

**A CASE STUDY FOR SOCIO ECONOMIC AND SUSTAINABLE AGRICULTURE  
PRACTICES OF NARANAPURAM PANCHAYAT, ANNUR BLOCK,  
COIMBATORE DISTRICT- USING GIS AND REMOTE SENSING**

**P. Suresh<sup>1</sup>, Dr. P. Gunasekaran<sup>2</sup>**

**<sup>1</sup>P. Suresh, Research Scholar, Department of Geography, GAC, CBE-18.**

**<sup>2</sup>Dr. P. Gunasekaran, Associate Professor, Department of Geography, GAC, CBE-18.**

***Abstract***

A sustainable agriculture is generally regarded as an alternative to modern industrialized or conventional agriculture, an agriculture described as highly specialized and capital intensive, heavily dependent upon synthetic chemicals and other off-farm inputs. The agricultural land use of rural part of Naranapuram Panchayat has been selected for the study. It is located on southern edge of Annur block in Coimbatore District in Kongu plateau region, Therefore the main objective of the study are to estimate the present infrastructure facility for the socio economic profile of selected farmers and sustainable agriculture practices implemented in the study area. The trend of utilization of land resources in context of physical-socio-economic and environmental factors, analysis the variation in factors affecting agriculture efficiency with respect to size of land holding in the Naranapuram Panchayat suggest suitable measures for micro level and specific plan for better rural agricultural land use. Therefore with the help of the above objective scenario of the area can be derived which will further help us in suggesting micro level plan the socio economic development of the farmers and sustainable agriculture practices for the sustainable agriculture development of the study area.

**Keywords:** Sustainable Agriculture Practices (SAP), Sustainable Agriculture Development, Remote Sensing, GIS and GPS.

## **A CASE STUDY FOR SOCIO ECONOMIC AND SUSTAINABLE AGRICULTURE PRACTICES OF NARANAPURAM PANCHAYAT, ANNUR BLOCK, COIMBATORE DISTRICT- USING GIS AND REMOTE SENSING**

