpabuyo. The population was made up of 447 registered Agro-market Enterprise and Horticultural Enterprises in the zone. Enterprise owners make up the respondents. The multi-stage sampling procedure used include three stages. The First stage; was the purposive selection of 100 enterprises in each block in the zone. The second stage; was the simple random selection of 16 enterprises from Calabar Municipality, and 14 enterprises from other blocks in the zone to form the cell. The third stage; was the selection of the owners of the enterprises to form the farm family. Primary data were collected by the use of a structured questionnaire while secondary data was provided based on the registered Agro-marketing enterprises and Horticultural enterprises in the zone by the State Ministry of Agriculture. This also included publications, articles and journals. Descriptive statistics used percentages, means and ranks to sort and code data for analysis/examination, interpretation and discussion. Variables were measured using a three point Likert type of **s**cale for; 'Agree' which is coded as 3, 'Undecided' coded as 2, and 'Disagree' coded as 1, and presented using mean score and ranking.

		Blocks							
	Enterprises	**Calabar South**	**Calabar Municipality**	**Akamkpa**	**Akpabuyo**	**Odukpani**	**Biase**	**Bakassi**	**Total**
1.	**Horticulture**	21	26	27	40	30	43	41	228
2.	**Agro-marketing**	40	50	27	23	31	28	20	219
	Total	61	76	54	63	61	72	61	447

Source: Cross River State Ministry of Agriculture, 2019.

Table 1 Number of Registered Agro-Marketing and Horticultural Enterprises in Calabar Agricultural Zone

Table 2. Sampling of the cell from the block

		Blocks								
	Enterprises	**Calabar South**	**Calabar Municipality**	**Akamkpa**	**Akpabuyo**	**Odukpani**	**Biase**	**Bakassi**	**Total**	**%**
1.	**Horticulture**	14	16	14	14	14	14	14	100	50
2.	**Agro-marketing**	14	16	14	14	14	14	14	100	50
	Total	28	32	28	28	28	28	28	200	100

Source: Field Survey Data, 2022.

A. Contribution of plastic materials/products to climate change by agro-marketers

Table 3. Mean rating of respondents based on the contribution of plastic products to climate change among agro-marketing enterprises

S/N	Variables	Agree	Undecided	Disagree	Means	Remark	Ranking
1.	Increase greenhouse gas emissions from plastic life cycle	90	2	8	2.82	Significant	3rd
2.	Massive domestic and municipal waste accumulation	89	2	9	2.8	Significant	4th
3.	Plastic molding, vacuum forming, and extrusion contribute to global temperature rise	71	9	20	2.51	Significant	9th

4.	Gas emission from plastic recycling plant produce more methane gas	90	0	10	2.8	Significant	4th
5.	Explosion of plastic manufacturing industries	92	0	8	2.84	Significant	2nd
6.	Plastic fossil fuel extraction and transport	87	0	13	2.74	Significant	5th
7.	Plastic manufacturing and refining	85	0	15	2.7	Significant	6th
8.	Plastic incineration	81	5	14	2.67	Significant	7th
9.	Methane leakage and flaring from plastic industries	73	7	20	2.53	Significant	8th
10.	Blocking of water ways leading to the accumulation of microbs and dangerous gases which contribute to climate change	95	0	5	2.9	Significant	1st
11.	Plastic pollution reduces the ability of phytoplankton to fix carbon through photosynthesis	69	10	21	2.48	Significant	11th
12.	Reduce reproductive ability in phytoplankton in waterlogged areas with accumulated plastic waste	72	5	23	2.49	Significant	10th

Source: Field Survey, (2022). Benchmark mean ≥ 2.0 Implies significant

Table 3 above, is an indication of the mean ratings of respondents based on the contribution of plastic to climate change among agro-marketing enterprises. According to the result, highly significant variables such as; blocking of water ways leading to the accumulation of micro-organisms and dangerous gases which contribute to climate change ($\bar{x}$ =2.9), explosion of plastic manufacturing industries ($\bar{x}$ =2.84), increase greenhouse gas emission from plastic lifecycle ($\bar{x}$ =2.82) and massive domestic and municipal waste accumulation ($\bar{x}$ =2.8) which ranked 1st, 2nd, 3rd and 4th respectively, are the most perceived contribution of plastic to climate change in the study area according to respondents in the agro-market enterprises.

Low ranks such as; methane leakage and flaring from plastic industries ($\bar{x}$ =2.53), Plastic molding, vacuum forming, and extrusion contribute to global temperature rise ($\bar{x}$ =2.51), reduce reproductive ability in phytoplankton in waterlogged areas with accumulated plastic waste ($\bar{x}$ =2.49) and plastic pollution reduce the ability of phytoplankton to fix carbon through photosynthesis ($\bar{x}$ =2.48) which ranked 8th, 9th, 10th and 11th, were less likely variables that contribute to climate change through plastic utilization.

