Status of Agrobiodiversity in Tamilnadu

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FOREWORD

Food is the one need of humanity, which cannot be compromised. The main objective of modernization of agriculture is the need for increased food production, for achieving which traditional agriculture is transformed by adoption of modern varieties of crop and livestock, besides external inputs. Infrastructure such as irrigation schemes, roads and markets, guaranteed prices and markets for produce as well as range of other policies acted as a bait to trap the self- reliance and self-sufficiency of our farming community. Today, although the average yield of crops seemed to have doubled, yet there are alarming regional differences. This apart, genetic erosion and reduction of diversity within a species has caused a great threat to sustainability of agriculture.

The phenomena of drought resistance ensured through traditional varieties are now a distance past. The outbreaks and resurgence of pest and disease attack is also linked to marginalization of traditional verities. There is altogether no maintenance of soil fertility by amending the soil with farm yard manure, green and green leaf manure resulting in destroyed soil structure and altered C:N ratio. Hence, although the country on a whole has been winners, yet farming community sadly remains as losers. It is more than obvious that our farmers are struggling for success in the face of huge odds. A sympathetic view of the

situation and adoption of an entirely different approach to agricultural development is the need of the hour.

Given this set-up, this book entitled "*Status of Agro Biodiversity in Tamil Nadu*" comes as a boon as well as an eye opener. It is an excellent documentation of the first hand knowledge on traditional agriculture. Besides, the book shares a vision to protect the rich heritage of our agro biodiversity in this era of IPR and patenting. Authenticated methodology followed in this study promises accuracy of data. The suggestion, which forms the conclusive part of the book, is exhaustive and down- to- earth. With the rich information on details of crops and indigenous farm practices the book will serve as a treasure for anyone interested in farming.

I wish to place on record my overwhelming congratulations to the authors who toiled for the success of this project and compilation of this book.

Sd/ **(K.VANAGAMUDI)**
DEAN (AGRICULTURE)

ACKNOWLEDGEMENT

This hand book had been a joint effort of CWS and Kudumbam. But in fact different people and organizations had contributed to the shaping and successful completion of the study and bring it in the form of a hand book. We from Kudumbam record our appreciation with thanks to the following persons and organizations.

To the various resource persons, trainers, district conveners, district co-ordinators, member NGOs, field staff and farmers from the LEISA network for entering into the spirit of the study, their effort; their time in organizing the PRA in the villages and for sharing their knowledge and experience with the study team.

To the individuals like Mr. Anwar, Ms. Rukmini Rao and Ms. Sudha of CWS, Dr. K. Vanagamudi, Dean of TNAU for their contributions throughout the study period in terms of designing, providing inputs and contents and also their support in facilitated the study in the right direction.

We thank DDS (Deccan Development Society), Hyderabad, for its excellent model of Community Biodiversity Registers, which only gave insights and learning to do it in Tamil Nadu. Their idea of going for an Alternative Public Distribution System to provide millets and pulses in subsidy has inspired our NGOs to follow the same.

To Dr. A. Lalitha, overall co-ordinator, who was instrumental in co-ordinating the entire process for many hours of overtime and hard work to meet the needs of the study. We thank Dr. Manjula for her involvement in designing and providing feedback on the content of the study.

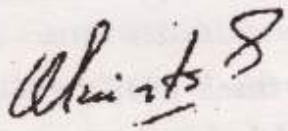
Center for World Solidarity, a supporter of Kudumbam funded the study process and the publication of this book. We gratefully acknowledge their support.

Our sincere thanks and gratitude to the staff and the Board of Siemenpuu foundation and Future Earth for their interest shown in the study and their support towards the additional funding requested for the publication.

Our future plan is to cultivate small and minor millets in abundance in the fallow land of small and marginal farmers and to establish seed and grain banks. A signature campaign is planned to recommend Tamil Nadu Government to provide millets and pulses in subsidy through PDS. Therefore we thank all the above for their valuable contribution to attain the above future goal in great success.

We also thank Mr. Jacob Maran, for his contribution in designing and printing the books. Our special thanks to all staff of Kudumbam LEISA network service cell, for their support in many ways and making it a success.

September 2006



(Oswald Quintal)
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Introduction

Agro-biodiversity has grown to an extent resulting in increasing awareness that its valuation and use might contribute to long-term conservation and helps to attain food security. This booklet gives an idea about the present status of agro-biodiversity in Tamil Nadu. Agro-biodiversity is the basis for global food security. This book clearly depicts the agricultural and provides insights into changing trends of food practices of people in rural Tamil Nadu. The compilation is the contribution of villagers in giving facts about their village practices. While discussing the Govt. and NGOs effort in conserving biodiversity, KUDUMBAM's effort on establishing Community Bio-diversity Registers to record people's knowledge on agriculture and in meeting the challenge of patenting the local crop species has become the major objective of this book.

This effort to record the present status of agro biodiversity to compare with the past has been done in the presence of village Panchayat leaders and councilors. The data on agro-biodiversity has been collected from 73 villages of Tamil Nadu where KUDUMBAM has initiated Low External Input and Sustainable Agriculture (LEISA) Network. The network promotes the concept of Low External Inputs and Sustainability in Agriculture.

Methodology of the study: For this study , census method of sample selectiom has been adopted, by which all member NGOs of LEISA Network has been selected for establishing Community Biodiversity Registers.

The member NGOs are being involved in Sustainable Agriculture, therefore the Agro biodiversity status of the villages where these NGOs have been working with are taken into consideration for this study. The past status has also been collected and is compared with the present status. Thus the comparative methodology has also been followed. Structured questions have been asked to the farmers to collect data through group interviews, individual interviews and mainly through PRA tool. Observation of the field has helped to cross check the present status.

The book addresses the details of crops in each village, soil type where each crop is being cultivated, intercrops, pests, diseases, consumption pattern, frequency of consumption, historical importance of the crop and, medicinal, fuel and fodder usage. This is an effort to strengthen biodiversity and safe-guard disappearing species and record people's knowledge. Traditional indigenous agricultural practices have been recorded in Community Biodiversity Registers with overall consensus of the village people. The facts, thus collected through, Participatory Rural Appraisal technique have been crosschecked, verified and data has been recorded in the register.

Food availability is decreasing drastically and now we are importing wheat from Australia and due to non availability of labeling the food be import can be GMO food.

The need for conserving biodiversity has been realized everywhere not only for balancing ecology but also to establish food security for all. The futuristic vision of present drought condition results in importing food grains including rice from other countries. A successful alternative is to go for traditional ways of cultivation. The traditional system not only increases food security, but also promotes soil fertility, health status, medicinal values and fodder for cattle, thus maintaining the ecological balance.

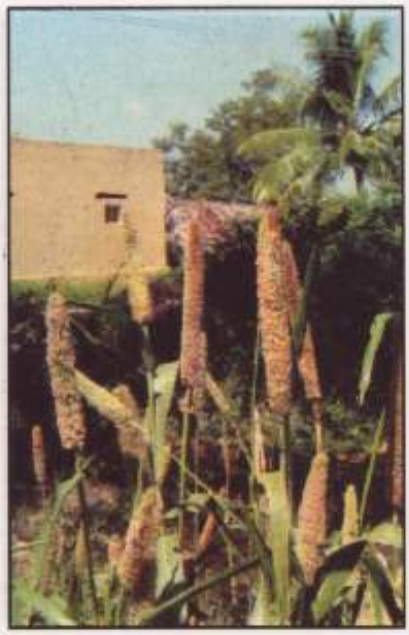
Status of Agro Biodiversity in Tamil Nadu

Biodiversity encompasses all forms of life present on earth. Biodiversity includes ecosystem, community, species, population and genus and so, conservation efforts and sustainable use will have to look into the complex inter and intra relationships. There is an increased awareness that we need to conserve our biological wealth not just for the efficient functioning of the earth but also for our own survival as every living organism is part of the web. Despite this awareness, we are losing many species everyday due to a myriad of reasons including unsustainable exploitation, loss of habitat, increased urbanization, and use of environmentally unfriendly chemicals and in some case due to natural process of extinction. Biodiversity is located in countries that are poor in economic terms.

