



Population Dynamics and Environmental Degradation in Akwa Ibom State, Nigeria

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Abstract

This paper examines population dynamics and environmental degradation in Akwa Ibom State. The study aimed at investigate the impact of population dynamics on environmental degradation in Akwa Ibom State. The population of the study consist of the total population of Akwa Ibom State. With the aid of Taro Yamane formulae, a sample size of 400 were generated. 400 questionnaires were strategically distributed to two local government area from each of the three (3) senatorial districts that made up Akwa Ibom State. The research questions of the study were analyzed using statistical tools of mean and standard deviation in Statistical Package for Social Sciences (SPSS) with a mean criterion of 3.0. The findings reveal that the impact of population dynamics on environmental degradations in Akwa Ibom State are: loss of biodiversity, congestion, land pollution, increase in greenhouse emission, deforestation in Akwa Ibom State etc. The study concluded that environmental degradation problems is not caused only by population dynamics, but by the absence of effective public policy design to reduce these problems. That as long as policies are in place that control the rate of child birth and the environmental impacts of the products and services we make and use, environmental sustainability can and will permeate everyday decision-making of residents, indigene, non-indigene and government of Akwa Ibom State thereby leading to sustainable environment.

Introduction

For many years past, we have become increasingly aware of population, natural resources and environmental problems facing communities, nations and the world at large. During the period, population, natural resources, and environmental issues have grown in scope and urgency. “Many developing countries such as Nigeria are using their natural resources at rates faster than the natural rate of replacement to sustain their rapid population growth; to generate foreign exchange; and to produce raw materials for industries.” Land, water and forests are among those valuable resources under excessive pressure due to human exploitation. “Millions of poor farmers destroy vast tracts of forest lands to make room for agricultural activities that will provide sufficient food for their household, community or country” (Pay Drechsel et al. 2001).

Human population has grown slowly throughout most of our history. Only the past 200 years has seen rapid global population growth become a reality. Humans have sought to understand the relationship between population dynamics and the environment since the earliest times, but it was Thomas Malthus (1798) in “Essay on the Principle of Population that is credited with launching the study of population and resources as a scientific topic of inquiry.” Malthus’ famous hypothesis was that population numbers tend to grow exponentially while food production grows linearly, never quite keeping pace with population and thus resulting in natural “checks” (such as famine) to further growth. Although the subject was periodically taken up again in the ensuing decades, for example George (1864) in his book titled *Man and Nature* “concern over human-induced soil depletion in colonial Africa, it was not until the 1960s that significant research interest was rekindled.” Akwa Ibom State was created on the 23rd of September 1987 by the then Military Administration of General Ibrahim Badamosi Babangida. The creation of the State brought to fruition years of prolonged struggle by the people that occupied the mainland part of the former Cross River State. The state lies between Latitudes 4° 32’ and 5° 33’ North and Longitudes 7° 35’ and 8° 25’ East, the State is bounded on the East by Rivers State, on the West by Cross River State, on the North by Abia State and on the South by the Gulf of Guinea. Akwa Ibom State currently covers a total land area of 7,249 square kilometers. The area does not take into consideration disputed territories. It is the 10th largest state in Nigeria in terms of landmass. About 13.4 percent of the 960km of Nigeria’s Atlantic Ocean coastline runs through the State. Akwa Ibom is one of the 36 States in the Nigerian Federation. The State is divided into 31 local government areas with Uyo as the State capital. Other major towns include; Eket, Ikot Ekpene, Ikot Abasi, Oron, Abak, Itu, Etinan, Ibeno, etc. As of 1991 National population census, the state population was 2,409,613, census 2006 it rose to 3,902,051 and in 2016 it was projected by Nigeria bureau of statistics 5,482,200 at 3.5% annual population change. As the population of Akwa Ibom State continues to increase and becomes more affluent, the “impact of population dynamics, especially the absolute increase in human numbers each year due to natural increase and/or mobility, has had a crucial effect in the state of natural resources.” “As population continues to expand in number, it exerts increased pressure on the proper functioning of the ecosystem and natural resource stocks. One of the reasons for the shrinking size of land holdings as well as the degradation of forest, soil, and water resources in many areas of the developing world is the direct result of rapid population growth” (Drechsel, Kunze and Vries, 2001). According to Rees (2011), much of the population growth in the next forty years will take place in less developed countries, particularly those of sub-Saharan Africa of which Akwa Ibom State is part of this region. The growing population of Akwa Ibom State poses challenges to politics, agriculture, sustainable development, environment, food security and migration not just to Akwa Ibom State but Nigeria as a whole in the present day, research in Nigeria have confirmed the persistent growth of population size which have brought about decrease in the rate of food production, congestion, unemployment resulting to social disorder, environmental degradation such as pollution (air, water and land), deforestation, urbanization, desertification, logging/lumbering, soil degradation, floods, oil spill etc. The population of Akwa Ibom State as of 1991 National population census was 2,409,613, has increased to 3,902,051 (NPC, 2006) and 2016 it was projected by Nigeria bureau of statistics 5,482,200 at 3.5% annual population change. The focus now in Akwa Ibom State is how to increase agricultural productivity with minimal attention given to resource/environmental sustainability in order to cater for the growing population in the

