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A Study of Growth Rate in the Productivity of Principal Crops in Sagar Division

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Abstract - Any growing economy that relies heavily on agriculture must go through the process of agricultural development in order to hasten economic progress. Agriculture is a crucial priority sector. Programs for agricultural development have placed a strong emphasis on productivity growth, which is now just as vital as growth due to expansion. Determining trends in area, production, and productivity as well as examining the expansion of area, production, and productivity of certain crops in the research region are the objectives, and the study in which discussed about agriculture, Agriculture and ecology' Growth and productivity of principal crops in Madhya Pradesh.

Keyword - agricultural, fertilizer, HYV

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INTRODUCTION

Agriculture is critical to the country's development. It makes a significant contribution to India's national GDP and creates a huge number of jobs in the country. Over the last few decades, agriculture in India has advanced enormously. Since the introduction of the new High Yielding Varieties, agricultural technology in India has undergone a significant revolution (HYVs). With the introduction of these fertilizer-responsive seedlings, yields per unit area have increased dramatically in numerous crops, giving the country a much-needed degree of food grain self-sufficiency. Traditional agriculture's stranglehold has been broken by increases in contemporary input usage, irrigation, and the use of agricultural technology. Green Revolution refers to the development as a revolution that has taken place. Chemical fertilizers, herbicides, better crop types, and irrigation were all advocated during the Green Revolution as a way to increase crop output in countries that had previously been deficient in food grain production. The new agricultural development plan's success has given the Indian agriculture sector fresh hope.

Land usage, soil, water, biodiversity, and the landscape are all impacted by agriculture in some way. Because of the use of agricultural inputs and management of soil fertility, intensive farming has disrupted the biological equilibrium. The area irrigated the cropping intensity of the land, and the rice-wheat HYVs have all increased considerably. Conversely, the acreage devoted to pulses, oilseeds, fodder, and natural inland fisheries is steadily shrinking. It is becoming increasingly difficult to use traditional cropping methods including mixed cropping, crop rotation, and intercropping. Since irrigation, artificial fertilizers, and pesticides have become more important, mono-cropping has become more common.

The state's overall development strategy must include agricultural development as a key component. At the time of the state's founding, people had varied perspectives. During the Green Revolution, agriculture in the state grew rapidly, making it self-sufficient in food production. Consequently, food grain output has increased from 2.6 million tons (MT) to 16 million tons (MT) during (2010-11) a six-fold increase. The rice-wheat cycle has become a key production method as a result of enormous improvements in wheat (11-fold) and rice output (16-fold). However, India is currently confronted with two major problems related to agriculture. This includes meeting the growing need for food and agro goods as well as unbalanced agricultural development due to shifting crop patterns. Conversely, the sustainability of the main production systems (rice-wheat, cotton-wheat, pearl millet-wheat/mustard, and wheat-sugarcane) is threatened by monoculture systems, overexploitation of natural resources, poor groundwater quality, and rising production costs in tandem with changing climates.

The development of a space farm would help the construction of a sustainable ecosystem, since plants may be used to recycle wastewater, create oxygen, continually filter the air, and recycle excrement on the space station or spacecraft; Satellites are being utilized to assess moisture levels

and ground temperatures to find out the optimal conditions in which to produce the duckweed. Reducing the acreage required for animal feed crops would minimize deforestation. Agriculture is crucial to the future of sustainable development. Globally the whole business is being pushed to generate around 70 percent more food to feed 9 billion people by 2050. It has been recognized that much of this growth will need to come from increased land and water productivity as well as extension of arable and irrigated regions. However, now, agriculture uses 70 percent of global freshwater, and generates nearly a quarter of all global greenhouse emissions. Some of the present agricultural techniques have detrimental repercussions on water quality, and they harm biodiversity via land removal and habitat fragmentation. Commodities production has been cited as one of the primary drivers of deforestation globally. Therefore the major issue on the future of global sustainable development is how this massive growth in food and farm commodities supply can be accomplished in a sustainable fashion.