Agro biodiversity is defined as that part of biodiversity on which human beings depend for their sustenance of food, fuel, and fiber. Agro biodiversity includes all crops and livestock and their wild relatives and all the interacting species of soil organisms, pollinators, symbionts, pests, predators and competitors. On a broader scale agro

biodiversity also includes the agro ecosystem components and types and the knowledge of managing biological resources, which vary from region to region.

Agro biodiversity can increase agricultural productivity, yields and food security, it will build stability, robustness and sustainability of farming systems, contribute to sound pest and disease management, conserve soil and increase natural soil fertility. It can also diversify products and income opportunities from farms, add economic value and increase net returns to farms, reduce risks to people and nation, increase efficiency of resource use and restore ecological health, reduce pressure of agriculture on fragile areas, forests and endangered species, reduce dependency on external inputs and increase nutritional values and provide sources of medicines and vitamins.



Biodiversity and the growth of agriculture are sometimes seen as conflicting goals though these two can be integrated through sustainable ecological practices. Sustainable development is possible through processes that are environ mentally sound, ecologically healthy natural resource management, ensuring food security, economic viability, and agricultural productivity and socially empowers the rural poor, ensures social equity, health and safety of people and encourages public participation.

There are approximately 75,000 species of edible plants though only about 7000 are cultivated and collected for food. Over 90% of food that we consume today comes from only about 103 species form.

Food security is defined as food that is available at all times which is accessible to all people and is nutritionally adequate in terms of quantity, quality and variety and is acceptable within the given culture.

Today, all over the world agricultural and food systems are in crisis and livelihood security is at risk. Food is becoming a global commodity, with the control increasingly shifting from farmers to giant multinational agricultural businesses. A seed earlier saved by the farmer is now becoming a property of a Seed Company. In case of pastoralists too, there is an increased promotion of controlled breeding. The traditional pastoral people are losing control of access to livestock breeds and grazing lands. These changes bring about an erosion of traditional practices, customs and even lifestyles that may create a negative impact.

As the major food crop-rice has replaced all traditional crop varieties like small and minor millets and cereals, our food security is at stake. With climatic changes, we need to conserve our crop diversity that are resistant to a multitude of factors like drought and salinity. Our traditional crops, though are quite resilient to droughts and pest attacks, are not encouraged as they do not have demand in domestic and international markets. Agriculture biodiversity and food security are inseparable. Monocrops, cash crops and genetically modified crops not only question the very existence of landless and small farmers but may also raise a frightening scenario where our traditional varieties become extinct.

Agriculture in India

Indian agriculture has been dynamic and has evolved over centuries. Indian rural and agrarian life has evolved using land, water and bio-resources in a sustainable manner by people who always believed that their culture is born out of nature especially, forests,. Indian mythology believes that all plants and animals possess souls. Many such thoughts and beliefs of the people led to the development of socio-agriculture practices and farming systems that helped in conservation and sustainable use of bio-resources in the long term. Assigning a sacred belief to certain areas like forest and hillocks or even specific plants ensured conservation. Traditional agriculture, believed in mixed cropping pattern using natural fertilizers and pesticides and, have been site specific taking into account the micro environment of the areas. This ensured a production system that yielded a wide variety of food, fodder, a chance for the soil to recover fertility, little risk from pesticides, conservation of genetic diversity of crops and most importantly food that was healthy and crop management.

In 1960's, driven by the need to increase food production for a growing population, the agriculture policy of India made a major shift to introduce high yielding varieties which led to monoculture and, the whole success of increased productivity was termed 'green revolution'. Though green revolution solved food crisis in India, it lead to a major problem for as farmers started depending on fewer crops that were predominantly high yielding varieties that needed greater application of fertilizers and pesticides. Indian farmer went in for cash crops with heavy investments in terms of irrigation, inorganic inputs resulting in steady erosion of genetic resources and traditional crops.

Agro-biodiversity in India

Archeological records show that Indian civilization has contributed to domestication of number of plants either or parallel to other civilizations.

Around 583 crop plants are cultivated in India of which 168 species are reported in the Hindustani center which is one of the 8 Vavilonian centers of origin and diversity, besides 334 wild relatives of crop species. Additionally the indigenous community uses 1532 wild edible plants. Ethnobotanically 9500 plant species are used with 7500 are medicinal use, 3900 are edible and multi-purpose usage.

A great variety of cereals, millets, grain legumes, oil seeds, fiber crops, vegetables, fruits, medicinal and aromatic plants, narcotics, spices and condiments and others have been domesticated in the Indian sub-continent. India is also an important center for cereals like barley, wheat and maize, pseudo cereals like amaranth buck wheat, millets and forages like finger millet and sorghum, alfalfa, foxtail millet, pearl millet, grain legumes like chick pea, lentil, oil seeds like black mustard, castor, safflower, sesame, fiber crops like cotton, vegetables like radish, bottle gourd, fruits like water melon, coconut, musk melon and medicinal and aromatic plants like belladonna, digitalis, poppy, black psyllium, spices like cardamom, chilly, cinnamon, fennel etc. Various colonial rulers like Portuguese, British, and French etc., introduced many of the crops in India.

In today's changing scenario land, water and biodiversity is diverted and destroyed for producing crops for international markets thus increasing domestic food insecurity and food imports from other countries. There are many examples where millions of hectares of land has been diverted to the production of cash crops for horticultural and oil seed production instead of food crops. The market driven economy has replaced food crops and produce cash crops according to the demand.

Agriculture has become completely commercial with the introduction of new technologies for agricultural production leading to a demand for fertilizers, pesticides and High Yielding seed Varieties (HYVs). This has resulted in rapid change of food habits from consumption of coarse cereals giving way to rice and wheat. Even among rice and wheat the local varieties are fast disappearing as the HYVs are taking over the market. The culture specificity of food is also disappearing at a fast rate and is been being replaced by similar staple food.

Uncultivated food sources (greens, wild fruits, tubers, small animals) were a major source of additional food to people all over the world, but with an intensification of production of mono-crops and pesticide usage destroyed uncultivated food sources.

Though an increase in rice is reported as an increase in 'food' production, it is in fact directly responsible for severe decline in the abundance and availability of overall food sources.

Although there is a decline in human consumption of millets, the amount of these grains used as fodder has increased by 4% per annum over the last 25 years. A major characteristic that millets have in common is that they are important subsistence food crops in many parts of India and other developing countries, and therefore, do not receive international research and political support they deserve. Millets are hardy species, which grow under harsh conditions and will produce food for farmers who do not have resources to purchase other grains.

Tamil Nadu Scenario

Tamil Nadu state lies between 8°05'N and 13°35'N and 76°15'E and 80°20'E and has a total geographical area of 1.30 lakh sq km, which amounts to 4% of the country's land surface. The general climate of the state is moderately hot and dry in plains. However, temperature close to 0°C is known in the hills during winter. The average rainfall varies between 900 and 1200 mm per annum from southwest (June–September) and northeast monsoon (October– February).

Population of Tamil Nadu is 61.9million with over one-third living in urban areas.

Land use Classification

Table 1: Classification of Land

Classification of Land	Area in Hectares (Ha)	% of Total Area
Total Geographical Area	13026645	100.00
Forests	2122041	16.29
Barren and Unculturable Land	509378	3.91
Land put to Non-Agricultural uses	2113353	16.22
Culturable Waste	379439	2.91
Permanent Pastures and other grazing lands	113474	0.87
Land under miscellaneous tree crops, groves	282980	2.17
Current Fallow Lands	953963	7.32
Other Fallow Lands	1862861	14.30
Net area sown	4689156	36.00
Area sown more than once	626871	
Gross area sown	5316027	

(Source- Agriculture Department, Policy Note -2003-2004)

Land use classification of Tamil Nadu is given in the table below. It shows that Net sown area in the state is around 36% and forests dorm about 16% of the total geographical area.