state which has led to diverse environmental degradation which has become a problem in the state. Therefore, this paper review the impact of population dynamics on environmental degradation in AkwaIbom State. It is on this background that the researcher intends to carry out this study in other to solve this problem that has been identified.

Conceptual Clarification

Population

Anyanwu et al (1987) put forward that “Population in Economics refers to the number of people (human population) living in any defined area such as Lagos, Abuja, Aba, Port Harcourt, Uyo.” Population is the total number of people living in a particular geographical area over a given period of time.

Population Dynamics

Population dynamics refers to how the number of individuals in a population changes over time. It can also be seen as the way in which the size and age structure of population change over time and the characterization of that change in mathematical terms. Population dynamics is the changes in the size, structure, and distribution of the global population.

Environmental Degradation

The United Nation International strategy for Disaster reduction (UNISDR, 2001) defines environmental degradation as the reduction of the capacity of the environment to meet social ecological objectives, and needs. Tyagi, et al., (2014), see environmental degradation as the deterioration of the environment through the depletion of natural resources such as air, water and soil. Chopra (2016) defined environmental degradation as the disintegration of the earth or deterioration of the environment through consumption of assets like, air, water and soil, the destruction of environment and the eradication of wildlife. Environmental degradation can be defined as the continuous disturbance of the environment through depletion of resources such as air, water, and soil; the destruction of ecosystem, habitat destruction, extinction of wildlife, and pollution. The main components of population dynamics are births, deaths, and migration. Birth Rate (B): This is the rate at which new babies are born in a country. High birth rate increases the population size, if it is low the population size will decrease. Death Rate (D): this is the rate at which death occurs in a country. High death rate will decrease a country population, while low death rate will increase the population size. The difference between births rate and deaths rate represents natural growth rate. Johnson (2003) “defined migration as the movement of people into and out of a country over a period of time.” He also stated that migration is sub-divided into two which are as follows:

Immigration (I): this is a process whereby people can move into a country from other countries. Increase in immigration increases the population size of a country. Emigration (E): this is a process whereby people go out of a country to settle in other countries either permanently or on a temporary basis. Many theories have been developed in relation to population and environment

sustainability across the world. Two of them that are practically applicable to this study which are the Malthusian and Demography transition theories.

Malthusian Theory

Reverend Thomas Robert Malthus an English Political Economist was concern about the political and socio economic condition of Great Britain regarding to population growth and food production, that he came out with the following proposal on population as embodied in his first essay titled; “Essay On Population 1798”

That human nature and impulses undergo appreciable changes over time. That an equalitarian society is unnatural. Saying that in a given society, everybody cannot be equal. That nothing could be done to wipe out poverty which is inherent in a given society. That poverty can never be related to either good or bad government. That change of any government cannot therefore stop poverty. That human tendency could be traced as the source of poverty. That want would arise as human population grows above food production. That the power of human population could increase far greater than the power of earth to produce food. That if human beings are not check in their natural form, human population will grow at a geometrical progression while food production increases at arithmetical progression. That population will grow at the rate of 1, 2, 4, 8, 16, 32, 64..... while food production will grow at the rate of 1, 2, 3, 4, 5, 6, 7, That if population still remains unchecked, human beings will double themselves in every 25 years and will increase 64 times in the next 150 years and that food will increase 7 times. That increase in food will lead to increase in population will lack of food will decrease population because many people will die of hunger. Malthus went further in his essay to give a recipe on how to check rapid growing population. He divides the checks into two: positive and preventive checks. **Positive checks** are those factors that brings about deaths of existing lives like war, pestilence, child exposure, infanticide, vicious customs etc.; while **preventive checks** are known as the postponement of marriage and voluntary abstinence. Malthus concluded that the two above checks can only control population growth and not to stop it because, according to him the issue of poverty and having more people to feed will always remain as a general law of nature.

