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A Study on Indigenous Dryland Practices in Tamil Nadu: Documentation, Categorization and Impact Analysis

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Abstract

The southern dry zone of Tamil Nadu is characterized by its arid climate and limited water resources, necessitating sustainable agricultural practices developed by local communities. This study aims to identify, document and classify 885 indigenous dry land agricultural practices employed in this region. Through field surveys across eight villages and interviews with 120 farmers, alongside historical agricultural data analysis, the research documents various traditional techniques optimized for water use, soil fertility and crop resilience. Practices are categorized based on spatial distribution, district wise categorization, technology wise categorization and crop wise categorization. Key findings highlight the predominance of pest and disease management practices and the vital role of these techniques in supporting agricultural productivity and environmental sustainability. By demonstrating the ecological and cultural significance of indigenous practices, this study provides valuable insights for policy makers and agricultural planners to develop strategies for sustainable farming in arid regions. The research also emphasizes the importance of preserving indigenous knowledge systems in the face of climate change and modern agricultural challenges.

Keywords : Indigenous agricultural practices, Dry land farming, Sustainable agriculture, Traditional farming techniques, Foliar application, Local knowledge

Out of 13 m ha of geographical area of Tamil Nadu, about 4 million hectares of cultivable area is still under the mercy of seasonal rainfall. Except Dharmapuri, Salem, Kanyakumari and the Nilgiris, the remaining districts are under the influence of North Eastern Mansoon rainfall for the dryland crop productivity. Unless the productivity from these dry lands gets stabilized, food production in Tamil Nadu is always under risk (Geethalakshmi *et al.,* 2001). Dryland farming occupies a predominant place in Tamil Nadu agriculture consisting nearly 56 per cent (3.19 m ha) of net cultivated area. Dry farming supports more than 50 per cent of Tamil Nadu population and contributes 40 per cent to the state's food production (IJSA, 2024). Dryland agriculture is vital for ensuring food security in regions with limited and unpredictable rainfall, supporting millions of livelihoods. By focusing on drought-resistant crops and efficient water management practices, it helps farmers adapt to climate change and build resilience against droughts. Moreover, it promotes sustainability through soil and water conservation techniques, while growing nutritionally rich, hardy crops that require fewer resources, making it a key contributor to both environmental preservation and rural economies (Vijaykumar, 2023).

Indigenous agricultural practices represent a deep reservoir of traditional knowledge that has evolved over centuries. These methods are uniquely suited to

local environments and have been fine-tuned through generations of experience. In Tamil Nadu, a state with a rich agricultural heritage, these practices continue to play a vital role, particularly in rural and tribal communities (Balasubramanian *et al.,* 2020). From water conservation techniques to organic farming, indigenous methods contribute to sustainable agriculture, resilience to climate variability and the preservation of biodiversity (Ramakrishnan, 2018). Despite the growing focus on modern agricultural technologies, indigenous practices offer numerous benefits, including low resource dependency, cost-effectiveness and a reduced environmental footprint (Kumar and Suresh, 2019). These techniques are not just agricultural methods; they are deeply embedded in the cultural and social fabric of rural Tamil Nadu. Practices such as the use of natural fertilizers, traditional seed preservation and community-driven irrigation systems like the *Kudimaramathu* system reflect a symbiotic relationship between nature and society (Narayanan, 2021). However, the documentation and systematic study of these indigenous practices have often been limited (Chakraborty and Singh, 2017). The growing influence of industrial farming and the increasing demand for high-yield crops have overshadowed these methods, pushing them to the periphery of mainstream agriculture (Subramanian *et al.,* 2022).

This study seeks to fill this gap by providing comprehensive documentation of indigenous dryland agricultural practices in Tamil Nadu. It aims to categorize these practices based on their spatial distribution, District wise categorization, Technology wise categorization and Crop wise categorization. In light of the current challenges posed by climate change, environmental degradation and the depletion of natural resources, understanding and preserving these practices are more important than ever. This research will also provide valuable insights for policymakers and agricultural practitioners, demonstrating the potential of indigenous knowledge systems to address contemporary agricultural challenges in Tamil Nadu and beyond (Govindarajan and Sekar, 2021). These time documented techniques along with modern agricultural practices can be adapted and innovated to suit current environmental challenges, especially in dryland areas. Additionally, incorporating these traditional methods into national and regional agricultural policies can help improve resilience to climate change, enhance soil conservation and promote food security, ensuring that local ecosystems and biodiversity are preserved while supporting the livelihoods of farmers. As a result, there is an urgent need to document and to categorize, these indigenous practices available in dryland areas. Hence, the present study was undertaken in the following specific objectives.