(Source-Agriculture department, policy note-2003-2004)

Tamil Nadu has a marine biosphere reserve the **Gulf of Mannar Biosphere Reserve** and a hill biosphere reserve, 'the Nilgiri Biospshere Reserve' which was the first to be set up in India under the Man and Biosphere Programme and is also the only Indian biosphere reserve that has been included in UNESCO's global network of biosphere reserves.

Important rivers that drain the state are Cauvery, Pennaiyar, Vaigai and Tamiraparani. Together, including hills of Eastern and Western Ghats, coastal plains and plateau region, the state offers varied habitats to a great diversity of micro organisms, plants, animals and human cultures. Peaks above 2000 MSL are frequent in the Nilgiris, Palnis and Anaimalais. Other hill ranges in state especially Kolli Hills and Shevaroys of the Eastern Ghats raise over 1300 MSL at many points. The landscape of the state thus represents –

- Wet or humid hills (Western Ghats - Nilgiris, Palnis, Anaimalais, Grass hills, Srivilliputtur and the hills of Madurai, Tirunelveli and Kanyakumari districts); some of which even include montane flora and fauna.
- High hills (Eastern Ghats -Javadi, Pachamalai, Kalrayan, Kolli); which are drier.
- Drier plateau ecosystems as that of Coimbatore and Erode.
- Dry plains that predominate the state and coastal plains including deltas, estuaries and mangroves.

The state has a protected area system comprising of 5 National Parks, 20 Wildlife Sanctuaries and 2 Biosphere Reserves. Tamil Nadu is endowed with a rich biodiversity and of the total recorded forest area in the state, 3134.70 sq km or 13.7% of the total forest area is dedicated towards wildlife conservation. 2.26 million Ha of land area is classified as forests of which 86.12% are Reserve Forests, 11.17% Reserved Lands and 2.71% Unclassified Forests.

Agro-climatic Zones of Tamil Nadu

Tamil Nadu is divided into seven agro-climatic zones based on rainfall, altitude, soil, cropping pattern and irrigation source. These seven zones are- North Eastern zone, North Western zone, Western Zone, Cauvery Delta Zone, Southern Zone, High Rainfall Zone and Hilly Zone.

- ✧ Paddy formed a major crop in Zones I, IV and V
- ✧ In zones I, II & IV, groundnut formed the second important crop
- ✧ Sugarcane, Sorghum and millets are the other crops which are prominently cultivated.
- ✧ Zone VII is highly dominated by Cash crop cultivation where Tea & Coffee form the major crops.
- ✧ In the dry region-dryland area millets and pulses are common as these crops need less amount of water.
- ✧ Vegetable cultivation is seen in all the districts and it is mentioned as other crops.

Table.2. Agro-climatic zones of Tamil Nadu

Crops	Districts Falling Under the Zone					
	I-North Eastern Zone Chennai, Kancheepuram, Thiru-vellore Vellore, Tiruvannamalai, Cuddalorand Villupuram	**II-North Western Zone** Salem, Namakkal and Dharmapuri	**III Western Zone** Erode and Coimbatore	**IV Cauvery Delta Zone** Thanjavur, Tiruchy Nagapattinam Thiruvarur, Karur and Perambulur	**V-Southern Zone** Pudukottai, Madurai, Dindigul, Theni, Ramanathpuram Sivagangai, Virudhunagar, Tirunelveli and Thoothukodi	**VI-High Rainfall Zone-** Kanyakumari
Paddy	721844	122941	78784	636000	576982	33661
Sorghum	22022	69762	101169	92312	99238	0
Pearl millet	80674	11943	2899	25617	47103	0
Finger millet	20110	80850	12881	482	5680	0
Green gram	12359	16426	9249	21465	23584	3
Black gram	35349	23864	4852	64065	34463	1507
Sugarcane	136029	40674	38106	46572	41795	0
Cotton	23281	43077	28242	39007	98558	1
Groundnut	383529	212990	96224	85343	121698	139
Banana	14959	3961	10868	19319	30478	4479
Mango	19523	34364	2824	4422	26572	1754
Other crops	191121	468070	300790	222751	501724	61300

VII Hilly Zone (The Nilgiris)

Crop	*Area coverage (Ha)*
Tea	54237
Coffee	8623
Vegetables (Peas, Cabbage, Carrot, Chillies, Turnip, Knolkhol, Radish, Beetroot, Lettuce, Cauliflower)	2742
Spices and Condiments	4145
Potato	2666
Cereals and Pulses	2132
Other non food crops	1538
Fruits	688
Other crops	264
Oil seeds	71
Flowers	1
TOTAL	77107

(Source- Agriculture Department, Policy Note -2003-2004)

Status of Agriculture in Tamil Nadu

Agriculture is the main occupation of near 60% of people, though the contribution from this sector has been declining. The land-man ratio is declining due to population pressure, the operational land holdings in the state are quite small being 1.01 Ha when compared to the national average of 1.69 Ha 72% hold marginal lands (less than 1 Ha) but only 26% of area. Small holdings (1.0 Ha –2.0 Ha) account for 16% of total holding and 23% of area. Large holdings (10 Ha and more) formed only 0.3% of total holdings covering over 9.3% of area. Scheduled Castes (SC) operate11.4% of the holdings, Scheduled Tribes (ST) operate 0.7% and the rest 87.9% is operated by other social groups. The operational land holding of ST is 1.49 Ha when compared to the 0.64 Ha of SCs and 1.06 Ha of others.

Total cultivated area is 5316027 Ha and the net area sown is 4689156 Ha of which 626871 Ha is sown more than once. The major cereals cultivated are paddy, sorghum, pearl millet, maize, finger millet, small millets pulses like bengal gram, red gram, black gram, green gram, horse gram; oil seeds like ground nut, gingelly, castor, coconut and other crops like cotton, sugarcane, tobacco, chilies etc.

Farmers who cultivated traditional varieties of rice, minor millets, vegetables and fruits and had farm animals to supply their needs of farmyard manure switched over to short term high yield varieties of paddy and other cash crops like cotton, sugar cane and groundnut with the advent of green revolution. Earlier they had food security as they could produce their food and fodder needs with wide variety of food they cultivate in their fields. But now they are dependent on crops which are vulnerable on many counts- pest attacks, market forces, crops that needed high amount of irrigation etc.

Gender and Agro biodiversity

The position of women in the country, through the prevailing social structure, is reflected in their economic roles. Women contribute substantially to household income, but her contribution is attributed as supplementary. Women not only take care of 70 to 80 % of fieldwork and post harvesting and processing is solely their responsibility. Men do all work involving machinery while all manual work like transplantation, weeding and threshing is done by women. Mainly men market the agricultural product.

Studies have shown that women contribute extensively to agriculture. They have the dual responsibility of taking care of their households and farm production. With rapid increase in agriculture degradation, changing agricultural technologies and practice; workload on women has increased considerably. Women contribute to the household income through farm and non-farm activities as well as through agricultural labourers. Especially in the process of minor millets cultivation, women have the major role and the process of threshing millets is labour consuming. The will be taken care of women widely. Moreover the rural women of the study area are the experts of the traditional food processing techniques of millets.

Women in this generation in general, though are well known of the high nutritious nature of millets and pulses but their natural intention is to give rice to their husbands and children and to consume millets. They think that millets have a lower status than rice.

