EXPLORING TEMPORAL SHIFTS IN AGRICULTURAL LAND USE OF NATHSAGAR DAM BACKWATER REGION IN SHEVGAON AND NEWASA TEHSIL OF AHMEDNAGAR DISTRICT, MAHARASHTRA (INDIA).

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Abstract:

Global agricultural land cover is changing due to changes in the environmental, socioeconomic, and technical domains. This article explores the evolution of agricultural land usage over several decades in terms of temporal changes. A thorough comprehension of these variations reveals the complex interaction between humans and land, encompassing both traditional behaviours and modern advancements. Wetland agriculture and other adaptive strategies are necessary because changed hydrology in dam backwaters causes cropland to undergo dynamic alterations. Analysing the responses of coastal communities near dam backwaters to environmental changes provides a range of responses that inform customised solutions for sustainable development. Cropping patterns adjust to new hydrological circumstances after dam construction, impacted by aquaculture, demonstrating the dynamic interplay between environmental dynamics and human innovation.

Key words: *Agricultural land, temporal changes, environmental shifts, cropland shifts, wetland agriculture, sustainable development, cropping patterns.*

Introduction:

In the setting of dam backwaters, the dynamics of agricultural development tell an engrossing tale of resilience and adaptability. The landscape is altered and traditional agricultural practices are tested when dams create backwater areas to regulate water flow. Over time, these backwaters might see significant shifts in land use, with agriculture adapting to the new hydrological regime. Farmers have the option of altering the crops they plant by utilising innovative agricultural techniques or moving to crops that thrive in wetter regions. Additionally, the presence of backwaters can help to establish aquaculture and wetland agriculture, which can increase the diversity of land use. Understanding these modifications to the cropland inside dam backwaters is essential for expanding agriculture and ensuring sustainable water management in these dynamic contexts.

A rich tapestry of interactions between humans and the environment is revealed by the examination of 32 villages located along the coast of dam backwaters. Patterns of adaptability and vulnerability are shown by thorough investigation, which includes socioeconomic surveys, mapping of land use, and ecological evaluations. Some of these villages have embraced aquaculture and wetland agriculture in response to the existence of dam backwaters, while others struggle with issues like waterlogging and soil erosion. Through exploring the complex dynamics of these communities, policymakers and other stakeholders can better create targeted interventions for sustainable development, which will guarantee the peaceful coexistence of ecological integrity and human livelihoods along the coast where dam backwaters are located. The cropping patterns in the area experienced a significant change following the dam's construction. A modification of farming methods was required to control water flow and create backwater regions. Farmers chose crop kinds better suited to the changed hydrological circumstances as they diversified their crops in an effort to adapt. Furthermore, the availability of water for irrigation made it possible to cultivate crops that had not before been practical, increasing agricultural productivity. Additionally, the rise of aquaculture in dam lakes affected crop selection even more, with some farmers incorporating fish farming into their farming practices. After dam building, human ingenuity and environmental dynamics interacted intricately, changing agricultural landscapes and livelihood strategies. This is reflected in the shifts in cropping patterns.

Components and Procedure:

1. Aims and Objectives:

1. Examine changes in the usage of agricultural land over time in the Shevgaon, Nevasa Tehsil, and Nathsagar Backwater region of the Ahmednagar District.
2. Evaluate the effects on the environment and society to develop sustainable land management plans.

2. Methodology and Database:

This study examines agricultural land use dynamics in Maharashtra's Nathsagar Backwater region, assessing socio-economic and environmental implications for informed land management options for

sustainable development. In order to analyse changes in agricultural land use in the Nathsagar Backwater region of Shevgaon and Nevasa Tehsil, historical data and field surveys will be employed for Objective 1. In order to comprehend local dynamics, interviews and case studies will be used in addition to secondary data tools in central tendency to identify trends. In order to evaluate impacts, Objective 2 includes stakeholder workshops and socioeconomic surveys will conduct. Recommendations for sustainable land management plans specific to the research region that strike a balance between environmental preservation and socioeconomic growth will be based on policy analysis.

3. Concept:

The agricultural land landscape is dynamically changing around the world due to changes in environmental, social, and technological paradigms. This study explores the temporal shifts in agricultural land use that have been seen across many years, from the adoption of new methods to the maintenance of old ones. Comprehending these oscillations provides important understanding of the complex interaction between people and the land they farm. Because of the changed hydrology in dam backwaters, cropland undergoes dynamic fluctuations that force farmers to adjust their practices and switch to wetland agriculture.

In these changing contexts, these kinds of modifications are essential for agricultural expansion and sustainable water management. Analysing coastal communities of dam that are adjacent to dam backwaters reveals a range of responses to shifting environmental conditions, emphasising the complexity of interactions between humans and the environment ranging from aquaculture to mitigating soil erosion. Cropping patterns alter dramatically after dam construction as farmers include aquaculture and vary their crop portfolios, demonstrating how human ingenuity can navigate the environmental dynamics that arise after construction.