Demographic Transition Theory

The theory is based on an interpretation of demographic history developed in 1929 by the American Demographer Warren Thompson. Demographic transition is a phenomenon and theory which refers to the historical shift from high birth rates and high infant death rates in societies with minimal technology, education (especially of women) and economic development, to low birth rates and low death rates in societies with advanced technology, education and economic development, as well as the stages between these two scenarios. Although this shift has occurred in many industrialized countries, the theory and model are frequently imprecise when applied to individual countries due to specific social, political and economic factors affecting particular populations. Demographic transition theory talks about the transfiguration or changes a country’s population structure undergoes as a result of economic development.

Literature Review

Ehrlic & Holden (1971), rising human population is the predominant factor in accelerating pollution and other resources problems, in both developed and developing nations of the world.

Meadow, et al. (1974) concluded that if present trends in the world population, industrialisation, pollution, food production and resource depletion continued with the same pace, the most probable result will be an uncontrollable decline in both population and industrial capacity.

Mureithi & Otieno (1975) pointed out that there is a likely imbalance in the next decade between agricultural production and population growth. They suggested that the problem can be solved from the demand side by reducing the population growth rate or from the supply side by increasing the agricultural production. The alternative is easier to effect. The former might be easier if we were to emphasize population control benefits to the people because the latter might be difficult because of the decreased sizes of land and lack of capital to improve the agricultural production technology.

Bernard and Anzazi (1979) observed that population pressure emerges when humans and their activities exceed the carrying capacity of that region to feed, clothe and sustain them. They seemed to agree with Ominde that Kenya's population pressure especially in the high potential districts has exceeded the carrying capacity of those areas resulting in land degradation and migration.

Ness GD et. al (1984) writing on population planning in Asia puts it very well that the land is shrinking and the children keep on coming it is hard to breath. He was referring to the decreasing land holdings caused by the increasing number of population.

Thomes (1989) stated that population growth contributes to high rates of deforestation both directly and indirectly.

Trainer (1990) stated that most of the developing countries suffer because of the rapid increase in population, that in turns cause to deplete natural resources, raising air and water pollution, deforestation, soil erosion, over grazing and damage to marine and coastal ecosystem. Because of rapidly growing population there is a tremendous pressure on the environmental resources to produce more food for growing population.

Kilewe and Thomas (1992) in their studies on land degradation in Kenya noted that land degradation through soil erosion is a pressing problem. They argued that each year, hundreds of hectares undergo land use changes where forests and grasslands are continuously converted to pastoral and agricultural land. This reduces the ground cover which is a potential catalyst to soil erosion. They concluded by saying that if this degradation of land resource is left unchecked; it would threaten the basic elements of life by decreasing the ability of Kenya's land resource to produce food supply that Kenya needs and lowers the quality of air and water. The other problem which emerges because of population pressure is migration. People will move from the densely populated areas to the sparsely populated areas or to urban centres.

Richard E.B. (1992) observed that changes in demographics as well as economic behaviour being induced by population growth and increasing pressures upon the land brings about increase in deforestation (of highland forests as well as lowland forests), soil erosion and soil desiccation.

Cropper and Griffiths (1994) argued that population growth, by increasing the demand for arable land, encourages the conversion of forests to agriculture. Since the people living in rural areas who are dependent on agriculture as a livelihood, one would expect deforestation to increase with rapid population density as well as rising demand for wood for both timber and fuel.

Cleaver and Schreiber (1994) found a declining trend among food productivity; population growth and natural resources, which deplete soil productivity resulting in vicious circle of population, poverty and environmental degradation.

Rosero-Bixby and Palloni (1998) conducted a study in Costa Rica, the study shows that propensity of deforestation increases with accessibility as well as desirability of the land for agriculture. The same study further reveals that deforestation is found to be high in areas where there is high population concentration.