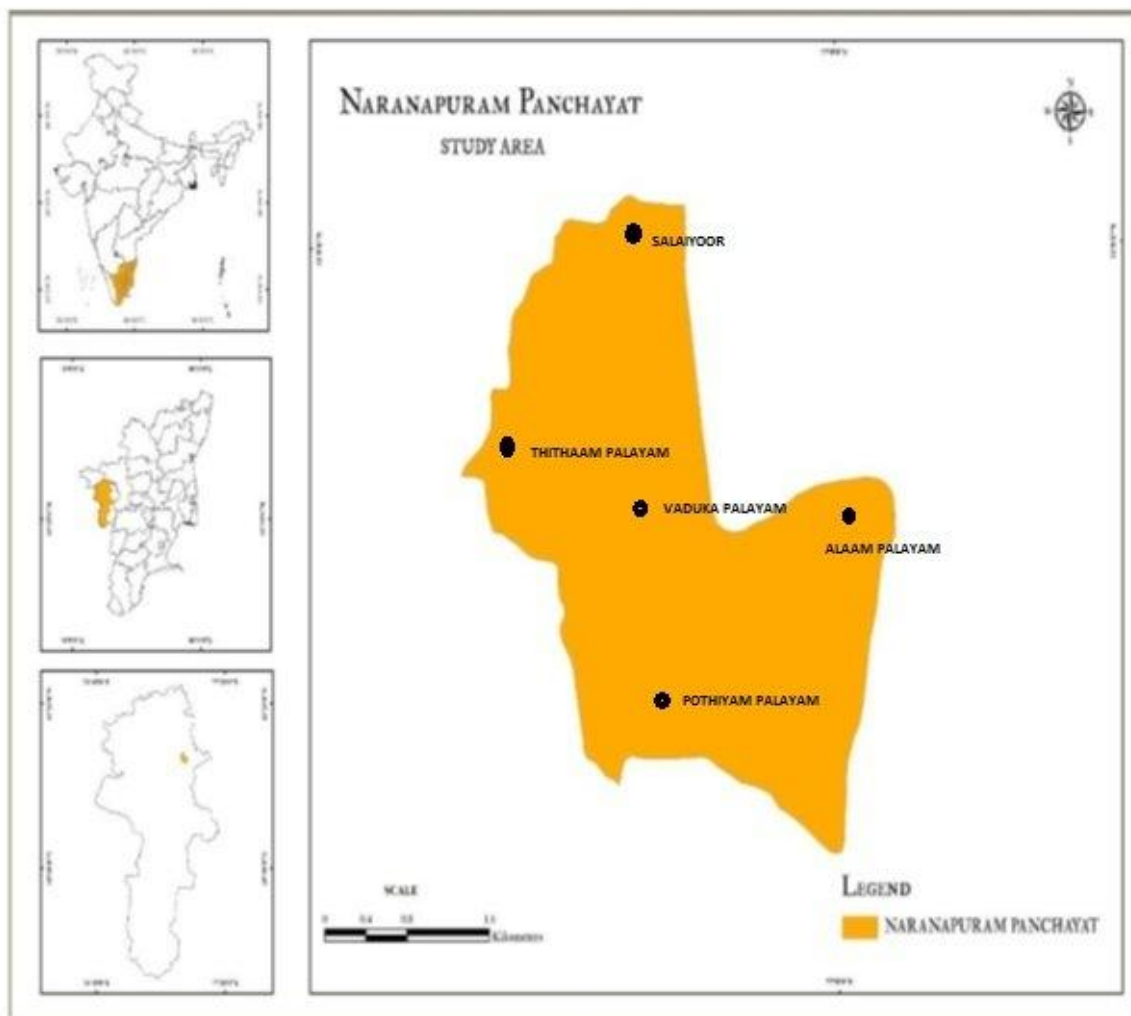
### **Introduction**

Agriculture is sustainable when it is ecologically sound, economically viable, socially just, culturally appropriate and based on a holistic scientific approach. Sustainable agriculture is a model and economic organization based on an equitable and participatory vision of development which recognizes the environment and natural resources as the foundation of economic activity. It preserves bio-diversity, maintains soil fertility and water purity, conserves and improves the chemical, physical and biological qualities of the soil, recycles natural resources, and conserves energy. Sustainable agriculture products diverse forms of high-quality foods, fibres, and medicine. A sustainable agriculture is generally regarded as an alternative to modern industrialized, or conventional agriculture. Protect the environment indefinitely, enhance the health and safety of the public, and produce adequate quantities of food at a profit for farmers. For the micro-level study of the agricultural land use, rural parts of Naranapuram Panchayat of Tamil Nadu, has been selected. It is located in western edge of Kongu plateau, which comes under high quality regur and clay soil. In the present study a challenge has been made to study the rural agricultural land use of Naranapuram Panchayat at grass root level for sustainable agricultural development.

### **Study area**

The study area geographically located at 9° 25' 51" North latitude to 77° 50' 04" East longitude. Naranapuram panchayat is located in Annur block, Coimbatore north taluk of Coimbatore district in Tamil Nadu, India. As per 2009 status Naranapuram village is also a grampanchayat. The 600 total number of houses are presented in Naranapuram Panchayat. The total population of Naranapuram Panchayat was 2,113 peoples. The male constitute 49% of the population and female constitute 51% of the population. The average literacy rate was 63%. Out of total area 915.8 hectares area of Naranapuram Panchayat has been studied for the micro level study and demographic attributes of the area has been studied.

MAP - 1



## Methodology

For the present study is five villages of the Naranapuram Panchayat (Alampalayam, Salaiyoor, Thithampalayam, Vadukapalayam, Pothiyampalayam) have been selected by random sampling method. The data is acquired from numerous primary and secondary sources. For primary data detailed schedule has been equipped, having general information regarding village, size of land holding, the socio economic profile of selected farmers and sustainable agriculture practices (SAP) etc. Plentiful questions regarding high yielding variety, fertilizers, pesticides, irrigation and use of altered pioneering techniques has been structured. To support primary data and several secondary sources.