4. Study Area:

In this study, we're looking at a special area in Maharashtra called Ahmednagar district, particularly in Shevgaon and Newasa. It's not too big, about 2,375.28 square km. There are two parts to it: Shevgaon is smaller than Newasa. This area is located between $19^0 12'14''$ and $19^0 33'57''$ North latitude and $74^0 56'48''$ to $75^0 32'44''$ East longitude. Over there, near the border of the districts, is the Jayakwadi dam that's built across the Godavari River. The whole area has 232 Villages. Out of the total area of 2374.28 sq./km, 90% is used for farming, which is about 2137.1 sq./km, 1% is forested, around 26.32 sq./km, and the rest, 9%, is used for other stuff, which is about 211.09 sq./km. And it rains about 503.7 millimetres on average there.


Figure – 1: Location Map of the Study Area.

ANALYSIS AND RESULTS:

Table No. 1 Percentage of Changes in Landuse from 1973 to 2021

| Sr. No.	Name of Village	Crop Land	Fallow Land	Natural Vegetation	Roads and Settlement	Rocky Outcrop	Scrub Land	Water body
				Shevgaon Tehsil				
1	Karhetakali	29	-56	-15	56	-47	-59	406
2	Khanapur	49	-72	-15	56	-69	-59	193
3	Antarwali Bk.	19	-45	-15	65	-43	-23	510
4	Ghotan	44	-61	17	63	-65	-61	416
5	Erandgaon	49	-63	17	64	-65	-63	259
6	Lakhefal	24	-69	78	64	-63	-43	200
7	Dahifal	30	-70	33	52	-65	-53	254
8	Vijaypur	20	-40	50	29	-58	-46	305
9	Dahigaon She.	35	-57	50	28	-58	-80	257
10	Ranjani	501	-70	33	52	-65	-53	212
11	Bodkhe	27	-68	50	29	-62	-64	490
12	Tajnapur	16	-38	50	29	-45	-68	544
13	Khuntefal	17	-38	50	29	-55	-54	248
14	Dadegaon	10	-29	-72	32	-50	-43	545
15	Joharapur	114	-70	33	52	-65	-16	212
16	Khamgaon	22	-31	50	29	-55	-69	195
17	Hingangaon Ne.	18	-38	33	29	-50	-51	162
18	Deotakli	104	-70	33	52	-65	-53	212
19	Dhorsade	16	-40	50	29	-56	-50	491
20	Antre	14	-53	50	29	-55	-49	1112
21	Shahar Takali	34	-62	50	5	-63	-75	291
22	Bhavinimgaon	19	-54	50	29	-50	-63	300
23	Dahigaon Ne	25	-69	50	29	-77	-67	152
	Total of Shevgaon Tehsil	**54**	**-55**	**31**	**40**	**-59**	**-55**	**346**
				Nevasa Tehsil				
24	Khamgaon	22	-41	50	29	-54	-68	267
25	Gopalpur	16	-47	50	29	-46	-54	255
26	Ramdoh	21	-57	50	29	-50	-72	244
27	Warkhed	77	-70	33	52	-65	-53	212
28	Suregaon Gangapur	22	-65	33	29	-47	-70	380
29	Galnimb	20	-57	50	29	-51	-75	112
30	Manglapur	17	-50	25	29	-72	-66	147
31	Khedle Kajali	23	-55	50	29	-69	-66	213
32	Pravara Sangam	28	-33	5	82	-30	-56	100
	Total of Nevasa Tehsil	**27**	**-53**	**38**	**37**	**-54**	**-64**	**215**
	Total	**33**	**-59**	**30**	**43**	**-60**	**-58**	**257**

Source- Calculate by Author from Official Data from Census Handbook.
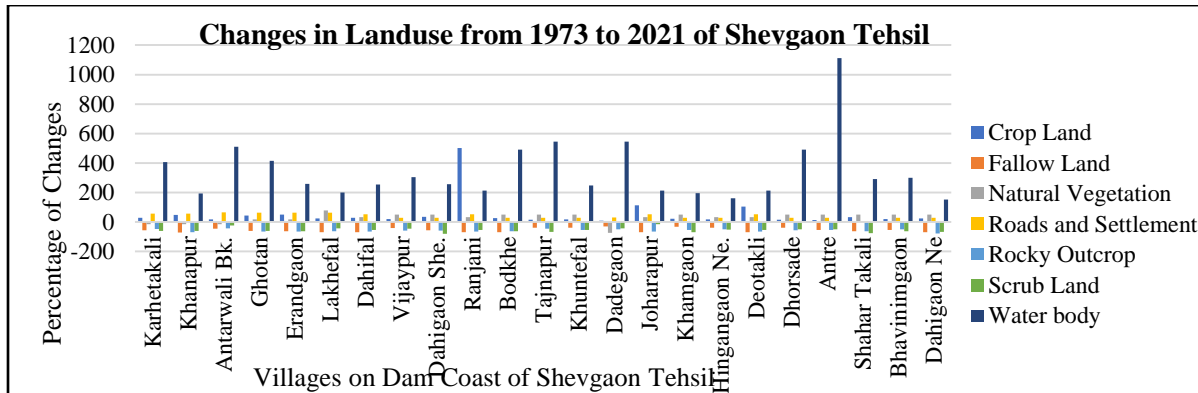
Graph No.1 Percentage of Landuse changes of Shevgaon Tehsil from 1973 to 2021