Steps taken by NGOs/ Research Institutes/ Government Departments

Concerned over the loss of biodiversity especially agro biodiversity, land degradation, decreased soil fertility, pollution of natural resources, a vicious cycle of increased pesticide

application, chemical fertilizers and immunity of the pests to new and more dangerous chemicals and social issues like migration, increased debts, health risks, a market dependent agriculture over which farmers had no control, dependence on multi national companies for seed, pesticides and in general, over the negative aspects of green revolution and food insecurity. Various non governmental organizations (NGO), research institutes involved with agricultural research and social development and progressive farmers focused on efforts to revive traditional agricultural practices.

Encouraging farmers to go in for diverse cropping patterns, organic farming, conserving traditional seeds and reviving cultivation of traditional crops, integrated farming system like agro forestry, fish culture in farms, cattle, poultry to ensure food security etc., were some of the steps taken by farmers, farmers' network and NGOs working in the agriculture sector to conserve agro biodiversity.

KUDUMBAM-LEISA Network's Effort on Agro-Biodiversity

KUDUMBAM, a development organization, was formed in 1982 to work with resource poor farmers in the drier districts of Tamil Nadu. In 1995, KUDUMBAM along with some progressive farmers and like-minded NGOs, started work on the concept of Low External Input and Sustainable Agriculture (**LEISA**) and formed a network of organizations having similar vision of organic farming. Over the years, 82 NGOs have become part of the network and work with resource poor farmers in advocating the cause of organic farming, which is in the form of training, exposure

The vision of the Network is to create a *harmonious coexistence of empowered Resource Poor Farmers (RPF) and a socially just bio-village where the improved and traditional agricultural practices are environmentally benign and sustainable.* Ecologically sound LEISA alternatives to HEIA (High External Input Agriculture) systems are envisaged to meet the needs of RPF. The LEISA concept is driven by a conviction that RPF, if provided adequate opportunities will share, experiment and emerge with suitable technology and utilization alternatives. Central to LEISA is the concept of participatory technology development (PTD). The technologies developed thus are likely to be more relevant to local conditions, peoples'/community problems and users' perceptions, practices and problems as opposed to those centrally generated and /or developed in isolation with the end users. PTD based outputs are likely to be more acceptable, less expensive and the least exploitative on human beings and nature.

visits, experience sharing, supply of traditional seeds, bio fertilizers, bio pesticides and identifying market for organic produce. KUDUMBUM has developed an organic farm 'Kolunji' at Oddugampatti, Keeranur, Pudukottai District, wherein farming is done integrating agro forestry, poultry rearing, cattle rearing, vermi-compost and composting as an example of sustainable farming to interested groups.

LEISA Network has been working on issues of Biodiversity since 1997. Centre for World Solidarity (CWS), Hyderabad came forward to support a study on the status of Agro-biodiversity and to evolve community biodiversity registers for traditional indigenous varieties.

Through this study LEISA tried to revive traditional crops and an attempt was made to ensure food security through cultivation of small and minor millets, storing seeds in grain and seed banks to be distributed to the farmers and villagers for consumption in their lean period.

With the knowledge of declining biodiversity, it was felt that there is a need to document traditional ecological knowledge in terms of Conservation of Biodiversity (CBD) and Intellectual Property Rights (IPR). This could serve as a record of disappearing knowledge to encourage conservation of traditional crops and utilization of plants, challenge patents and monopoly.

Status of Agro biodiversity in Tamil Nadu' attempts to document the agro-biodiversity wealth of the state. In this effort we have tried to document the details regarding all crops especially traditional varieties. Some of the details include species cultivated in each agro climatic zones, cropping patterns, cultivation practice, storage details, harvest practices, gender roles etc.

Biodiversity registers are of utmost importance in today's world as biodiversity and the knowledge regarding it is disappearing at an alarming rate. Tens of thousands of varieties of rice were grown in different parts of the country, however, today just a handful of varieties are grown throughout the country. Modern markets have demolished the diversity on people's farm, gardens and forests. They demand only a few varieties thereby forcing farmers to grow only those varieties. This has destroyed the traditional diversity, which people had conserved. Modern agricultural practices have altogether destroyed the wide variety of volunteer plants on farmers' fields that were used as vegetables/greens as they are considered "weeds" that need to be destroyed.

Moreover big multinational companies are now patenting plant varieties that have been traditionally grown, studied, used and conserved by our farmers and rural people. Neem, Mustard, Turmeric and Basmati rice are just some of the well-documented cases that were granted patents in the western world. Fortunately as these plants and their uses have been extensively documented in our traditional literature and texts, we were able to challenge the patents. However, many of our biodiversity and its' uses have hardly been documented and till now have been passed by word of mouth. With globalization and rapid

urbanization, such knowledge may very well disappear in a generation or two, but for few concen trated efforts by NGOs and panchayats which have made serious attempts to document traditional crops, livestock, poultry, fertilizers, pesticides and herbal medicines. Such documen tation are commonly termed Community Biodiversity Registers (CBRs), are means by which we can establish that such knowledge already exists and it will also help us to conserve our disappearing biodiversity and access our "traditional knowledge". Biodiversity Registers will help us in understanding the true potential of our biological wealth.

LEISA is a network of nine districts in Tamil Nadu and work in close association with NGOs from all these districts. A questionnaire based on the model prepared by Deccan Development Society (DDS), Hyderabad was used, editing and adding the queries suited to our local conditions.

The parameters for the questionnaire ranged from ecological details regarding soil conditions to irrigation agricultural details from sowing to harvesting. Data was also collected with regard to utilization of weeds and crops as food and medicine, the market, consumption patterns, gender roles etc. A model of the questionnaire is attached as Annexure I.

The NGOs were the facilitators for the interaction with the farmers. Data was collected from people through a Participatory Rural Appraisal with the field staff of the NGOs acting as facilitator. The State Level Biodiversity Coordinator played a major role in bringing all the organizations, field staff together for this task, designing the questionnaire, coordinating the PRA (Participatory Rural Appraisal) exercises and consolidating data from the diverse sources.

The PRAs were conducted in a central place of every village taking care that the village president, councilor, elders and women and men farmers. Nine districts were included in this exercise with 73 NGOs and an equal number of villages participating in the preparation of the Community Biodiversity Registers. A copy of the NGOs and villages associated in the study is included as Annexure II.

Table.3.

S.No	DISTRICT	NGO	VILLAGE	REMARK	PROBLEM/VIEWS
1.	TRICHY	**AHIMSA**	**Thoppanaikanpatti**		
2.		VOICE	C.R. Palayam	**Traditional paddy varieties are still cultivated.**	
3.		TRD	Karnampatty		
4.		RGT	Varadharajapuram		
5.		GMKN	Thadhampatty		
6.		PPDES	Vengadathan patty	**Millets production is high.**	

S.No	DISTRICT	NGO	VILLAGE	REMARK	PROBLEM/VIEWS
7.		VDC	Ayyampalayam		
8.		RACE	Pidaripatti		
9.	PUDUKKOTTAI	ANBU TRUST	Thirukkolakudi	Traditional paddy varieties are still cultivated.	
10.		VENTURE	Irunthiraipatti	Traditional paddy varieties are still cultivated.	
11.		KUDUMBAM	Konguthirayanpatti		Couldn't get traditional seeds
12.		VELLICHAM	Nanjur		
13.		GRAMIA	Mettupatti	Millets are still consumed.	
14.		IRCS	Kulathur		
15.		WORD	Vallathirakottai	Farmers have Traditional seeds	
16.		SAKTHI (PPDS)	Veerappatti	Integrated farming system is visible.	
17.		LORD	Settipichampatti		
18.		GREEN VISION	Karunavalkudi	Millets production is seen.	
19.		NISAT Trust	Managiri		
20.	DINDIGUL	CIRHEP	Sivanganapuram	Millets production and consumption is high.	
21.		REAL	Thoppupatti		

S.No	DISTRICT	NGO	VILLAGE	REMARK	PROBLEM/VIEWS
22.		ECHO	Karuppa Moopanpatti	Millets production and consumption is high.	Land alienation and migration are problems.
23.		RWO	Paganam		
24.		CEDA	Veyiladichanpatti	Millets production is high and crop rotation is seen	
25.		POPE	Vangamanuthu		
26.		ACT	Perumal Koilpatti		
27.		Y NEEW	Kallupatti	A value added drink similar to horlicks made from millets is prepared and sold.	
28.		REDA	Devathur		
29.		RASI	Chinnyampatti		
30.		SWESTIC	Sundaripalayam	Millets consumption is seen.	
31.	MADURAI	SSRD	Thethur	Millets production is high.	
32.		SHEPHERD	Vedarpuliyankulam		
33.		AARC	S. Krishnapuram andSolapuram		
34.		POWER Project	Kutlaadenpatti	Millets consumption is seen.	