## Data and Technique

The primary data collected from farmers in Narnapuram Panchayat, Annur block, Coimbatore District. Simple statistical technique used for calculation and prepared various thematic maps.

## ANALYSIS

Sustainable Development should be ecologically should, economically viable and socially acceptable. The major objective of Sustainable Agricultural Practices are as follows:

- i. To study the socio economic profile of selected farmers
- ii. To document sustainable agriculture practices implemented in the study area.

The present case study deals with the socio- economic conditions of the farmers in the study area and the SAP adopted by farmers in the study area.

Table: 1

Age wise distribution of farmers

| S.NO  | Age in years | No. of Respondents | Percentage |
|-------|--------------|--------------------|------------|
| 1     | < 30         | 10                 | 9.80       |
| 2     | 30-40        | 22                 | 21.57      |
| 3     | 40-50        | 41                 | 40.20      |
| 4     | 50-60        | 19                 | 18.63      |
| 5     | > 60         | 10                 | 9.80       |
| Total |              | 102                | 100.00     |

Table.1 shows the age- wise distribution of farmers of the study area. It is pointed out by several studies that there is a positive relationship between age and adoption process and young people are supposed to be venture some and risk prone. Age - wise analysis of the farmers in the present study show that majority of them (40. 20 %) are in the age group 40-50 years. And they have their own reservation in adoption of innovative ideas.

Table: 2

## Educational status of farmers

| S.NO  | Qualification  | No. of Respondents | Percentage |
|-------|----------------|--------------------|------------|
| 1     | Illiterate     | 26                 | 25.5       |
| 2     | Primary        | 17                 | 16.7       |
| 3     | Middle         | 29                 | 28.4       |
| 4     | Sec            | 18                 | 17.6       |
| 5     | HSC            | 6                  | 5.9        |
| 6     | Other graduate | 6                  | 5.9        |
| T0tal |                | 102                | 100.00     |

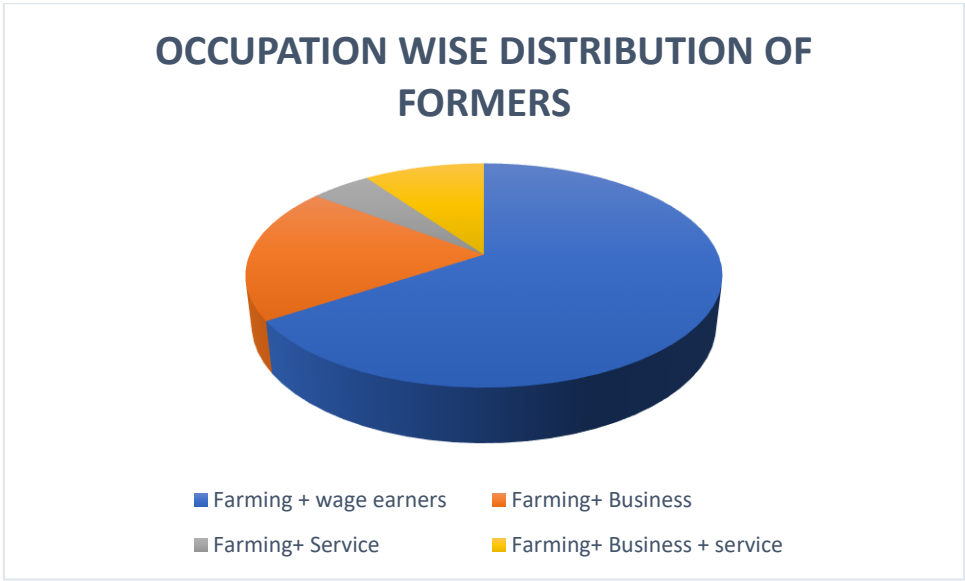
Educational status of respondents has been furnished in Table. 2. It is found that about one fourth of the respondents are illiterate. As majority of them are literate it is not to expect that they will understand the significance of sustainable agricultural practices.