Agriculture

Agriculture is the activity of raising crops and animals for food or other purposes. In the emergence of sedentary human civilization, agriculture was crucial, as cultivating domesticated species generated food surpluses that allowed humans to dwell in cities.. Agriculture has a long and illustrious history that dates back thousands of years. Neolithic farmers first planted wild grains approximately 11,500 years ago after beginning to collect them around 105,000 years earlier. Over 10,000 years ago, humans tamed pigs, sheep, and cattle. More than a dozen different parts of the world have their unique plant lore. Around 2 billion people were still dependent on small-scale subsistence farming until industrial agriculture, based on large-scale monoculture, took over in the twentieth century.

Technology and modern agronomy have improved agricultural yields by a factor of ten while creating extensive ecological and environmental harm, such as pesticides and fertilizers. Modern techniques in animal husbandry, such as selective breeding, have improved meat production while also raising questions about animal welfare and environmental harm. Antibiotic resistance and growth hormones in commercial meat production are just a few of the environmental problems we face today Ecological problems like desertification and climate change may all have a negative impact on agricultural outputs since agriculture is a source of these problems as well as their focus. Genetically modified organisms are illegal in certain countries, while they are widely used in others.

Foods, textiles, energy, and raw materials are among the most important agricultural goods (such as rubber). Cereals (grains), vegetables, fruits, oils, meat, milk, fungus, and eggs are examples of food classes. Only the service sector employs more than a third of all people on the planet, but agriculture has seen a steady decline in recent decades, especially in emerging nations where industrial agriculture and automation are taking the place of smallholdings.

The ratio of agricultural output to input is used to calculate agricultural productivity. Crop yield, which refers to the weight of an individual crop, is commonly used to gauge the entire agricultural production. As a result, the market value of the finished product is commonly used to calculate agricultural productivity. Many other inputs, such as labor or land, can be used to compare this productivity. Partial measurements of productivity are what are known as such comparisons.

Total factor productivity (TFP) can be used to estimate agricultural production. By comparing an index of inputs to outputs, one may calculate agricultural productivity. To address the drawbacks of partial productivity measures, such as the difficulty in determining what variables are responsible for changes, this measure of agricultural productivity was developed to address such issues. TFP shifts are frequently ascribed to advances in technology.

Food security is largely dependent on agricultural production. Deforestation and other environmental degradation and climate change can be slowed by increasing agricultural output and using sustainable techniques to do so.

Agriculture And Ecology

Numerous applications of agroecology may be made, including as a scientific study, as well as a social movement. Agroecology now offers a multidisciplinary framework for studying agriculture's activities. Agriculture and ecology are two intertwined disciplines that cannot be separated. Ecology has a wide range of definitions, each provided by different ecologists. Modern technology has both severe environmental and socio-economic consequences, which is why agroecology focuses on preserving dynamic agriculture that maintains yields and maximizes the use of local resources while reducing those impacts. As defined by the OECD, agroecology is "the investigation of the relationship between crops and the natural environment.”Agro-ecology" is a scientific field of study, agricultural practice, or political or social movement, according to. For environmentalists and others, sustainable agriculture is defined as "a full systems shift toward food, feed, and fiber production that balances environmental reliability, social fairness and economic feasibility among all sectors of the public, as well as global and intergenerational peoples. With this definition, it's clear that sustainability is meant to encompass all living things, including people, not just those on the planet right now. In other words, agroecology examines all of the inputs and outputs of the system as a whole, including cultural and environmental influences as well. Using this information, the food production system may be

improved while also meeting the needs of the ecosystem and its inhabitants.

REVIEW OF LITERATURE

Karol Kociszewski (2018) As a starting point for identifying potential alterations in Polish agriculture, the goal is to systematize agricultural development ideas related to sustainable development (SDA). A review of the literature was used to determine the differences between the ideas presented by the author using descriptive and comparative analysis. Reduced agricultural productivity might have both good and negative environmental effects for sustainable agricultural and rural development (SARD) and multifunctional rural development (MRD). As a result, it's better for sustainable development (SD) if multifunctional agriculture is based on environmental criteria. If this is the case, we are on the verge of having environmentally friendly agriculture. This is why the author developed and used his definition of the SDA and its goals. For Polish agriculture, the sensible rule of sustainability protects the country's essential natural capital. Poland's agriculture is now through a dual development phase (industrialization and sustainable transition). Agriculture funding should be tied to environmental compliance and the supply of public benefits, according to the SDA's position. It is dependent on the CAP's environmental and economic policies being appropriately directed and efficiently executed.