S.No	DISTRICT	NGO	VILLAGE	REMARK	PROBLEM/VIEWS
35.		INDEX	T.Thirumal		
36.		PARD	S.Valayapatti		
37.	ERODE	JEEVAJOTHI	Theerthakoundanvalasu		
38.		SRESHA	Kaniyur	Millets and pulses are grown in large quantity.	Not able to sell organic ground nut and maize for better price.
39.		WORD	Kuttikinathur	Millets cultivation is high.	Widows are humiliated. People are migrating to quarry works.
40.		NEW YERA	Porulur		
41.		SEED	IkkaraiNehamampudur		
42.		HILLS	Kootarithotti		
43.	SALEM	NRDA	Kapaloothu	Millets cultivation is high.	People are involved in income generation programme by making small packets of millets and pulses for sales.
44.		DGRSA	N. Puthupatti	Millets consumption is markedly more among women	
45.		SIS	Konampatti	Millets consumption and production are more	

S.No	DISTRICT	NGO	VILLAGE	REMARK	PROBLEM/VIEWS
46.		DRSWS	Kothukkadu	Millets production is high.	
47.		TPI	Dasa Samudram	Many traditional paddy varieties are cultivated.	
48.		SHTCDP (Yercaud)	Maramangalam	Major cultivation is only millets and pulses. Only one paddy variety is cultivated.	Organic farming is the only farming system.
49.		DEEPAM	Sengadu	Millets and pulses are cultivated more. Wheat is also cultivated here.	Other then millets vegetables like carrot and spices are seen.
50.	VILLUPURAM	ACT	Kodungal(Mugaiyur)	Millets cultivation and consumption are more.	
51.		VCDS	Vellakulam	Millets cultivation is high.	
52.		ACD	S.Bilrampattu		
53.		MSCD	Aavudaiyarpattu		
54.		RCT	Chennakunam	Millet consumption is seen.	

S.No	DISTRICT	NGO	VILLAGE	REMARK	PROBLEM/VIEWS
55.		SSS	Kaveripakkam	Millets consumption is seen.	
56.		NEL	Sathiyamangalam	Millets production and consumption is more	
57.		SEED	Irundai	Millets	
58.		HRC	Ozhindiyapattu	consumption is seen.	
59.		GREPS	Aeripalayam		
60.	KANCHEEPURAM	GUIDE	Ullavoor	Millets consumption is seen.	
61.		RHADA	Mambakkam		
62.		DGSEA	Vilvarayanallur		
63.		RDS	Puduedaiyur	Millets production and consumption is more	
64.		SEC	Vattampakkam		
65.		GMS	Periya Irumbedu		
66.		HEADS	Chithathur		
67.		TEDF	Panakattupakkam	Millets production is high.	

S.No	DISTRICT	NGO	VILLAGE	REMARK	PROBLEM/VIEWS
68.	DHARMAPURI	STEPS	Dharmathoppu	Millets production and consumption is more.	
69.		GANDHI SEVALAYAM	Aadhiyur	Millets Consumption is seen.	
70.		RDS	Pudupatti		
71.		NEEF	Ettimarathupatti	Millets production and consumption is more.	
72.		SRD	Kodamandapatti	Millets consumption is seen.	
73.		CID	Kelapparai	Millets production is high.	

Some of the inferences drawn from the PRA are:

1. Millet consumption has considerably reduced. Millets intake was 95% once but now was replaced by rice. Pulse intake was 6 kg for a family of 4 to 5 members per month once, but now has reduced to one and half kg. The people and the Primary Health Care (PHC) workers say that the children are malnourished.

2. External purchase has increased with regard to Non-cash edibles like greens, vegetables, tubers, fruits, oil and non-cash small livestock like rabbits, birds, fish, etc., leading to a conclusion that a high fiber diet has been replaced by low fiber diet.

3. Due to external indebtedness they have to sell the products immediately after the harvest. In some villages the brokers purchase it

for prices that are much less than the market prizes.

4. Nearly 80% of the people get rice from the Public Distribution System (PDS) for consumption. Only a few people consume millets once a day or once in two days.

The rice intake has been doubled, tripled and has become 4 times a day among 60% households in the villages.

5. Seeds of the short variety crops, pulses and cereals are purchased from agriculture office only. In Konguthirayanpatti village near Keeranur, it is learnt that the agriculture office people sell Maize with the confirmation that it cannot be cultivated again leading to a disturbing inference that it may be genetically modified (GMO). The department people do sell the seeds, which can not germinate for further cultivation.

Majority of the farmers don't have seeds for long duration crops. They go to other villages for purchasing seeds of long duration traditional crop varieties.

6. As farmers in most villages have gone in for cultivation of short duration variety crop, there is increase of saline land, which in a way increases 10-20% of fallow lands.

7. As there was a wide variety of biodiversity earlier, the mineral intake was high compared to the present status. For example the diversified crop cultivation and crop rotation give place for the growth of edible weeds and greens. The diversified cropping pattern encourages crop rotation, which allows millets, pulses and cereals cultivation in one season, which promotes not only carbohydrate content in our consumption practice, but also other minerals and iron. Whereas it is obvious that mono cropping promotes single mineral intake.

8. The knowledge of food preparation and processing with traditional crop varieties have reduced remarkably and traditional items' food processing needs to be revived.

9. Fruits of tree species like Iluppai (*Madhuca longifolia*) and Castor (*Riccinus communis*) were used for extracting oil earlier, but have now slowly disappeared.

10. Around 80% of the villages, there are landless coolies who are able to eat food only once or twice a day. They have been affected adversely by the depletion of bio-diversity. That is when they go to work in a diversified crop field they could get other non cash food apart from paddy and other grains. Whereas in a mono crop field they will not be able to get such non - cash food. Where as in some villages especially in Kappaloothu, Salem district, people go for income generation through cultivating small and minor millets.

11. Generally it was seen that many of the farmers sold the millets and pulses for cash due to debts and hence there is less consumption of such food especially amongst the women.

Though the farmers cultivate rice, they sell it and buy rice from PDS. So they are willing to buy millets if it is subsidized and sold through the PDS.

12. The community as a whole are willing to involve in millets production with the cultivation of traditional, indigenous varieties of all crops and also are much interested to revive the disappearing species of each crop they cultivate in their local area. Similarly a majority of farmers do sell the grains they produce as soon as they harvest, due to their debt, whereas they opined that when the millets are produced in large quantities, as there is possibility for procurement from Govt./PDS they could consume the same with pleasure as it has more calorific value. At the same time they feel that there is no storage bins or grain banks they had to sell the grains as soon as they harvest; and is being taken for low price.