To collaborate the findings in Table 3, Cristina (2021) asserted that, during plastic recycling, a large amount of heavy metal pollution such as benzene, dioxines and methane gas are released into the environment which affect the climate and cause global warming.

B. Contribution of Plastic Materials/Products to Climate Change by Horticultural Farmers

Table 4. Mean rating of respondents based on the Contributions of plastic products to climate change by horticulturists

S/N	Variables	Agree	Undecided	Disagree	Means	Remark	Ranking
1.	Increase greenhouse gas emissions from plastic life cycle	72	8	20	2.52	Significant	9th
2.	Massive domestic and municipal waste accumulation	65	3	32	2.33	Significant	11th
3.	Plastic molding, vacuum forming, and extrusion contribute to global temperature rise	52	29	19	2.33	Significant	11th
4.	Gas emission from plastic recycling plant produce more methane gas	60	21	19	2.41	Significant	10th
5.	Explosion of plastic manufacturing industries	85	0	15	2.7	Significant	5th
6.	Plastic fossil fuel extraction and transport	92	5	3	2.89	Significant	1st
7.	Plastic manufacturing and refining	84	6	10	2.74	Significant	4th
8.	Plastic incineration	91	0	8	2.81	Significant	3rd
9.	Methane leakage and flaring from plastic industries	78	2	20	2.58	Significant	8th
10.	Blocking of water ways leading to the accumulation of microbes and dangerous gases which contribute to climate change	83	2	15	2.68	Significant	6th
11.	Plastic pollution reduces the ability of phytoplankton to fix carbon through photosynthesis	77	8	15	2.62	Significant	7th
12.	Reduce reproductive ability in phytoplankton in waterlogged areas with accumulated plastic waste	93	0	7	2.86	Significant	2nd

Source: Field Survey, (2022). Benchmark mean ≥ 2.0 Implies significant

Table 4 above, is a mean rated table that shows the contribution of plastic to climate change by respondents in horticultural enterprises. Implications drawn from the result of the table showed that; plastic fossil fuel extraction and transport ($\bar{x} = 2.89$), reduce reproductive ability in phytoplankton in waterlogged areas with accumulated plastic waste ($\bar{x} = 2.86$), plastic incineration ($\bar{x} = 2.58$) and plastic manufacturing and refining ($\bar{x} = 2.74$) which were ranked 1st, 2nd, 3rd and 4th were highly significant factors that influence the contribution of plastic to climate change. According to respondents in horticultural enterprises, least factors that influences the contribution of plastic to climate change were; increase greenhouse gas emissions from plastic life cycle ($\bar{x} = 2.52$), Gas emission from plastic recycling plant produce more methane gas ($\bar{x} = 2.41$), Plastic molding, vacuum forming, and extrusion

contribute to global temperature rise ($\bar{x}$ =2.33) and massive domestic and municipal waste accumulation ($\bar{x}$ =2.33)

The findings in table 4, is in tandem with Cristina (2021) that plastic recycling causes a breakdown which causes severe interference in the soil, water and food, leading to contamination, pollution, entanglement, ingestion, decrease in nitrification, soil quality degradation, disparity in wildlife flora and fauna.

C. Climate Change Influence on the Use of Plastic Products in Agro-marketing

Table 5. Mean rating of respondents based on Climate change influence on the use of plastic products in Agro-marketing enterprises.

S/N	Variables	Agree	Undecided	Disagree	Means	Remark	Ranking
1.	Incubation of disease as plastic may serve as a cold shelter for breeding in a hot weather.	50	10	40	2.1	Significant	13th
2.	High level of temperature leads to degrading of plastic quality	90	2	8	2.82	Significant	3rd
3.	Change in content and colour of plastic product overtime due to exposure to high sunlight	91	2	7	2.84	Significant	2nd
4.	Low heat retention capacity encourages adoption/utilization	61	0	39	2.22	Significant	12th
5.	It degrade the quality of plastic materials/packages to loss it texture	79	1	20	2.54	Significant	6th
6.	Increases the workhour spent in clearing litter from the farm environment	80	5	15	2.65	Significant	5th
7.	Increase the amount of capital input in production	72	8	20	2.52	Significant	7th
8.	Climate change reduces the ability of plastic products to last long	82	5	17	2.73	Significant	4th
9.	Climate change reduces the efficiency of plastic materials to protect stored product from the adverse effect of global warming	69	2	29	2.4	Significant	10th
10.	Climate change increases the consumption of liquid plastic products	70	2	28	2.42	Significant	9th
11.	Continuous heating and cooling of plastic products	95	0	5	2.9	Significant	1st

	leads to spoilage of stored products						
12.	It causes the inactivity of certain ingredients in packaged products by altering the indication/reactions	74	6	20	2.48	Significant	8th
13.	Provides an additional cost of labour	62	8	30	2.24	Significant	11th
14.	Destruction of products and increase in input leads to business failure.	95	0	5	2.4	Significant	1st
15.	Implementation of cost reduction strategy in plastic use	72	10	18	2.54	Significant	6th
16.	Unpredictable weather conditions	95	0	5	2.9	Significant	1st