Luu Tien Dung, Phan Van Hai, et al., (2018) Vietnam has achieved significant progress in improving agricultural growth throughout the country's three decades of agricultural rehabilitation from 1989. Value-added in agricultural output has risen considerably as have product volumes, exports, and product values added. Despite this, the model of growth was largely extensive and heavily reliant on natural resources. As a result, the sector's growth is now slowing due to factors such as a spontaneous and small-scale production model, weak technological application in agro-forestry-fisheries, stagnant expansion of arable land, scarcity of water resources, increasing environmental degradation, and the negative effects of climate change. Using economic and environmental data, this research examines how sustainable agriculture is evolving in Vietnam. It then makes policy recommendations on how to best support the country's continued growth in sustainable agriculture in the next years.

Vishal Tyagi, Mona Nagargade et al., (2018) to feed an expanding population has been India's most difficult post-independence issue. Varieties known for their high yield are therefore utilized in conjunction with irrigation water, fertilizers, or pesticides to maximize crop production. Together, these advanced production methods have enabled the country to build up a food reserve. There is a threat to humanity's continued existence due to natural resource depletion, atmosphere degradation, and pollution brought on by human-induced environmental alteration manifested as climate change. As time has passed, chemical farming's heavy reliance has shown some of its darker aspects. There is a loss of fertility in the soil, which necessitates the use of more fertilizer. Due to pests growing more resistant, spraying must be done more often, resulting in residues far above the permissible threshold. As a result, a new sustainable development concept was required. One way to stop this downward trend is to switch to organic farming. Organic farming techniques provide some remedies to the challenges now plaguing industrialized or green revolution nations' agriculture sectors, according to a critical evaluation. But there's a question over whether big-scale organic farming will be able to meet India's vast population's growing demand for food without harming the land and the environment. This includes all farming methods that preserve environmentally sound, socially responsible, and commercially viable agriculture. The disadvantages of traditional farming may be solved by organic farming. Organic agricultural techniques are urgently required to improve the environment's health, and they should be considered as a mitigation strategy for climate change. Food safety, environmental stewardship, and organic farming are some of the key concepts.

Jialing Yu and Jian Wu.,(2018) "The Sustainability of Agricultural Development in China: The Agriculture–Environment Nexus" Environmental consequences are affected directly or indirectly by agriculture policies already in place. Agricultural policies and conservation policies are examined for their effects, adequacy, and conflicts, as well as some unforeseen side effects. As a result of the article's findings, it is concluded that China's technological and institutional innovation should focus on more integrated sustainable development, taking into account the agriculture–environment linkage.

Lu Zhang, Chengxi Yan, et al.,(2018) "The impact of agricultural chemical inputs on the environment: global evidence from informatics analysis and visualization " There have been three distinct phases of study on this issue during the last 30 years, according to our results, namely an early phase (1990–99), a medium phase (2000–07), and a late phase (2008–16). Directions for research for the three outlined stages include studying pesticides and veterinary drugs' effects on the environment, fertilizer use's impact on the environment, food safety, and food safety technologies, as well as agricultural chemical inputs' impact on the environment through monitoring and control strategies. Agricultural scenarios of food crop production and fish aquaculture are the focus of most studies on our area of interest. Pesticides and fertilizers are two of the most important agricultural chemical inputs. Pesticides are widely used. Regarding the influence of agricultural inputs, soil and water are the most investigated environmental media because of pollutant production and transfer processes, Cycles

of nitrogen and phosphorus, as well as indications for impact assessment Methods for preventing pollution and reducing it are also being studied extensively. Finally, institutions and organizations in North America, Eastern Asia, and Europe have made significant contributions to this area of research.

Saikia Dibyajyoti (2012) studied the geographical factors affecting agriculture in the Nagaon area of Assam. During the period from 1990-91 to 2005-06, researchers looked at how physical and nonphysical factors impacted agricultural growth. They also examined changes in cropping patterns, cropping intensity, crop combination, crop diversification, and the introduction of commercial crops. 14 variables were used with the aid of main component analysis and composite z-score analysis to study agricultural land use patterns, degree of agricultural development, and variations in those patterns.