Information on cropping, right from sowing till harvesting and marketing has been collected from all the villages where a PRA was conducted. The data has been consolidated for each district and the compiled state level data has been given below:

Table: 4. Details of Crops in Tamil Nadu Villages

Crop Details	Paddy	Pearl Millet	Sorghum	Finger Millet
Variety	White, Red, Black Ponni, Aanaikatti samba, Seeraga samba, Mappillai samba, Samba mosanam, Vaadan Samba, Kitchadi Samba, Rubber samba, Vellaikodi, Bavani, Ambasamudram, Baasumathi, Aduthurai, Karthigai samba, Gundunel, Malainel, IR-20, IR-50, Puzhuthikar, Cowni, ADT-36, 37, 39, CO-43, CO-47 and 48	Local Variety (Kattu kambu, Mottai kambu, Kulla variety, Pottu kambu, kuruvai, Pani kambu, Ariki kambu	White, Red, Irugu sorghum, Kaaka sorghum and Yellow sorghum	White, Red and Black and Irukku and Hill variety
Soil Type	Clay soil, Red soil, Black Cotton, Laterite and Silt soil	Clay soil, Red, sandy Silt soil and Black Cotton soil	Red and Laterite soil, Clay, Sandy Soil	Clay, Red, Sandy and Laterite Soil
Intercrops	No intercropping. In the fence Cow pea and Black gram are grown.	Cow pea, Red gram, Cucumber Black gram, Sesame	Lablab, Cow pea, Red gram, Cucumber, Green gram	Barnyard millet, Red gram, Lablab, Gingelly

Crop Details	Paddy	Pearl Millet	Sorghum	Finger Millet
Source of Seed	Seeds from home, Agricultural Department, Farmers' society, exchange with local farmers, outside Market, neighbouring village.	Seeds from home, exchange of local farmers, Agricultural Department, Local fertilizer shop, Union office.	Seeds from home, exchange of local farmers, Agricultural Department.	Seeds from home, exchange of local farmers, Agricultural Department Fertilizer shop.
Seed Selection	Seeds collected from the first threshing, not affected by pests/insects.	Seeds collected from good quality panicle; seeds not affected by pests and insects.	Seeds selected from good quality panicle, not affected by pests and insects.	Seeds selected from good quality panicle, not affected by pests and insects
Seed treatment	Bio-fertilizer seed treatment, fungicide seed treatment, soaking in water, Effective microorganism technology.	---	---	---
Amount of seed required	Short duration crop-15-30 kgs Long duration crop-25-50kgs	5-10 kgs. per acre	5-12 kgs per acre	6-10 kgs. per acre.
Period of Sowing	Dry land farming- July-August Irrigated farming-September-October	April - May; September-October July-August;	September-October. July-August;	September-October, February -March.
Space between Crops	4 to 5 inches between crops	Half foot between crops	4 to 5 inches between crops	Half foot between crops
Weed Control	Rooting out by hand during 25-30 days; 2nd weeding 50-55 days.	For dry land crop no weeding.	Hand weeding 30 days after sowing	Weeding by hand or by a small machine once during 20-25days
Weed Usage	Used as fodder, compost, Green-leaf manure and other medicinal usage.	Used as fodder	As fodder, compost and greens for consumption	As fodder and composting.

Crop Details	Paddy	Pearl Millet	Sorghum	Finger Millet
Diseases	Leaf spot, root rot, stem rot, Wilt and Blast and Zinc deficiency	Zinc deficiency sugary disease and aphids	Potash and Zinc deficiency, shoot fly attack, and shoot rot, sugary disease.	Zinc deficiency, sugary disease during rainy season.
Pests	Stem Borer, Leaf roller, Thrips, Ear Head bug, White Fly, Green Larvae and Moth.	Aphids, Green larvae and Sucking pest.	Aphids, Green Larvae and Sucking pest, Ear head bug, Plant hopper	Stem borer, Ear head bug and Green larvae.
Predators	Ladybird beetle, Spider, Damselfly and Dragonfly, Short horned leafhopper and Wasp.	Dragonfly, Spider and Ladybird beetle.	Dragonfly and Lady bird beetle	Beetle, and Damselfly
Crop Age/ Crop Duration	Short duration crop- 90 to 110 days; Long duration crop-120 to 180 days.	120 days4 months	120 days4 months	100 to 120 days
Method of Separating Grains	Threshing by hands – 75% By Machines – 15% Threshing by bull – 10% Adding to 125%	Threshing in bags by machines; threshing by hands.	Spreading on the road; threshing by bull.	Threshing using sticks and iron rod., threshing by bull.
Yield	Long-term crop (samba)-30-40 bags/acre. Short term crop (kuruvai) 17-20 bags/acre.	4-12 bags per acre.	White sorghum 5 bags; Irungu sorghum 10 bags	4-10 bags per acre.
Seed Storage	Traditional storage system: Nel marisal, Kudhir, Pot in stories, Gunny bags, Manju kulumai, and Seed storage pit.	Storing by packing in a cloth, Storing in mud paths.	Storing in kudhir, Pot, gunny bags after drying on full moon day.	Storing by packing in a cloth bag, kuzhumai, Gunny bags and in Thazhi (pots).
Labourers	Men 10-15/acre Women 50-60/acre	Men 10-15/acre Women 25-30/ acre	Men 15-20/acre Women 30-40/ acre	Men 10/acre Women 50/ acre

Crop Details	Paddy	Pearl Millet	Sorghum	Finger Millet
Place of Sale	To local farmers, to local market, to outside market - other districts.	To local farmers, local market, other outside market, to wholesale centers	To farmers, merchants, local markets, outside markets.	To local markets, local farmers, to local grocery shop and to outside market.
Cost of Selling	Short duration crop Rs.400-450/bag; Long duration crop Rs.600/bag	Rs. 600-700/ bag	Rs.500-600/bag	Rs.1000/bag
Preparation of Food Items	Rice, boiled varieties, fried varieties, rice items with sugar, rice with black gram mix for idly, dosa, vada and the like.	Food, porridge, sprouted millet, sweet and boiled items.	Sorghum rice, dosa, fried corn, sorghum flour, with sweet, nutrition food.	Roti, flour item, porridge, vadai, and spicy varieties
Times of Consumption	20 yrs back rice was consumed once a day while at present it has increased to 2-3 times due to PDS.	Once in 15 days-30 days while it was once a day 20 yrs back.	Once in a month while it was twice a day 20 yrs back.	Three four times in a month.
Fodder Usage	Paddy husk and hay stalk is used as fodder for cow, bull and buffalo.	Husk is used as cattle feed. Flour millet is used as medicine for cows.	Husk is used as fodder. Flour is used to improve secretion of milk in cows.	Used as cattle feed` and for thatch making
Fuel Usage	Crop waste is used as fuel.	Crop waste is used as fuel.	Crop waste is used as fuel.	Crop waste is used as fuel.
Medicinal Usage	Traditionally people use it make bandage for bone fractures.	It is believed that it cures chicken pox and will reduce body heat	It is believed will reduce body heat.	It is believed to cure Anaemia, Diabetes, and Headache, Chest pain, to decrease body weight.

Crop Details	Paddy	Pearl Millet	Sorghum	Finger Millet
Participation of Women	Participating in sowing, transplanting, weeding and harvesting.	Participating in sowing, weeding and harvesting.	Women do 80% of work.	Participating in sowing, weeding and harvesting
Soil Fertility	Soil fertility decreases for next crop.	Soil fertility increases for next crop.	Soil fertility increases for next crop.	Soil fertility increases for next crop.
Rain/water Needed	10-13 times rain is needed	5 times rain needed	5 times rain needed	6 times rain needed
Percentage of People Cultivating	Nearly 45% of people are cultivating.	20-25% are cultivating.	10-25% are cultivating.	5-10% are cultivating.
Endangered Varieties	Kichidi samba, Bhavani, Ambasamudram, Kothamalli nel, Vellakodi	Some local varieties like Seemati...	A few local varieties	Some local varieties like plantain variety

Crop Details	Foxtail Millet	Little Millet	Horse gram	Red gram
Variety	White, Black and Red foxtail millet	Black, red, Suruttai, Sadai, Illam samai and grass millet.	White, black and other traditional variety	Local variety as Samba, Kuruvai, big, small and white variety and improved company variety.
Soil Type	Red, Black Cotton and Silt soil	Clay, Red, Sandy Silt and Black cotton soil	Red, Black cotton soil and Sandy soil	Red, Sandy and black soil
Intercrops	No intercropping but in some places cultivating Red gram, Cowpea, Maize, Sunflower and Lab lab.	Cow pea, Green gram Red gram, and Country beans.	No intercrops	Sorghum, Cow pea, Pillipesera and vegetables
Source of Seed	From local farmers, Navadanya shop and local market.	From home, local farmers and Block Development Office (BDO).	From local and nearby markets	Own seeds, purchasing from other farmers and outside markets.