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A study of Dasgupta and Lubchenco (2000) empirically found relationship between population growth and natural resources in the United States. He stated that the composition and scale of activities in the United States are changing chemistry of the nation's land, water and atmosphere so dramatically that some of these changes are adversely affecting its natural capital and thus, the ecosystem services are required to support its population.

The study by Drechsel, Kunze and Vries (2001) in Sub-Saharan Africa similarly shows that fast growing population has been exerting substantial stress on natural resources and the agricultural populations are moving to hitherto unoccupied and protected areas resulting in biophysical deterioration like soil fertility and deforestation.

Pingali, Elahietal., (2001 and 2019) stated that inputs such as chemical pesticides and fertilizers can lead to various environmental problems (pollution of water bodies, reduction of useful insects, declining soil fertility), and health hazards for humans, especially when not properly handled.

Mcneill (2006) reaffirms that population exerts unprecedented pressure on the natural environment directly or indirectly. He further argues that the speculations that much of the world's cropland will be changing to nature will not be materialized for the reason that many of the poor farmer's in developing countries will continue clearing forestland.

Wolter, Johnston and Niemi, (2006) Findings show that "land use and cover change is an indicator of changing human demographics, natural resource uses, agricultural technologies, economic priorities, and land tenure systems".

Long, et al., (2007) identified industrialization, urbanization, population growth, and China's economic reforms as major factors of land use changes in Kunshan. Another study in Zimbabwe also recognized that pressure for agricultural land, building materials and fuel wood triggered land use/cover changes.

Khan et al. (2009) suggested that rapidly growing population not only increases pressure on marginal lands, over-exploitation of soils, overgrazing, over cutting of wood, soil erosion, silting, flooding but also increases excess use of pesticides, fertilizers, causing land degradation and water pollution.

Makhanya, (2015), examined the effect of demographic dynamics on land degradation. The survey study revealed that demographic trends and factors have a critical influence on consumption patterns, production, lifestyles and long-term sustainability. Also, that Ratau was overpopulated, overgrazed, underdeveloped and degraded. It was further established that there are some linkages between material poverty of the villagers, poor agricultural land management and environmental degradation, which indicates an adverse synergistic relationship between demographic dynamics and sustainable rural development in the study area.

Lebogang, (2017), investigated the role of cultural and demographic factors in environmental degradation along Metsimotlhabe River on the northern outskirts of Gaborone city, Botswana. The study revealed that a rapid rise in the human population, unemployment, rural to urban and cross border migration and the cultural norm of livestock keeping have contributed to degradation along the Metsimotlhabe River.

Borderon, et al., (2019), examined the extent of migration influenced by environmental change with a focus on Africa. Using qualitative and quantitative studies that cover 53 countries, the study revealed that environmental change does influence migration in Africa. Thus, this study unravels the complex interactions between the nature and duration of the environmental pressure and that the livelihood of the population.

Majeed and Ozturk, (2020), investigated the relationship between environmental degradation and population health using global panel data of 180 countries from 1990 to 2016. The analysis is conducted using two-stage least squares (2SLS) and system-generalized method of moments (SGMM) and fixed-effects approach based on the Hausman test. The result revealed that environmental degradation negatively influences population health outcomes. Thus, the study concludes that health-related reforms need to be aligned with policies that ensure lower environmental degradation.

Jipinget, al., (2022) investigate the role of environmental degradation, institutional quality, and government health expenditures for human health: evidence from seven countries. The study reviewed that economic growth, government health expenditure, human capital significantly reduces human health disasters like malarial incidences, cases and at the same time greenhouse gas emissions and regulatory quality are significantly positively correlated to human health issues in emerging economies.

From the above literature review, none of these studies talk about the impact/nexus between population dynamics and environmental degradation in Akwalbom State. This study therefore, departs from previous studies by examining just the nexus between population dynamics and environmental degradation using Akwalbom State as a case study.

Methodology

Sample Size

The population of this study consist of all the 31 local government areas that made up Akwalbom State. In 1991 National population census, the state population was 2,409,613, census 2006 it rose to 3,902,051 and in 2016 it was projected by Nigeria bureau of statistics 5,482,200 at 3.5% annual population change.

The sample size for this study was determined with the aid of Taro Yamane formula.