Objectives of the Study

1. To document the Indigenous dryland practices in southern dry zone of Tamil Nadu.

2. To categorize the documented Indigenous dryland practices as in to various categories.

Need of the Study

Agriculture in Tamil Nadu, particularly in the southern dry zone, is increasingly threatened by climate change, water scarcity, soil degradation and the pressures of modern agricultural practices. As the region faces recurring droughts, unpredictable rainfall and diminishing groundwater levels, it is crucial to explore sustainable solutions that can help farmers adapt to these challenges while maintaining productivity and food security.

This study is essential as it seeks to document and categorize the vast array of traditional agricultural practices in the southern dry zone of Tamil Nadu, providing a comprehensive resource for researchers, policymakers and farmers.

METHODOLOGY

Locale of the Study

Southern Dry zone of Tamil Nadu formed the study area as it possesses its major area under dry land cropping as compared to the other six agro-climatic zones. This zone comprises of eight contiguous districts *viz.,* Madurai, Dindigul (Dindigul and Natham taluks), Pudukkottai (excluding Aranthangi taluk),

Ramanathapuram, Virudhunagar, Sivagangai, Thirunelveli and Tuticorin.

Selection of Districts

Out of the eight districts, four districts *viz.,* Dindigul, Ramanathapuram, Virudhunagar and Tuticorin were selected for the study based on their major area covered under dry land cropping.

Collection, Classification and Documentation

One village was selected in each of the two blocks of the four districts selected as above and in turn eight villages for the first phase based on their major area covered under dry land cropping. In each selected village fifteen aged and experienced farmers specialized in indigenous dry land practices were selected for collecting the practices thus making a total of 120 farmers to be contacted and the village wise distribution of farmers is presented in Table 1.

Collection of Indigenous Dryland Practices

All the 120 farmers selected for the study were contacted in person. Informal interview method was followed for collecting the indigenous practices available with them in various crops under dry land cropping system. Farmers were asked to enlist as well as to narrate the practices and the methods for adopting them. Apart from the farmers, indigenous dry land practices were also collected from the secondary sources such as folk lores, ancient literatures, reports, palm leaf inscriptions, astrological literatures etc. The step-by-step process of carrying out some of the practices, preparation of organic nutrient mixtures, bio-pesticides etc. were also recorded.

Classification of Indigenous Dryland Practices

The collected indigenous dryland practices were then classified systematically in to 32 crops containing 577 practices and into 14 general agriculture sub-heads containing 308 practices.

Results and Discussion

Documentation of Indigenous Dryland Practices

Descriptive texts such as reports : In total 885 indigenous dryland practices collected in this study have been documented in the form of descriptive text.

Inventories : Six types of inventories containing 96 items were prepared and documented from the list of practices collected.

Photographs : Two hundred and fifteen photographs were captured/ documented on various dimensions of Indigenous Dryland knowledge/practices

Laminated photographs : Out of 215 photographs, 59 photographs were prepared as Wall mountable Laminated Photographs (12 x 10 size) and preserved as a piece of documentation works.

Table 1

Block wise distribution of respondents

Name of Districts	Name of Block	Name of the Village	Number of Respondents
Dindigul	Reddiarchatram	Kasavanampatti	15
	Natham	Sathampadi	15
Ramanathapuram	Mudukulathur	Keelathuval	15
	Kamuthi	Kumarakuruchi	15
Virudhunagar	Aruppukkottai	Chettikuruchi	15
	Sattur	Pothireddiapatti	15
Tuticorin	Pudur	Pudur	15
	Vilathikulam	Poosanur	15
		Total	120

Drawings : Six drawings were prepared on cropping pattern practices such as Inter cropping. Mixed cropping, Border cropping. Trap cropping, Multi mixed cropping in the form of charts.

Actual samples : In total, 50 Herbarium specimens on various crop varieties and bio-control inputs and seed samples of Seven crop varieties were collected and preserved.

Categorization and Analysis of IDPs

Over centuries of farming, farmers have been trying out several local alternatives to fulfil their needs and to solve their problems. This trial and error have built up an amassed wealth of Indigenous practices. Although, this priceless wisdom has been left uncared for the past few decades as a result of green revolution, many farmers still possess and adopt a number of Indigenous Dryland Practices (IDP's) in carrying out their farming activities. In this study, totally 885 IDPs were identified on agriculture through informal interviews with 120 aged and experienced farmers representing the eight blocks from four districts of Tamil Nadu.

Spatial Distribution of Collected IDPs

A look at the Table 2 provides us the details on totally identified IDPs, the number of blocks in which they are available and the actual number of IAPs identified.

The total number of IDPs collected from the four districts was 1,752. Of these 1,752 IDPs, some were found in only one of the four districts, while others were available in two, three or all four districts. The total number of IDPs available across all four districts was 885. Of these, 383 IDPs (43.28%) were found in only one district, 278 IDPs (31.41%) were available in two districts, 83 IDPs (9.38%) were found in three districts and 141 IDPs (15.93%) were present in all four districts. The 383 IDPs found in only one district were specific to that district, while the non-district-specific IDPs available in all the districts were likely related to crop production, crop protection and post-harvest aspects of major crops.