Crop Details	Foxtail Millet	Little Millet	Horse gram.	Red gram
Seed Selection	Seeds collected from the first threshing; (with iron rod)	Seeds collected from fully grown good quality panicle not affected by pests and insects.	After removing weeds seeds will be selected and by drying it properly.	Seeds that are not affected by pests and insects will be selected and also by socking it with salt water, the floating seeds will be removed and the precipitated good seeds will be separated.
Seed Treatment	Drying the seeds completely.	No special seed treatment.	Treating seeds with Bio Fertilizer (Rhyzobium)	Treating seeds with Bio fertilizer (Rhyzobium).
Amount of Seed Required	3-5kgs / acre	3-10k.gs/ acre.	2-3kgs/ acre	4-8kgs/acre
Period of Sowing	July - August (Aadi Pattam) or August- September (Aavani Pattam)	July to August (Aadi Pattam) or August-September	June - July & September	May-June (vaigasi Pattam) and July-August (Aadi pattam)
Space between Crops	15 to 30cms between crops	Half foot between crops.	15cms - 1 foot	1-1.5ft between crops
Weed Control	Weeds will be removed by hands on the 30th & 45th day of the crop.	No weeds.	Weeds will be removed by weeder and also by hands.	For intercrop no weeding; but for the main crop remove weeds by weeder and by hands.
Weed Usage	Used as fodder and compost	-	Weeds will be used as fodder	Weeds are used for fodder, as green leaf manure and the greens will be used for consumption

Crop Details	Foxtail Millet	Little Millet	Horse gram	Red gram
Diseases	Not susceptible to any disease.	Disease free.	Not prone to disease	Fungal attack
Pests	-	No pest attack.	Boll worm attack	Boll worm, green pest and Aphids
Predators	Beetle and Damselfly	-	No predators	Lady Bird Beetle
Crop Age/ Crop Duration	Traditional rain-fed variety-180 days; Irrigated field 90-100 days	90 days crop.	Black horse gram is of three months duration and white variety is of 6 months duration.	Three months and Traditional variety is six months duration.
Method of Separating Grains	Threshing by bull and stick	Threshing by hands, bulls and tractors.	Threshing by hands, stick and bull.	Beating by sticks after drying it.
Yield per acre	3-6 bags per acre	3-4 bags per acre.	3-4 bags (each of 100kgs)	2-3 bags per acre
Seed Storage	In gunny bags and in clay pots.	Stored in pots and gunny bags.	Storing it in pots by mixing with ash	Drying it with the red soil paste and storing it.
Labourers	15-20 persons	20 persons	20 persons	30 persons
Place of Sale	In local and in other district shops	Not for sale only for home consumption.	In the local and outside market	Local and outside market
Cost of Selling	Rs. 600-650/ bag	If sold, the price is Rs.1000/bag.	Rs.800-1000/ bag	Rs.1800-2000/ bag (100kgs)
Preparation of food items	Foxtail millet flour and added with sweet.	Rice and Porridge.	Rasam (soup), porridge and boiled horse gram.	Sambar, Vadai and Rasam
Times of Consumption	Twice in a months	Occasionally.	Two or three times in a month	Consuming almost daily

Crop Details	Foxtail Millet	Little Millet	Horse gram	Red gram
Fodder Usage	-	-	Used as fodder for cattle and also as compost	Husk as a feed for cow and buffalo.
Medicinal Usage	-	-	It controls irritating cough and cold	To increase body weight
Participation of Women	65% of women participation is there	50% of women participation is there	Nearly 60% of them participate in the cultivation process.	50% of women participate in the cultivation.
Soil Fertility	Available next for cropping.	Available for next cropping.	Soil fertility will be increased for the next crop.	Soil fertility will be increased for the next crop.
Rain/water	needed 4 times rain needed	4 times rain needed.	3 times rain needed	4 times rain is needed
Percentage of people cultivating	1% of the people are cultivating	1% of the people are cultivating.	Nearly 1% are cultivating this crop.	Nearly 30% of people are cultivating
Extinct varieties	This variety is slowly disappearing	-	They are still cultivating this variety	It is still in the practice of cultivation

Crop Details	Black gram	Cow Pea	Green gram	Gingelly
Variety	Black, Red, Short, Big, and Small variety, summer special big and small variety and Samba variety.	Bunch variety and Samba creeper variety.	Local varieties like Kuruvai, small gram and big grams are available.	White, Black and small sesame
Soil Type	Red, Black Cotton, Clay, Sandy and Silt soil	Red, Sandy, Black and Laterite soil.	Red soil, black cotton soil and Laterite soil.	Laterite, sandy, black cotton and Red soil
Intercrops	No intercropping but in some places cowpea is being cultivated.	No intercropping	In some places cow pea, Kongura, pumkin, cucumber, cluster, beans and caster are being cultivated as intercrops.	Red gram ground nut and castor cultivated on bunds.

Crop Details	Black gram	Cow Pea	Green gram	Gingelly
Source of seed	Farmers have their own seeds; and purchase it from other farmers or from Agri. Dept..	Own seed, purchase from other local farmers and from BDO and Agri dept.	Own seeds and buy from local market.	Having own seeds at home, purchase from local farmers and from Agri.dept
Seed Selection	Seeds selected from good quality fully grown panicle; and seeds not affected by pests and insects.	Seeds collected from first threshing and not affected by pests and insects.	Good quality seeds which are not affected by pests and insects will be selected.	First collected seeds from first threshing will be selected.
Seed treatment	Treating it with Bio fertilizer.	Seed treatment through Bio fertilizers.	Not specific seed treatment is followed.	In some places mixing it with ash and dried in sunlight
Amount of seed required	5-8kgs / acre	5kgs/ acre.	It ranges from 2kgs to 10kgs per acre	2-3kgs/acre
Period of Sowing	July - August (Aadi Pattam) or Feb. - March (Masi Pattam); Sept. - Oct. (Puratasi pattam)	July to August (Aadi Pattam) and/or January to March (Thai pattam)	July August (Aadi pattam)	July to Aug.(Aadi pattam; Feb.- March (Masi pattam); and April - May (Chithirai pattam)
Space between crops	Half to one foot between crops	One to one and a half foot between crops	1-1.5ft	Half foot between crops
Weed control	Using weeder and by hand the weed is being controlled; First weeding is within 20 days & 2nd is within 40 days.	Some places no weeding and in some places weeding by hand.	One time weeding by hand or weeder	No weeding usually.
Weed usage	As fodder, green leaf manure, compost preparation and for consumption purpose.	The weeds will be used as fodder, and as compost and greens will be used for consumption.	Weeds will be used as fodder and for making compost	-