Pierre-Marie BOSC and et al (2012) investigated the changes in agriculture, their variety, and the difficulties they present. When he did this research, he looked at how structural changes affect agriculture and the role it plays in economic development. He also looked at productivity as an important aspect of agricultural transformation and how to use a new paradigm to analyze it. He also looked at how different farms and regions have changed as a result of the new paradigm in agricultural transformation. He's also looked into and kept tabs on changes in agriculture. He has a few indicators including labor, land, capital, and equipment inputs that he uses in his research.

Manjunatha, B. L.; Dipika Hajong et al., (2012) "impact of agricultural development on the environment" Even if the amount and frequency of chemicals used in fanning have increased with each cropping season, more chemicals are still needed to restore the soil while crop production is declining. More groundwater depletion and pollution were brought to light due to increasing irrigation. Farmers in Punjab with shallow wells are being compelled to build tube wells as the water table drops by 0.6 meters each year due to this problem. The threat to ecosystem biodiversity is also said to be increasing as a result of the introduction of GM crops, even among those who support genetic engineering in agriculture and refer to it as the "second green revolution.

Victor Tamba Simbay Kabba and Jiangfeng Li (2011) analyzed changes in land use and land cover, as well as the ecological consequences in Wuhan, China. He used Land sat TM images and remote sensing technology to examine changes in land-use patterns from 1987 to 1994 and from 1994 to 2005. Urbanization, socioeconomic factors, ecological consequences, and land-use changes all affected each other, as he had discovered in his research. During this time, changes in socio-economic variables and population had resulted in changes in land use and land cover, which he had not considered.

Vyalij P. Y. (2011) conducted a study on Nashik district's agricultural land usage There were also studies on the spatial-temporal analysis of agricultural productivity to discover agricultural problems, and he studied the spatial-temporal analysis of irrigation facilities, agricultural land use, and agricultural regionalization using various crop combination, crop concentration, and crop diversification techniques. He used a cluster analysis approach, using six criteria, to examine the degrees of agricultural growth. The level of development in the studied region varies widely, as has been seen. For the years 1960-61 and 2000-01, he looked at crop combinations and found that there were twelve different combinations in the earlier year and ten in the more recent year. He also performed a multiple regression analysis to determine the connection between the various variables. There is a strong link between population density and agricultural density, with a correlation coefficient of 0.91; irrigation has a correlation coefficient of 0.97. A few things stand out in the study's performed literature review. Crop intensity appears to be positively correlated with farm size, according to some research. This implies that crop intensity has risen on large farms, whereas it has decreased on smaller ones. That's because small farmers are forced to cultivate their property for only one or two seasons each year since they can't afford to have another source of irrigation to prove that water is scarce in the off-seasons Small farms have lower crop intensities as a result. Whereas large farmers grow their land year-round utilizing different irrigation methods to maximize yields

Narkhede, D.S. (2010) investigated agricultural land usage and degradation in Raigarh district as a result of human activity (Maharashtra). From 1980-81 to 2000-01, he studied land usage and the resulting changes in the area. As a result, rice has emerged as the dominant crop, covering more than 50% of the land in cultivation. Rice also ranks first in this area, followed by fodder. It was also determined that plateau regions had better agricultural output than hilly regions, with the latter having lower agricultural productivity. He conducted micro-level research in the subject region by choosing 10 communities to focus on. It was possible to get a wide range of traits. The Raigarh district's land degradation was attributed to several factors, including the excessive use of chemical fertilizers, loss of topsoil caused by brick-making operations, and inefficient farming methods.

METHODOLOGY

Nature and Sources of Data

The data necessary for this study has been obtained from both primary and secondary sources.

Primary data

Primary activities will be collected from the personal interview method from the sample cultivating farmers, on the basis of finalized interviewed

schedule; a detailed survey of sample cultivating farmers will be conducted by visiting the sample households.