1. Landuse changes of Shevgaon Tehsil from 1973 to 2021:
1. **Crop Land:** Most villages in Shevgaon Tehsil have witnessed an increase in crop land; Karhetakali, Erandgaon, and Ranjani, in particular, have seen notable increases. This suggests that agricultural activities remain a priority in the area, perhaps as a result of a persistent or growing consumer demand for agricultural goods.
2. **Fallow Land:** The majority of villages have less fallow land than they formerly had, which may indicate more productive use of the land or even the extension of farming into formerly uncultivated areas. However, the amount of fallow land has significantly decreased in some villages, including Khanapur and Bodkhe.
3. **Natural Vegetation:** The Tehsil's natural vegetation has somewhat decreased overall, suggesting that deforestation or the conversion of natural areas to other land uses may be taking place. On the other hand, notable increases in native vegetation have been observed in villages like Lakhefal and Dahigaon She, indicating conservation or reforestation efforts.
4. **Roads and Settlement:** Over time, urbanisation and the development of infrastructure have resulted in a steady growth in the number of roads and settlement areas in the majority of settlements. The notable rise in Shahar Takali may be attributed to the city's rapid expansion.
5. **Scrub Land, Rocky Outcrop, and Water Bodies:** These categories typically exhibit declines throughout the Tehsil, suggesting potential changes in land management techniques, urbanisation, or deterioration of the land. There are some outliers, though, such as Lakhefal, which has a significant rise in rocky outcrops, and Erandgaon, which has an increase in scrub area.
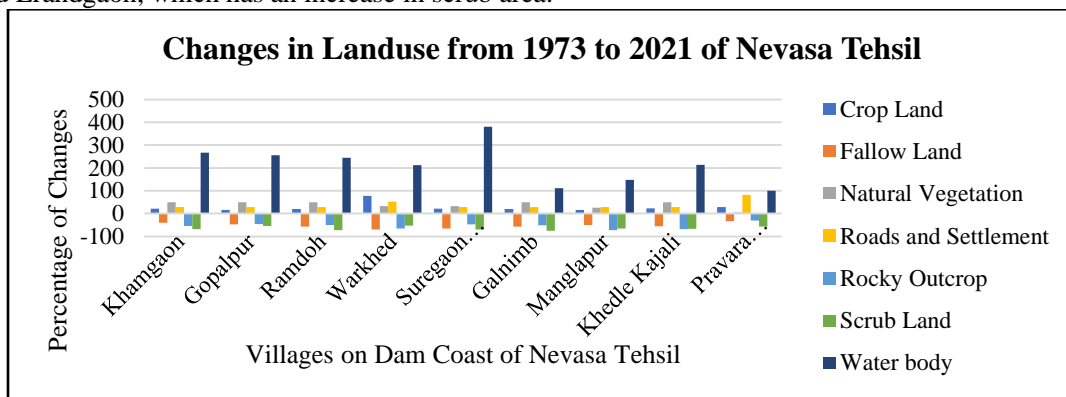
Graph No.2 Percentage of Landuse changes of Nevasa Tehsil from 1973 to 2021

2. Landuse changes of Nevasa Tehsil from 1973 to 2021:
1. **Crop Land and Fallow Land:** Nevasa Tehsil has a general tendency of more crop land and less fallow land, which is similar to Shevgaon and suggests an emphasis on agricultural expansion and the use of available land resources.

2. **Natural Vegetation:** The natural vegetation of Nevasa Tehsil is trending in both directions, with certain communities seeing increases and others seeing reductions. Pravara Sangam has experienced a notable upsurge, which might perhaps be attributed to either natural regeneration or conservation initiatives.

3. **Roads and Settlement:** Similar to Shevgaon, Nevasa Tehsil has seen a discernible rise in the number of roads and settlement areas, a sign of urbanisation and infrastructural development.

4. **Scrub Land, Rocky Outcrop, and Water Bodies:** These categories, like Shevgaon, typically exhibit declines that raise the possibility of changes in land use practices or degradation of the surrounding area.