The formula of Yamane (1979) is presented as follows:

$$N = \frac{N}{1+N(e)^2}$$

Where :

N = population of study

e = degree of freedom/significance at 5% (0.05)

l= constant

Substituting numbers in to the formula we have:

$$n = \frac{5,482,200}{1+5,482,200(0.05)^2}$$

$$n = 399.9 = 400.$$

Sampling Techniques

Both primary and secondary sources of data was used for this study. A closed-ended questionnaires was strategically distributed to a sample of 400 residents which cut across the 3 senatorial district in Akwalbom State of which 380 returned. Purposive sampling techniques were adopted for the study. For the purpose of clarity, six (6) local government out of the thirty-one (31) Local Government Area in Akwalbom State were purposively selected as the sample of this study. The choice of using Purposive sampling techniques in this research work is that it provides non-probability samples which receive selection based on the characteristics which are present within a specific population group and the overall study. The research instrument adopted for this study was a self-structured questionnaire titled: Population Dynamics and Environmental Degradation (P.D.E.D). It enabled the researcher obtained relevant data for the research. The questionnaire was designed to elicit information from the respondents, and to suit the need and purpose of the study. Descriptive statistics and non-parametric statistical tools were used as the

instruments of data analysis to analyze responses from the respondents. The descriptive statistical tools of: tables, percentages, averages and more were also used for data presentation. On the other hand, 5 Linkert scale with the use of Mean Deviation in Statistical Package for Social Science (SPSS) were used in analyzing the three research questions. The research questions were analyzed using a mean criterion of 3.0 for the research questions, an aggregate mean below 3.0 means the respondents disagree with the stated research question while an aggregate mean of 3.0 and above means the respondents agree with the stated research questions.

Data Presentation, Analysis and Discussion of Findings

Presentation of Data

The breakdown of Questionnaires Administered and Returned

State of Resident	Numbers Distribute	Numbers Returned	Percentage
Ukanafun	30	27	6.75
IkotEkpene	40	38	9.5
Eket	80	79	19.75
Oron	70	64	16
Uyo	90	87	21.75
Etinan	90	85	21.25
Total	400	380	95

Source: Researcher's Fieldwork, 2022.

Sex of the Respondents

Sex	Frequency	Percentage (%)
Male	175	43.7
Female	225	56.3
Total	400	100

Source: Field Work, 2022

Age of the Respondents

Age	Frequency	Percentage (%)
18-30 yrs	60	15
31-45 yrs	55	13.7
46-60 yrs	100	25
61 and above	185	46.2
Total	400	100

Source: Field Work, 2022

Occupation of the Respondents

Occupation	No of Respondents	Percentage (%)
Retired Civil servants	70	17.5
Farmers	195	48.8
Students	55	13.7
Traders	80	20
Total	400	100

Source: Field work 2022

Area of Residents of the Respondents

Residential Area	Frequency	Percentage (%)
Urban	262	65.5
Semi-Urban and Rural	138	34.5
Total	400	100

Source: Field Work, 2022

Academic Level of the Respondents

Academic level	Frequency	Percentage (%)
FSLC	50	12.5
WAEC	185	46.2
B.SC	120	30
Postgraduate	45	11.2
Total	400	100

Source: Field Work, 2022

Data Analysis

The data for this study is hereby presented and analyzed below using simple percentage and Statistical Package for Social Sciences (SPSS) software to test the level of significance of the research question.

Respondents Perceptions on the Impact of Population Dynamics on Environmental Degradation in AkwaIbom State

S/N	Factors	Mean	Standard Deviation	Decision
1	More waste is being dumped in the environs of AkwaIbom State as a result of increase in population.	3.44	0.67	Agreed
2	One of the byproducts of population growth is being stress on freshwater which has led to it shortage in AkwaIbom State.	3.31	0.74	Agreed
3	Increase in population led to loss of biodiversity in AkwaIbom State.	3.63	0.64	Agreed