Secondary Data

To fulfill the first objective of the present study, time series data related to principal crops will be collect. The secondary data related to principal crops is collected for the period 2010-01 to 2020-21 from the Statistical Abstract of Madhya Pradesh. The secondary data related to study will be collected from various issues of Statistical Abstract of Madhya Pradesh;

Selected Indicators

There are several environmental indicators in agriculture. Agricultural activities that will be an impact on the physical characteristics of land and environmental natural resources will be used to identify agri-environmental problems. Agriculture and the environment will be a complicated relationship. According to the findings, agricultural growth will be negative influence on the environment because of the indicators will be used in this study for empirical analysis. These indicators encompass land use patterns and farming practices as well as water and fertilizer usage and pesticide application to discover the results.

Sample Design

Researchers were aware that studying the whole cosmos is neither feasible nor desirable. As a result, a representative sample of the study's universe is often drawn to preserve the study's scientific perspective and relevance. Using a multistage sampling process, and sample farmers was used to choose the population for the main study's sample population. Approx 50 people were chosen at random for the research. Using proportional sampling, Sagar division was choosing a sample of approx 400 farmers.

Techniques of Data Collection

To gather the required information, a collection of pre-tested interview schedules covering various topics is dispersed among the respondents. For farmers, there was 20 questions on the agenda. To gather information about agricultural development and issues encountered by farmers, this time table is being will be used.

Tools for Data Analysis

Primary and secondary data will be collected, then tabulated and analyzed with the aid of some basic statistical techniques. To ensure that the data is structured, the editing team will take the time to properly arrange and estimate it. For grouping, frequency and cross-tabulations of the data will be used. Simple statistics like average and percentage will be used to examine the data. To find out the result CAGR will be used to calculate the growth rate of productivity of principal crops by using the following formula:-

$$Y = Y0\,(1+r)^{t} \quad \text{..... (i)}$$

The equation (i) can be rewrite in the logarithmic form as follow:-

$$\text{Log } Y = \text{Log } Y0 + t \text{ Log } (1+r) \quad \text{..... (ii)}$$

Equation (ii) can be rewritten as:-

$$Y = A+Bt \quad \text{..... (iii)}$$

Where $\text{Log } Y0 = A$

$$\text{Log } (1+r) = B$$

In equation (iii):-

Y= Productivity of principal crops

A= Constant term

B= Regression Coefficient

t = Time Period

Or ‘r’ in percentage = (AntilogB-1) × 100

In a semi-log model like regression (iii), the slope coefficient “B” in the present case, measures the proportional or relative change in Y for a given absolute change in the explanatory variable, time in the present case. If this relative change is multiplied by 100, we obtain the percentage change or the growth rate. So In our case, the relative change is B, so if B is multiplied by 100, it gives a growth rate.

The compound growth rate (r) has been worked by:-

B= Log (1+r)

r = AntilogB-1

Or ‘r’ in percentage = (AntilogB-1) × 100

DATA ANALYSIS

Growth and Productivity of Principal Crops in Madhya Pradesh

Nearly half of India's workforce is employed in agriculture, making it the country's primary economic sector. A decrease from 55.4% to 16% has seen agriculture's contribution to GDP fall. The Indian government launched a new agricultural policy known as the Green Revolution in 1966–1967 to