District Wise Categorization of IDPs

Apart from the spatial distribution done earlier, all the collected IDPs were categorized district wise so as to understand how many IDPs were found in each district and the same has been presented in Table 3.

It can be noted from the table that out of the 1,752 IDPs collected, 489 (27.91%) were found in Tuticorin district, followed by 457 (26.09%) in Dindigul district, 433 (24.71%) in Ramanathapuram district and 373 (21.29%) in Virudhunagar district. Among the four districts, Tuticorin recorded the highest number of IDPs, which may be attributed to the district's varied soil conditions and the wide variety of crops grown there as compared to the other districts.

TABLE 2

Spatial Distribution of identified IDPs over different districts

(n=120)

Spatial Distribution	Number of identified ID Practices	Number of Districts in which available	Actual ID practices	
			No	%
ID Practices found in any one district	383	1	383	43.28
ID Practices found in any two districts	556	2	278	31.41
ID Practices found in any three districts	249	3	83	9.38
ID Practices found in any four districts	564	4	141	15.93
Total	1752	-	885	100.00

Table 3

District wise categorization of identified IDPs

Name of Districts	Number	Percentage
Dindigul	457	26.09
Ramanathapuram	433	24.71
Virudhunagar	373	21.29
Tuticorin	489	27.91
Total	1752	100.00

Technology Wise Categorization of Identified IDPs

The collected IDPs were also classified according to their technological dimensions (varieties, seasons, seeds, manuring, plant protection, harvest, post-harvest aspects, etc.). A review of Table 4 indicates that 30.17 per cent of the IDPs were related to pest and disease management, followed by post-harvest aspects (21.36%), others (10.37%), seeds, sowing and planting (9.04%), manuring (5.99%), seasons (5.31%), crop diversification (4.97%), soil and water management (3.84%), varieties (3.50%), weed management (1.58%), harvest aspects (1.36%), inter-cultivation (1.36%), and preparatory cultivation (1.13%).

As the ancient Tamil literature *Thirukkural* states, plant protection is the most important aspect of crop production, which is why this dimension has the highest number of IDPs. Long before the discovery of inorganic and synthetic organic compounds, plant products and other natural substances were effectively used to control pests and diseases. Banerji *et al.* (1985) also reported that about 2,000 plants with insecticidal properties were known to our ancestors, which explains why more IDPs have been reported in this area. Additionally, 20.90 per cent of IDPs are related to post-harvest aspects, likely due to humanity's long struggle against the continuous loss of seeds and grains in storage, which dates back over 10,000 years, as noted by Banerji *et al.* (1985).

Since three related sub-dimensions seeds, sowing and planting were combined as a single aspect and the number of crops covered was slightly higher (28), this aspect has also recorded a significant number of IDPs.

Table 4

Technology wise categorization of identified IDPs

(n=120)

Technology Spheres	ID Practices	
	Number	Percentage
Varieties	31	3.50
Seasons	47	5.31
Soil and Water management	34	3.84
Preparatory cultivation	10	1.13
Seeds, sowing and planting	80	9.04
Manuring	53	5.99
Inter cultivation	12	1.36
Weed management	14	1.58
Pest and Disease management	267	30.17
Harvest aspects	12	1.38
Post- harvest aspect	189	21.36
Crop diversification	44	4.97
Others	92	10.37
Total	885	100.00

Table 5

Crop wise categorization of IDPs according to economic botanical classification

(n=120)

Particulars	ID Practices	
	Number	Percentage
Cereals	60	6.78
Millets	111	12.54
Pulses	77	8.70
Oilseeds	86	9.72
Commercial crops	57	6.44
Sugar crops	52	5.87
Fruits	27	3.05
Vegetables	36	4.67
Spices and Condiments	49	5.54
Agro-forestry	22	2.49
General agriculture	308	34.80
Total	885	100.00

Crop Wise Categorization of IDPs

Most of the technologies are crop oriented and crop specific. It may not be complete, if the study fails to categorize the available IDPs according to the crops to which they belong.

It can be observed from the table that food crops accounted for 44.14 per cent of the IDPs, followed by general agriculture (34.80%), horticultural crops (7.72%), commercial crops (6.44%), spices and condiments (5.54%) and agroforestry (2.49%). This is because, food crops continue to dominate the area under cultivation in resource-poor, dryland areas.

The study emphasizes the critical role that IDPs continue to play in promoting sustainable agriculture in Tamil Nadu's dryland areas. These practices are not only environmentally friendly and resource-efficient but also culturally significant, preserving traditional knowledge systems that have developed over generations. Given the current challenges of climate change, resource depletion and biodiversity loss, there is an urgent need to recognize, document and integrate these indigenous practices into mainstream agricultural policies and programmes. This would ensure their preservation and enhancement, contributing to the resilience of farming communities and the sustainability of agricultural systems in Tamil Nadu and beyond.

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