Table: 3

## Occupation wise distribution of farmers

| S.NO  | Occupation                  | No. of Respondents | Percentage |
|-------|-----------------------------|--------------------|------------|
| 1     | Farming + wage earners      | 67                 | 65.7       |
| 2     | Farming+ Business           | 20                 | 19.6       |
| 3     | Farming+ Service            | 5                  | 4.9        |
| 4     | Farming+ Business + service | 10                 | 9.8        |
| T0tal |                             | 102                | 100.00     |

MAP - 2



Occupation wise classification of the respondents is presented in table 3 Majority (65.7) of the respondents are owner cultivators and they also work as labourers under big farmers. About 19.6% of the farmers are engaged in business like along with farm work as the size of the family is large in the case of majority in the families they had to be engaged in supplementary activities to augment their family income.

Table: 4  
Family type of farmers

| S.NO  | Family type | No. of Respondents | Percentage |
|-------|-------------|--------------------|------------|
| 1     | Joint       | 36                 | 35.3       |
| 2     | Nuclear     | 66                 | 64.7       |
| Total |             | 102                | 100.0      |

Disintegration of joint family system is a visible feature in rural areas and the survey reveals that 64.7% of the households belong to nuclear type.

Table: 5  
Fuel for cooking

| S.NO  | Fuel for coming | No. of Respondents | Percentage |
|-------|-----------------|--------------------|------------|
| 1     | LPG             | 69                 | 67.6       |
| 2     | Kerosene        | 14                 | 13.7       |
| 3     | Others          | 19                 | 18.7       |
| Total |                 | 102                | 100.0      |

About a decade back the people used to cut down the trees for fuel purpose. Since the felling of trees is prohibited by the forest officers they have switched over to kerosene.

Table: 6  
Sanitation facility of farmers

| S.NO  | Sanitation facility         | No. of Respondents |            |
|-------|-----------------------------|--------------------|------------|
|       |                             | No                 | Percentage |
| 1     | Individual flush out Toilet | 100                | 98.04      |
| 2     | No Toilet                   | 2                  | 1.96       |
| Total |                             | 102                | 100.00     |

Drinking water and sanitation facilities are key to clean environment and public health of the village. In spite of the efforts taken by the state Government and district administration to implement "Total sanitation Schemes" 98.04 % of the households do not have toilets in their houses. They have still a long way to go to realize the objective of total sanitation.

## Sustainable Agriculture Practice adopted by the respondents

Table: 7

Distribution of farmers According to Possession of Land

| S.No. | Land In Acres | No. Respondents |            |
|-------|---------------|-----------------|------------|
|       |               | No              | Percentage |
| 1     | < 2.5         | 51              | 50.00      |
| 2     | 2.5-5         | 38              | 37.3       |
| 3     | >5            | 13              | 12.7       |
| Total |               | 102             | 100.0      |

The table 7 shows the distribution of respondents according to the possession of land. Of the total respondents 50 percent of them possess 2.5 acres of land and below, 37.3 percent of the farmers between 2.5-5 acres of land and the rest 12.7 percent own more than 5 acres of land. It is clear that 50 percent of the respondents own less than 2.5 acres of land.

Table: 8

Type of Irrigation

| S.No  |                 | No. Respondents |            |
|-------|-----------------|-----------------|------------|
|       |                 | No              | Percentage |
| 1     | Well            | 36              | 35         |
| 2     | drip Irrigation | 66              | 65         |
| Total |                 | 102             | 100.0      |

Table. 8 shows the type of irrigations followed in the study area. About 65 percent of them use drip irrigation and the remaining 35 percent followed well type of irrigation. Interview with the farmers revealed that they are known about the irrigation techniques like drip irrigation sprinkler type irrigation etc.

Table: 9

## Farm power status of farmers

| S.No  | Farm power equipment's | Numbers    |            |
|-------|------------------------|------------|------------|
|       |                        | Own        | Rented     |
| 1     | Country Plough         | 2 (1.96)   | 1 (0.98)   |
| 2     | Iron Plough            | 3 (2.9)    | 96 (94.12) |
| 3     | Power Sprayer          | 40 (39.21) | 4 (3.92)   |
| 4     | Oil Engine             | 4 (3.92)   | 1 (0.98)   |
| 5     | Pump Set               | 79 (77.46) | 18 (17.65) |
| Total |                        | 102        | 100.0      |

The table 9 shows the farm power status of farmers. About 94.12% of the farmer rented the iron plough activities. 77.46% of the respondents own pump set for irrigation purpose and 39.21% power sprayer get it on own.