help the country become more food independent. High-yielding varieties (HYVs), fertilizers, insecticides, irrigation systems, and other modern agricultural implements (such as mechanical threshers, diesel and electric pumps, etc.) were all part of the "Green Revolution" that began in the 1960s. As a result of these shifts, India's agricultural practices moved away from traditional methods and toward those of the modern era. The Indian agricultural sector has seen a phenomenal growth in output as a result of the use of modern agricultural methods, particularly in the areas of wheat and rice. The fast and dramatic rise in rice and wheat output and productivity per hectare brought about by modern technologies is striking. The western part of Uttar Pradesh, the state of Madhya Pradesh, and the Punjab were among the first to experience this change. Because of its agricultural prowess, Madhya Pradesh was a focal point of the Green Revolution. After the revolution, the state began contributing 15.6% of the country's food stockpile in 2015–16, earning it the nickname "Food Mine." It is estimated that over 70% of the state's population relies on agriculture for their livelihood. Agriculture in Madhya Pradesh receives a significant boost from the Green Revolution. Due to the green revolution, food-grain output has climbed from 2.6 million tonnes at the start of the era (1966-67) to 16.6 million tonnes in 2020-21. Rice output has increased by 16 times, while wheat production has increased by 11 times, making the rice-wheat rotation a significant agricultural strategy. Without a doubt, Madhya Pradesh is presently a surplus state in food grain thanks to the ushering in of the Green Revolution in the early 1970s. With just 1.34 percent of India's land area and 1.83 percent of the country's population, the state of Madhya Pradesh has been known as the "grain bowl of India" because to its rapid agricultural development. Expanding an area's surface area is the same as growing vertically, in that it increases output by increasing yield per square foot. Increases in crop yield are more telling of the industry's long-term health than those in area or output alone. For this reason, India's agricultural development plan has focused less on increasing annual production and more on increasing the yield of certain crops per unit of land. The enhanced output has been concentrated in a few locations, mostly the north western states, although the remarkable contribution of modern agricultural technology in expanding food grain production enabling India to develop buffer stock. Food grain crop output and the gross state product (GSDP) at constant prices both grew by 60.7% in these states between 2015 and 2016 as a result of agricultural transformation. The relative significance of growth of primary crops in the agricultural sector may be gleaned from an analysis of the area, production, and productivity of various crops in the economy. The total cultivated area in Madhya Pradesh has expanded from 4599 thousand hectares in 1966-67 to 6489 thousand hectares in 2020-21, showing tremendous growth in the agricultural sector. From a low of 3298 metric tonnes in 1966–67, agricultural output of food grains reached 16354 metric tonnes in 2020–21. The increased productivity of main crops during the Green Revolution era is largely responsible for this impressive agricultural performance. Since the mid-1960s, the state has undergone a remarkable transformation in the manner in which it cultivates food grain, and this growth rate is a major contributor to that development. For the years 2011-21, researchers analyzed the growth rate of several crops on their own. The following tables show the trend in total planted area of major crops from 2011 to 2021.

Table 1: Area of Principal Crops in Madhya Pradesh

	Rabi			Kharif				Commercial crops		
Year / Crops	Wheat	Gram	Barley	Rice	Jowar	Maize	Bajra	Sugarcane	Cotton American+ Desi	Rapeseed & Mustard
2010-11	2299	142.5	29.7	1027	104	17.9	586	161.2	629.4	536.4
2011-12	2267	54.7	30.3	905	113	15.9	514	189	518.3	607
2012-13	2315	122.8	27.1	1015	101	16.6	625	160.3	526	619.2
2013-14	2316	107.9	22.4	1024	96.7	15.8	565	133	621.2	699.8
2014-15	2303	129.8	28.2	1047	89.2	17.5	632	129.2	538.8	707.8
2015-16	2377	107.7	37.7	1042	89.1	13.4	619	140.6	527.7	598.1
2016-17	2461	107.3	39.5	1073	90.7	13.8	628	140.4	482.5	496.5
2017-18	2461	123.6	53	1211	86.6	25	613	90.5	456.1	514
2018-19	2488	84.1	42.1	1206	77.7	12.2	584	79.2	505.1	511.1
2019-20	2504	111.5	37.3	1243	70.8	9.6	660	84.5	493.3	509.7

Table 2: Production of Principal Crops in Madhya Pradesh

	Rabi			Kharif				Commercial crops		
Year / Crops	Wheat	Gram	Barley	Rice	Jowar	Maize	Bajra	Sugarcane	Cotton American+ Dasi	Rapeseed & Mustard
2010-11	9437	122	86	2726	22	47	832	927	722	800
2011-12	9188	41	81	2468	22	29	458	1065	1038	697
2012-13	9114	100	73	2790	26	41	1006	928	1407	965
2013-14	9043	91	58	3010	26	39	746	823	2075	824
2014-15	8853	72	79	3194	26	36	706	831	1502	792.8
2015-16	10059	90	115	3375	27	30	1021	965.1	1805	804
2016-17	10232	54	112	3606	42	37	1156	885	1882	597
2017-18	11360	129	185	3299	44	25	1087	520.6	1862	894
2018-19	10488	62	137	3628	39	26	930	570.7	1918	847
2019-20	11578	110	130	3465	38	19	1183	604	1747	953

CONCLUSION

Agricultural development and its effect on the environment in Sagar division studied as a modest effort to investigate environmental sustainability via conservation and management. The research results indicate a significant link between agricultural development access and environmental sustainability. These agriculturally dominant regions of the state face a severe danger as their land, soil, and water resources deplete and degrade at an alarming pace. The study's goal is to evaluate the environmental effect of agricultural growth. It was decided that Sagar division would be the focus of this research owing to the state's abundance of beneficial resources, including fertile land, reliable irrigation, high productivity, and a history of the early embrace of new technology and contemporary production methods.