Source: Field Survey, (2022). Benchmark mean ≥ 2.0 Implies significant

On Agro-market enterprises, Table 5, which represent the mean ratings of climate change impact on the use of plastic product in agro-marketing enterprises by agro-marketers implied highly significant levels with variables such as;

Destruction of products and increase in input leads to business failure ($\bar{x}$ =2.9), unpredictable weather conditions ($\bar{x}$ =2.9), Continuous heating and cooling of plastic products leads to spoilage of stored products ($\bar{x}$ =2.9), Change in content and colour of plastic product overtime due to exposure to high sunlight ($\bar{x}$ =2.84), High level of temperature leads to degrading of plastic quality ($\bar{x}$ =2.82) and Climate change reduces the ability of plastic products to last long ($\bar{x}$ =2.73). these ranked 1st,1st, 1st, 2nd, 3rd and 4th respectively.

Less significant variables on climate change impact on the sue of plastic products among agricultural product marketers include; Climate change reduces the efficiency of plastic materials to protect plants from the adverse effect of global warming ($\bar{x}$ =2.4), Products may become sour, losing it original taste, favour and function ($\bar{x}$ =2.24), Low heat retention capacity encourages adoption/utilization ($\bar{x}$ =2.22) and Incubation of disease as plastic may serve as a cold shelter for breeding in a hot weather ($\bar{x}$ =2.1). These also ranked10th, 11th, 12th, and 13th respectively.

To support this findings, Lev (2021) asserted that from shifting weather patterns to rising sea levels climate change threatens food security, increase the risk and incidence of flooding, acid rain, harsh weather, continuous rise in temperature which affect stored products and packaged products, shelf life, durability, degradation, denaturation and marketability.

D. **Climate Change Influence on the Use of Plastic Products in Horticultural Enterprises**

Table 6. Mean rating of respondents based on climate change influence on the use of plastic products in horticultural enterprises

S/N	Variables	Agree	Undecided	Disagree	Means	Remark	Ranking
1.	Incubation of disease as plastic may serve as a cold shelter for breeding in a hot weather.	40	20	40	2.0	Significant	14th
2.	High level of temperature leads to degrading of plastic quality	99	1	0	2.99	Significant	1st
3.	Change in content, texture and colour of plastic product overtime	92	3	5	2.87	Significant	3rd
4.	Low heat retention capacity encourages adoption/utilization	85	0	15	2.7	Significant	9th
5.	Increased leaching of plastic chemicals into the soil	89	0	11	2.78	Significant	7th
6.	Increases the workhour spent in clearing litter from the farm environment	92	0	8	2.84	Significant	5th
7.	Causes a weakening or loose joint of plastic farm shed, structures and canopies	85	0	15	2.7	Significant	9th
8.	Climate change reduces the ability of plastic products to last long	91	0	9	2.82	Significant	6th
9.	Climate change increases the rate of water loss in plants in the nursery	93	0	7	2.86	Significant	4th
10.	Climate change reduces plastic efficiency to safeguard plants from inclement weather	93	0	7	2.86	Significant	4th
11.	Reduce plastic ability to improve water efficiency	91	0	9	2.82	Significant	6th
12.	Reduce plastic efficiency to boost crop yield up due to harsh weather	75	0	25	2.5	Significant	10th
13.	Reduces plastic efficiency to control weed	68	2	30	2.38	Significant	12th
14.	Reduces the life cycle of plastic irrigation pipes due to exposure to excess heating and wetting	88	2	10	2.78	Significant	7th
15.	Makes plastic products to loose their elasticity	72	3	25	2.47	Significant	11th
16.	Increase the utilization of irrigation water	84	6	10	2.74	Significant	8th

17.	Increase the incidence of disease and insects pests	50	10	40	2.1	Significant	13th
18.	Unpredictable weather conditions	96	0	4	2.92	Significant	2nd

Source: Field Survey, (2022). Benchmark mean ≥ 2.0 Implies significant

The mean ratings in Table 6 of climate change impact on the use of plastic products in horticultural enterprises by respondents in horticultural enterprises presents significant indications of climate change influence on the use of plastic products in horticultural enterprises which include; high level of temperature leads to degrading of plastic quality ($\bar{x}$ =2.99), unpredictable weather conditions ($\bar{x}$ =2.92), change in content, texture and colour of plastic product overtime (2.87), climate change reduces the efficiency of plastic materials to protect plants from the adverse effect of global warming ($\bar{x}$ =2.86) and climate change reduces plastic efficiency to safeguard plants from inclement weather ($\bar{x}$ =2.86).