4	Population growth leads to congestion in the environs of AkwaIbom State.	3.35	0.74	Agreed
5	Establishment of industries such as mobile has led to environmental degradation in AkwaIbom State	3.11	0.91	Agreed
6	Population growth brings about increase in land degradation in form of land pollution in AkwaIbom State.	3.43	0.73	Agreed
7	Diverse means of transportation that has release huge quantities of poisonous gases such as carbon monoxide, nitrogen oxides, and hydrocarbon is as a result of population growth in AkwaIbom State.	3.53	0.55	Agreed
8	Population growth brings about increase in greenhouse emission in AkwaIbom State.	3.14	0.91	Agreed
9	Increase in population lead to increase in water and land pollution which in turn reduce the level of productivity in AkwaIbom State.	3.27	0.80	Agreed
10	The use of old technology such as vehicles, generators, and motor vehicle has led to both noise and air pollution in AkwaIbom State as this disturb it natural environment.	3.48	0.55	Agreed
11	Deforestation has led to the loss of valuable plant and animal habitat as a result of increase in population in AkwaIbom State.	3.53	0.63	Agreed
12	Most of the trees that provide shelter, oxygen to the natural environment is being cut down and used for building of house for the timing population in AkwaIbom State.	3.42	0.65	Agreed
13	Most of the creeks and water ways are being filled and use to build houses, shops, schools, churches in AkwaIbom State thereby causing flood and erosion in the state.	3.48	0.57	Agreed
14	Increase in human and industrial activities has led to various oil spill in AkwaIbom State which has affected it environment.	3.31	0.74	Agreed
	Aggregate mean	3.39	0.70	Agreed

Source: Field Work, 2022

Discussion of Findings

The findings of this research revealed the impact of population dynamics on environmental degradation in AkwaIbom State. According to the findings, the impact of population dynamics on environmental degradation are; population growth brings about increase in waste dumping in the environs of AkwaIbom State, shortage of freshwater which is being stress by the byproduct of population growth in AkwaIbom State, loss of biodiversity in AkwaIbom State, population growth lead to congestion in the environs of AkwaIbom State, increase in environmental degradation as a result of establishment of mobile in AkwaIbom State, land pollution, population

growth has bring about diverse means of transportation that has release huge quantities of poisonous gases such as carbon monoxide, nitrogen oxides, and hydrocarbon in AkwaIbom State, population growth brings about increase in greenhouse emission in AkwaIbom State, increase in population lead to increase in water and land pollution which in turn reduce the level of productivity in AkwaIbom State, the use of old technology such as vehicles, generators, motor vehicle has led to both noise and air pollution in AkwaIbom State which disturb it natural environment, deforestation which has led to the loss of valuable plant and animal habitat as a result of increase in population in AkwaIbom State, cutting down of trees that provide shelter, oxygen to the natural environment for building of house for the timing population in AkwaIbom State, filling of creeks and water ways for the purpose of building houses, shops, schools, churches in AkwaIbom State thereby causing flood and erosion in the state, increase inhuman and industrial activities which has led to various oil spill in AkwaIbom State which has affected it environment.

Conclusion

No doubt, the economy of every states and nation of the world is determined by its population and enabling environment. The level and quality of its population and environment couple with good government policies will determined the level of development in any given state. AkwaIbom State population in urban and semi urban areas are beginning to outweigh the level and rate at which it environment can produce food as a result of increase in population thereby causing divers environmental problem. The rural residence is busy clearing forest and burning bushes in the name of fetching fuel wood for domestic energy purpose as such in return cause flooding, erosion, degradation, loss of habitats and desertification.

Conclusively, environmental degradation problems are not caused only by population dynamics, but by the absence of effective public policy design to reduce these problems. There is nothing incompatible with population and environmental protection as long as policies are in place that control the rate of child birth, and the environmental impacts of the products and services we make and use. With those policies in place, a concern for environmental sustainability can and will permeate everyday decision-making of residents, indigene, non-indigene and government of AkwaIbom State thereby leading to environmental sustainability which in turns will benefit all of the citizens in the state.

Recommendations

The following are recommended to AkwaIbom State government to adopt in order to achieve optimum population that will be environmental friendly:

- i) Government of AkwaIbom State should establish a law that will help to reduce the number of family size to at most two children.
- ii) Government of AkwaIbom State should adopt the use of PIGOVIAN TAX which assessed against private individuals, business and industries in the state for engaging in activities that create adverse side effects for the environment. This means that tax per unit of the

economic activities of individuals, business and industries that course damages to the environment should be implemented.

- iii) Government and NGOs should encourage farmers and industries in the state to use modern technology and techniques of production by providing this technology for them or by given them loans that will enable them to afford this technology so as to reduce the rate of environment damage.

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