REFERENCES

1. Le Quy Kha. (2017) Overview of agricultural 4.0 in the world and its applicability in

Vietnam. Journal of Agriculture and Rural Development, (7/2017), 3-10.

2. Van Pham, L., & Smith, C. (2014), ‗Drivers of agricultural sustainability in developing countries: a review', Environment Systems and Decisions, 34 (2), 326-341.

3. Hayati, D., Ranjbar, Z., et al., (2010), ‗Measuring agricultural sustainability', In biodiversity, biofuels, agroforestry and conservation agriculture, 73-100.

4. Pretty, J. (2008), ‗Agricultural sustainability: concepts, principles and evidence', Philosophical Transactions of the Royal Society B: Biological Sciences, 363 (1491), 447-465.

5. Karol KOCISZEWSKI (2018) on "Sustainable development of agriculture - theoretical aspects and their implications" www.ees.uni.opole.pl ISSN paper version 1642-2597 ISSN electronic version 2081-8319 Economic and Environmental Studies Vol. 18, No.3 (47/2018), 1119-1134, September 2018.

6. Luu Tien Dung, Phan Van Hai et al., (2018) on "SUSTAINABLE AGRICULTURE DEVELOPMENT: ECONOMICS AND ENVIRONMENT ASPECTS IN VIETNAM" 11 - 12 May, 2018 May 2018Conference: 9th NEU-KKU INTERNATIONAL CONFERENCE ON SOCIO-ECONOMIC AND ENVIRONMENTAL ISSUES IN DEVELOPMENTAt: Ha Noi

7. Vishal Tyagi, Mona Nagargade et al., (2018) on "Sustainable Development for Agriculture and Environment" Sustainable Development for Agriculture and Environment, First Published 2018 ISBN: 978-81-936088-2-1

8. Saikia, D. (2012) "Agricultural Development in Nagaon District, Assam: A Geographical Analysis", Published Ph.D. Thesis submitted to Gauhati University, Assam

9. Pierre-Marie BOSC, and et al (2012), "Agricultural Transformation: Their Diversity and the Challenges They Pose", International Farming System Association, Europe Group.

10. Victor Tamba Simbay Kabba and Jiangfeng Li (2011): "Analysis of Land Use and Land Cover Changes, and Their Ecological Implications in Wuhan, China", Journal of Geography and Geology, Published by Canadian Centre of Science and Education Vol. 3, No. 1, pp. 104-118

11. Vyalij, P. Y. (2011): "Agricultural Landuse in Nashik District", Ph.D. Published thesis submitted to Tilak Maharashtra Vidyapeeth, Pune.

12. Narkhede, D.S. (2010): "Agricultural Land Use and Land Degradation in Raigarh District (Maharashtra): A Geographical Perspective, Ph. D. thesis submitted to Shivaji University, Kolhapur.

13. Jialing Yu and Jian Wu.,(2018) "The Sustainability of Agricultural Development in China: The Agriculture–Environment Nexus" Sustainability 2018, 10, 1776; doi:10.3390/su10061776 www.mdpi.com/journal/sustainability

14. Lu Zhang, Chengxi Yan, et al., (2018)"The impact of agricultural chemical inputs on environment: global evidence from informatics analysis and visualization " International Journal of Low-Carbon Technologies, Volume 13, Issue 4, December 2018, Pages 338–352, https://doi.org/10.1093/ijlct/cty039 22 August 2018

15. Manjunatha, B. L. ; Dipika Hajong et al., (2012) "impact of agricultural development on environment" ISSN : 0970-0420., Record Number : 20123181323, Publisher : MKK Publication, Location of publication : Kolkata, Country of publication : India, Language of text : English

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