RESULT:

The combined data for both Tehsils shows a notable change in land use throughout time, marked by an increase in agricultural output, urbanisation, and modifications to the natural landscape. There are worries about the loss of natural ecosystems and fallow land, even though certain places have exhibited encouraging trends including an increase in crop land and natural vegetation. It might be necessary to address these changes and lessen any potential environmental effects while promoting the socioeconomic growth of the area through conservation initiatives and sustainable land management techniques.

CONCLUSION:

From 1973 to 2021, Shevgaon and Nevasa Tehsil in the Ahmednagar District saw changes in land use that are indicative of a complex interaction between environmental changes, urbanisation, and agricultural growth. In both Tehsils, there has been a discernible rise in crop land and a decrease in fallow land overall, suggesting increased agricultural activity. But along with this come changes in land cover, such as rocky outcrops and scrub areas, and decreases in native vegetation. Road and settlement area increase are clear indicators of urbanisation. Certain towns display encouraging tendencies, such as a rise in natural vegetation, while others show alarming decreases in natural environments. To address these changes and guarantee the region's balance between socioeconomic development and environmental preservation, sustainable land management techniques and conservation initiatives are essential.

REFERENCES:

1. Patil, S. K., & Dikshit, A. K. (2019). Assessing Land Use and Land Cover Changes and Their Impact on Land Surface Temperature in Maharashtra, India. Remote Sensing Applications: Society and Environment, 14, 112-122.

2. Patil, S., & Jha, M. (2018). Land Use and Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Nashik District, Maharashtra, India. Egyptian Journal of Remote Sensing and Space Science, 21(2), 245-255.

3. Pawar, S. D., & Chavan, N. R. (2016). Agricultural Land Use Pattern Analysis Using Remote Sensing and GIS Techniques: A Case Study of Sangamner Tehsil, Maharashtra, India. International Journal of Scientific Research and Modern Education (IJSRME), 1(2), 83-98.

4. Vyas, P., & Mukhopadhyay, S. (2015). Land Use Land Cover Change Detection and Analysis Using Remote Sensing and GIS: A Case Study of Nashik District, Maharashtra, India. International Journal of Engineering Research and Applications (IJERA), 5(3), 53-59.

5. Kale, M. P., & Rathod, P. G. (2018). Assessment of Land Use and Land Cover Changes in Sangamner Tehsil, Maharashtra, India: A Remote Sensing and GIS Approach. International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET), 7(3), 1469-1479.

6. Deshmukh, M. A., & Waghmare, R. T. (2019). Assessment of Land Use Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Pathardi Tahsil, Maharashtra, India. International Journal of Science and Research (IJSR), 8(7), 307-312.

7. Zope, P. E., & Gawande, S. P. (2016). Assessment of Land Use and Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Pathardi Tahsil, Maharashtra, India. International Journal of Emerging Technology and Advanced Engineering (IJETAE), 6(2), 26-36.

8. Patil, V. D., & Hulgeri, P. V. (2017). Assessment of Land Use Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Karjat Tahsil, Maharashtra, India. International Journal of Science and Research (IJSR), 6(12), 267-274.

9. Patil, S. S., & Lohar, A. N. (2018). Analysis of Land Use and Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Sangamner Tahsil, Maharashtra, India. International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET), 7(4), 1912-1922.

10. Borkar, P. S., & Mankar, A. M. (2017). Detection of Land Use and Land Cover Changes Using Remote Sensing and GIS: A Case Study of Pachora Tehsil, Maharashtra, India. International Journal of Engineering Research and General Science (IJERGS), 5(6), 226-235.

11. Gaikwad, P. A., & Naik, G. N. (2015). Assessment of Land Use and Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Kopargaon Tehsil, Maharashtra, India. International Journal of Scientific Engineering and Research (IJSER), 3(11), 39-46.

12. Patil, P. B., & Patil, S. S. (2018). Monitoring of Land Use and Land Cover Changes in Sangamner Tahsil, Maharashtra, India, Using Remote Sensing and GIS Techniques. International Journal of Geomatics and Geosciences (IJGGS), 9(1), 453-465.

13. Dhumal, K. N., & Patil, A. G. (2016). Analysis of Land Use Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Jamkhed Tahsil, Maharashtra, India. International Journal of Advanced Remote Sensing and GIS, 5(1), 1547-1558.

14. Thakare, M. P., & Wankhade, S. S. (2017). Assessment of Land Use Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Rahuri Tehsil, Maharashtra, India. International Journal of Current Microbiology and Applied Sciences (IJCMAS), 6(12), 2749-2760.

15. Chavan, S. S., & Rathod, K. J. (2018). Analysis of Land Use and Land Cover Change Detection Using Remote Sensing and GIS: A Case Study of Ahmednagar District, Maharashtra, India. International Journal of Advanced Remote Sensing and GIS, 7(1), 2354-2367.