Table: 10

## Type of land

| S.No  | Farm power equipment's | Number of Respondents |       |            |
|-------|------------------------|-----------------------|-------|------------|
|       |                        | No                    | Acres | Percentage |
| 1     | Dry land               | 79                    | 278   | 88.26      |
| 2     | Wet land               | 23                    | 37    | 11.74      |
| Total |                        | 102                   | 315   | 100.0      |

It is found from table 10 that about 88.26% of the land of the respondent are dry land and 11.74 % of the land can be classified as wet land. It can be inferred that about 88.26% of the land falls under dry land category, which needs irrigation facility. It is believed that the corresponding increase in the water level has had a direct impact on the total number of irrigated land.

Table: 11

## Knowledge on Techniques of soil management farm

| S.NO | Techniques of soil management                                   | No.of Percentage Respondents | Percentage |
|------|-----------------------------------------------------------------|------------------------------|------------|
| 1    | Maintenance of water storage                                    | 70                           | 68.63      |
| 2    | Maintenance of livestock                                        | 34                           | 33.33      |
| 3    | Existence of perennial plants to add organic matter to the soil | 43                           | 42.16      |

Soil maintenance through indigenous practices is one aspect of sustainable agricultural development. The study area is characterized by hot semi arid eco region. The agricultural is basically rain fed. Over to the years the tremendous pressure on land has led to the depletion of natural resources at a very alarming rate. The last two decades experienced continuous failure of monsoon and over exploitation of groundnuts. The lands are to be rejuvenated with soil management practices, maintenance of water storages, cultivating plants to add organic matter to the soil, mixing cow dung with soil etc.

The table 11 presents knowledge of respondent about the techniques of soil management. It is learnt that majority of the farmers (68.63%) are familiar with water storage maintenance practices, one third of them have knowledge about enriching the soil with cow dung and penning methods. About 42% of them grow perennial plants to add organic matter to the soil.

Table:12

## Knowledge on recycling waste

| S.No | Recycling waste                              | No of. Respondents |            |
|------|----------------------------------------------|--------------------|------------|
|      |                                              | No                 | Percentage |
| 1    | Application of farm yard manure              | 30                 | 29.41      |
| 2    | Application of Compost                       | 40                 | 39.2       |
| 3    | Green Manurering /green leaf Manurering      | 4                  | 3.92       |
| 4    | Crop residue management                      | 3                  | 2.94       |
| 5    | Bio-fertilizer                               | 85                 | 83.3       |
| 6    | Growing leguminous crop in cropping systems. | 20                 | 19.61      |

Application of farm yard manure (29.41 %) green leaf manuring (3.92 %), crop residue management, application of bio fertilizers (83.33 %) and cultivation of leguminous crop (19.61 %) are some of the methods which promote sustainable agricultural practices. Interview with the farmers, shows that the farmers in the area have more knowledge about application of bio fertilizers.