Other less significant influence represented in Table 6, include; Makes plastic products to loose their elasticity ($\bar{x}$ =2.47), Reduces plastic efficiency to control weed ($\bar{x}$ =2.38), Increase the incidence of disease and insects ($\bar{x}$ =2.1) and incubation of disease as plastic may serve as a cold shelter for breeding in a hot weather ($\bar{x}$ =2.0).

Climate change has ensued the use of plastic which according to Karen (2021), the production of healthy sunflowers and horticultural activities in the greenhouse require a careful control of factors such as nutrients, water and temperature including pest and disease control and management. These factors and practices utilizes the use of plastic to meet this requirement.

E. Plastic Role in Mitigating the Effects of Climate Change in Horticultural Enterprises

Table 7. Distribution of respondents based on the role of plastic in mitigating the effect of climate change in horticultural enterprises

S/N	Variables	Agree	Undecided	Disagree	Means	Remark	Ranking
1.	Improve water utilization/consumption	78	5	17	2.61	Significant	10th
2.	Preserve plants root from harsh weather	82	2	16	2.66	Significant	8th
3.	Improves plant strength and root cohesion	71	7	22	2.52	Significant	12th
4.	Prevent and control erosion	77	8	15	2.62	Significant	9th
5.	Improve soil humidity	69	0	31	2.38	Significant	14th
6.	Reduce water loss from plants due to high rate of evaporation	92	3	5	2.87	Significant	2nd
7.	Prevent wilting and death of plants	93	0	7	2.86	Significant	3rd
8.	Reduce weather variability	60	21	19	2.41	Significant	13th
9.	Enhance efficient use of organic matter	85	0	15	2.7	Significant	6th
10.	Improve temperature for	83	2	15	2.68	Significant	7th

	micro-organisms to thrive						
11.	Enhance better aeration	84	6	10	2.74	Significant	5th
12.	Reduce soil compaction	78	2	20	2.58	Significant	11th
13.	Reduce ground heat to plant	96	2	2	2.92	Significant	1st
14.	Use of water is economical	87	1	12	2.75	Significant	4th
15.	Use of chemicals is economical	82	2	16	2.66	Significant	8th
16.	Normalizes the concentration of carbon dioxide in the soil	71	7	22	2.52	Significant	12th
17.	Plastic shade reduce the overall temperature in the gardens	78	5	17	2.61	Significant	10th
18.	Prevent stunted growth in plants	50	10	40	2.1	Significant	15th

Source: Field Survey, (2022). Benchmark mean ≥ 2.0 Implies significant

According to the result in Table 7. All the variables, on how the use of plastic mitigate climate change effects in horticultural enterprises were significant. This implies that the use of plastic in horticultural enterprises; reduce ground heat to plant ($\bar{x}$ =2.92), reduce water loss from plants due to high rate of evaporation ($\bar{x}$ =2.87), prevent wilting and death of plants ($\bar{x}$ =2.86), use of water is economical ($\bar{x}$ =2.75), enhance better aeration ($\bar{x}$ =2.74), enhance efficient use of organic matter ($\bar{x}$ =2.7), improve temperature for micro-organisms to thrive ($\bar{x}$ =2.68), among others, which ranked 1st to 7th respectively.

The findings of Table 7, shows that plastic helps to reduce the harsh effects of climate change, which according to Cristina (2021), is now very essential in our daily lives such that it is very difficult to eradicate them. If not, the world environmental bodies could have found it very easy to replace the use of plastic.

CONCLUSION AND RECOMMENDATION

The study discovered that plastic has a significant impact on the occurrence of global warming as numerous operations of it extraction, molding, forming, disposal and recycling, contribute to climate change as indicated by respondents. On the other hand, climate change affects the nature, quality and texture of most plastic products in various ways which can cause a deterioration of products in package. Plastic perform a crucial role in reducing the damage associated with climate change in horticultural farms.

The study recommended that environmental and agricultural agencies in the state should synergize to enhance safety and awareness in plastic use by respondents. It further recommended that policies that safeguard food and drinks from plastic pollution be enacted by government and regulatory bodies. That plastic production companies should seek ways to reduce their carbon emission by using improve climate change mitigation methods. And also that more research that focuses on the negative effect of plastic extraction and production processes as it contributes to climate change be carried out so as to study the relationship between plastic use and climate change, in order to improve knowledge, and mitigate the factors that enhances global warming.

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