MAP - 3

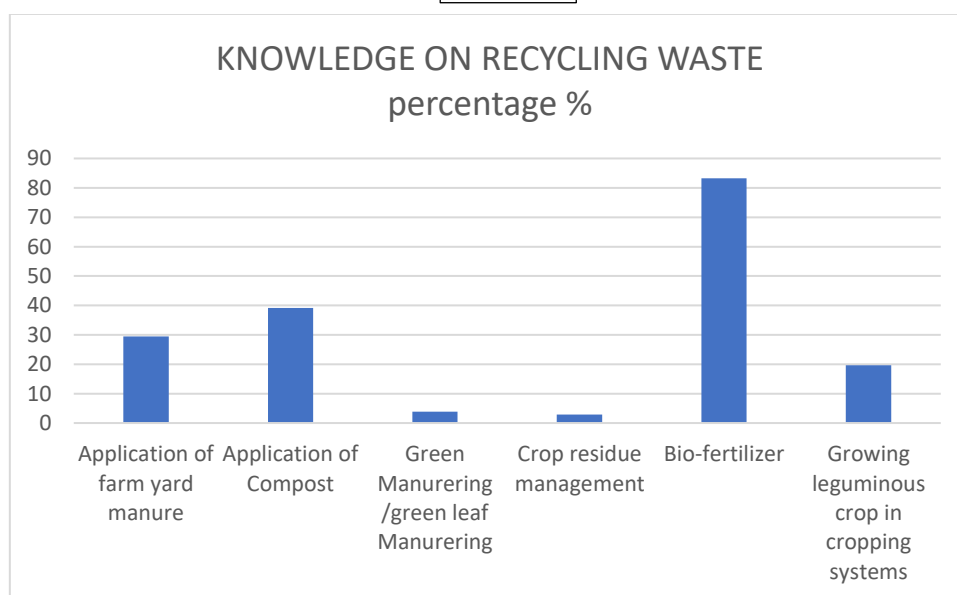
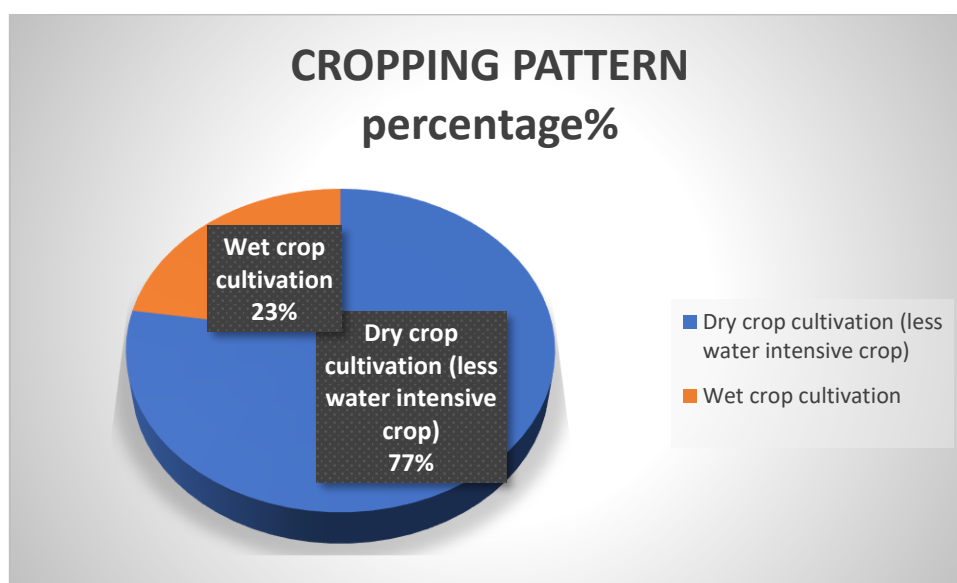


Table:13

## Cropping Pattern

| S.NO  | Title of crop                                       | No  | Percentage |
|-------|-----------------------------------------------------|-----|------------|
| 1     | Dry crop cultivation<br>(less water intensive crop) | 79  | 77.46      |
| 2     | Wet crop cultivation                                | 23  | 22.54      |
| Total |                                                     | 102 | 100.0      |

MAP - 4



The cropping pattern of the study area is presented in the table 13. The table shows that percent of the farmers cultivate wet crops and always do so for such crops only. The water intensive crops are not suitable for the area and about % of people opt for dry crop like cholam, millets, green gram, horse gram, and Jasmine which are suitable for the area and would not create much advance impact on improving water table.

#### Problems faced by the farmers:

The farmers are unable to practice the sustainable agricultural practices because of the following reasons:

- Majority of the farmers were not aware of the various sustainable agricultural practices.

- The cattle population is dwindling in the area due to high cost of rearing animals. As a result, indigenous techniques could not be practiced.
- The farmers have no access to latest information.
- The illiterate farmers were unable to grasp the latest information on sustainable agricultural practices.
- The literate farmer wants the government to distribute booklets on sustainable practices in local language.

### **Suggestion:**

1. Mass awareness programmes on sustainable agricultural and watershed practices should be organized to spread the message of sustainable farming to the farmer community.
2. Transparency must be ensured in the project implementation in both physical and financial aspects to win the confidence of localities.
3. Regular meetings of the farmer clubs should be organized.
4. Smooth functioning and implementation can be ensured by establishing a good rapport with local bodies like Panchayats and Gram Sabha.
5. To reach larger masses, local youth could be trained and employed as volunteers for disseminating information and mobilizing participation.
6. Construction of physical structures like farm pond, percolation pond, loose stone boulders, check dams and for all other watershed structures latest technology and design should be adopted.
7. A knowledge base should be created by tapping and recording the indigenous knowledge on sustainable farming and watershed practices.

### **Conclusion:**

Adoption of sustainable agricultural practices and promotion of watershed development are the effective strategies for addressing the crisis facing us. Popularization of bio-pesticides, crop rotation, legume cultivation, use of vermin-compost manure etc. is essential for promoting sustainable agriculture. Construction and maintenance of watershed structures must be taken up as a movement to harness the available water through rainfall and for preserving the water table level. The alarming call of nature can be ignored only at the own risk of survival of the humanity.

## REFERENCES

- Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. Longmans, Green and Co.
- SINGH, J. (1976), An Agricultural Geography of Haryana, Kurukshetra: Vishal Publishing, pp. 90.
- FAO. (1993). Sustainable Agriculture and Rural Development (SARD): Policy and Strategy Paper. Food and Agriculture Organization, Rome.
- KANAGASABAPATHI, K (1996), Indigenous knowledge system of Tribals for Agricultural Development. Un pub. Ph.D. thesis, Dept. of Agrl. Annamalinagar. Extension, Annamalai University.
- SINHA (1998), International Encyclopaedia of Sustainable Development New Delhi: Anmol Publications Pvt. Ltd.
- SINGH, KUNDU, SHOPA SINGH (1998), Hand Books of Modern Management Series 1 Agriculture Management. New Delhi. Mittal Publications.
- PARVATHI, S., K. CHANDRAKANDAN AND C. KARTHIKEYAN, (2000), Women and dry land post-harvesting practices in Tamil Nadu, India. Indig. Know & Devt. Monitor 8(1): 13-16.
- GANESAMOORTHY, S. (2000), Indigenous Knowledge on Post Harvest Practices. Un pub. M.Sc.(Agri.) thesis, TNAU, Coimbatore.
- GUPTA, ANIL K. (2000), Grass roots innovations for survival, LEISA INDIA Newsletter, 2 (2): 20-21.
- Warwade, P., Hardaha, M. K., Kumar, D., & Chandniha, S. K. (2014). Estimation of soil erosion and crop suitability for a watershed through remote sensing and GIS approach. Indian Journal of Agricultural Sciences, 84(1), 571–576.
- Kumar, L., & Mutanga, O. (2018). Google Earth Engine applications since inception: Usage, trends, and potential. Remote Sensing, 10(10), 15.
- Prasad, K. V., et al. (2023). Integrated studies for land suitability analysis towards sustainable agricultural development in semi-arid regions of Andhra Pradesh, India. Geosystems and Geoenvironment, 2(2), 100-131.
- Balasundaram, A., Aziz, A. B. A., Gupta, A., Shaik, A., & Kavitha, M. S. (2024). A fusion approach using GIS, green area detection, weather API and satellite imagery for fertile land discovery and crop suitability. Scientific Reports, 14, 16.
- Sawant, N., Das, B., Mahajan, G., Desai, S., Raizada, A., Kumar, P., & Singh, P. (2025). Crop suitability analysis for the coastal region of India through fusion of remote sensing, geospatial analysis and multi-criteria decision making. Scientific Reports, 15, 87.
- Anand, S., Yadav, S., Lal, P., Mishra, P., & Rani, U. (Eds.). (2026). Sustainable Agriculture Development and Management Through Geospatial Technologies. Springer.