Crop Details	Black gram	Cow Pea	Green gram	Gingelly
Diseases	Potash deficiency, Fungal attack and Root rotten disease.	Spotted Leaf and fungal attack.	Disease free	Leaf curling
Pests	Stem borer, Root borer, Red Hairy cater pillar, Bollworm and sucking pests.	Aphids, Leaf roller, sucking pest and green bollworm.	Green bollworm	Leaf roller
Predators	Lady Bird Beetle	Lady Bird Beetle, Damsel fly and bees	Lady bird beetle and damselfly	-
Crop Age/ CropDuration	Three months	120 days crop	90 and120 days	120 days
Method of separating grains Beat-	ing by sticks after drying.	Threshing by	sticks Threshing it by sticks or sometimes by bull	By threshing on the floor or by beating with sticks
Yield	3 to 4 bags / acre	4 bags per acre	3-5bags per acre	3-4 bags/acre
Seed Storage	Storing after socking with red soil and with herbal leaves viz Neem, Pungam and Nochi; Storing it in gunny bags and traditional storage bin (kuzhumai)	Stored after soaking with red soil and with herbal leaves like neem, pungamia and nochi. It should be stored after drying.	Drying it nicely in a new moon day and storing it in gunny bags	Seeds will be stored in pots or cloth bags
Labourers	20-25 persons	35-40 persons	10-15 persons	12-15 persons
Place of Sale	Local and outside markets and to commissioned agent.	Local and outside markets and to commissioned agent	Local and outside markets	To local and outside markets/ buyers
Cost of selling	Rs.1500/bag	Rs.700-1500/ bag	Rs.10-15/kg	Rs.1000-1500/ bag
Preparation of food items	Vadai, for Idly and paste	Used in Sambar, boiled food and as fried item.	Sambar, Sweet payasam and boiled items	As oil and sweet item and will be added in other items like'murukku'

Crop Details	Black gram	Cow Pea	Green gram	Gingelly
Times of Consumption	Twice or once in a week	Weekly once	one or two times in a week	Oil will be used daily/frequently
Fodder usage	Husk as a feed for cow, bull and buffalo.	The husk is a food for cow, bull and buffalo.	-	-
Medicinal usage	For chest pain treatment, back pain & for body pain treatment	A medicine for headache and for easy digestion.	Cure digestion problem, can be used for facial treatment	Oil is good for applying in the body before bath
Women participation	75% of women participation is there	70% of women participation is there	70-80% of women are participating in the work like sowing,weeding and harvesting	70-80% of women participation is there.
Soil Fertility	Soil fertility will be increased for the next cropping	Soil fertility increases for the next crop	Soil fertility increases for next cropping	Soil fertility decreases
Rain/water needed	5 times rain is needed	7 times rain needed	4-6 times rain needed	2 or 3 times rain needed
Percentage of people cultivating	45% of people are cultivating	60% of the people are cultivating	10-20% are cultivating	15-25% of people are cultivating
Extinct varieties	-	-	-	-

Crop Details	Gound Nut	Cotton	Custard	Coriander
Variety	Samba, red, white, three nuts and two nuts variety	Dry land and field cotton	White, red and big custard variety.	Traditional variety
Soil Type	Red, clay and sandy soil	Red, sandy and black cotton soil.	Clay and red and Laterite soil.	Black soil

Crop Details	Gound Nut	Cotton	Custard	Coriander
Intercrops	Bengal gram, country beans, maize, ragi, castor, sesame, red gram, lablab and cow pea.	Brinjal, lady's finger, country beans and chenna	Maize, red gram, Lablab and Gingelly.	Bengal gram
Source of seed	Own seeds, purchase from other farmers and merchants and from agri. depts..	Own seeds, With local farmers, and outside market	Own seeds or from local farmers	From local and outside farmers and market
Seed Selection	Seeds of good quality	Seeds collected from fully grown crop	First threshed good quality seeds will be selected.	First, good quality seeds.
Seed treatment	Seed treatment with bio fertilizer	Seed treatment with the help of bio-fertilizer and fungicide	-	-
Amount of seed required	Three nuts 25kgs/ acre; two nuts 50-60kgs/ acre	5-6kgs /acre.	Main cropping needs 10-12kgs; in intercropping 300grams.	4-5kgs
Period of Sowing	Rain fed-Sept-Nov. Irrigated-July-Aug.&Feb.-April	July to August (Aadi Pattam) or Sept, Oct., Dec.	July -August (Aadi pattam); May-June (Vaigasi pattam)	June-July
Space between crops	Half ft between crops	One to one and a half between crops	Five inches between crops	One foot between crops
Weed control	Weeding by hand& with the weeder; 1st weeding in 25-30days second in flowering stage.	20-30th day one weeding by a small machine or by hand	Weeding by hand on the 18thday	Hand weeding and by small weeding machine
Weed usage	Fodder, greens for consumption	-	As fodder and for compost making	Used as fodder
Diseases	Zinc deficiency, root rot, leaf spot and wilt disease.	Disease free	Red hairy caterpillar.	-

Crop Details	Gound Nut	Cotton	Custard	Coriand
Pests	Green larvae, case worm and ear head bug	Boll worm, Red hairy cater pillar and white fly	White larvae	-
Predators	Damselfly	Spider and birds	-	Lady Bird
Crop Age/ Crop Duration	100days	180 days crop	90-120days	70days
Method of separating grains	Seeds are separated by hand and by machine	Threshing by sticks the seeds are separated	Threshing by hands	Threshing b and stick
Yield	15-20bags/acre	3 quintal	Nearly 50 kgs/ acre if it is a main crop	8-10 bags
Seed Storage	Stored in gunny bags	Stored in dark rooms and in gunny bags	In gunny bags after drying it.	Stored in bags
Labourers	35 persons	35-45 persons	10 persons	20 persons
Place of Sale	To local and outside buyers, to grinding mills and to commissioned shop	To local and outside buyers for making oil	To local and outside markets	Local and side market
Cost of selling	Rs.700-900/bag	One quintal Rs.2000/-	Rs.15/kg	Rs.40/kg
Preparation of food items	Oil, Sweet item, in mixture and as nutrient flour	Cotton milk/ oil	Mainly used for seasoning.	Coriander der is use cooking an leaves for ing chutney.
Times of Consumption	As oil daily as other items occasionally	Occasionally	Daily	Twice in a in diff forms
Fodder usage	Husk, leaves, ground nut cake as cattle feed	Cotton seed for cattle	-	-

Crop Details	Gound Nut	Cotton	Custard	Coriander
Medicinal usage	-	Cure small pox blisters	-	To cure cold, gastric problem and for digestion.
Women participation	60-70%of women are participating	60% of women are participating	60-80%of women participation is there.	90% of women participation is there.
Soil Fertility	Soil fertility increases for the next crop	Soil fertility decreases	Soil fertility increases for next cropping	No loss in the fertility of soil
Rain/water needed	6-7 times rain needed	3-4 times rain needed	Two to three times rain needed	150-200mm is needed
Percentage of people cultivating	60-70% of people are cultivating	10-15% of people are cultivating	30-40% are cultivating	10% of people are cultivating
Extinct varieties	-	-	-	-

Crop Details	Barnyard Millet	Kodo Millet
Variety	Country variety	Local variety, big and small variety
Soil Type	Red Soil, Black Cotton, sandy and Laterite soil	Sandy, red, silt and laterite soil
Intercrops	Cowpea, Green gram and Pillipesara	No intercrops
Source of seed	Seeds from local farmers, Navadanya shop and local market.	Own seeds at home and from local farmers
Seed Selection	Seeds not affected by pests or insects and of good quality	Seeds collected from fully grown good quality panicle;
Seed treatment	No special seed treatment	Drying in sunlight
Amount of seed required	8 kgs / acre	3-5kgs/ acre.
Period of Sowing	July - August (Aadi Pattam)	July to August (Aadi Pattam) or Feb.-March.
Space between crops	Four inches between crops	4-6 inches between crops

Crop Details	Barnyard Millet	Kodo Millet
Weed control	Weeds will be removed by hands	Weeds will be removed by hands in 20-25days
Weed usage	Fodder for cattle	Fodder for cattle
Diseases	-	-
Pests	-	Green larvae and Grass hopper
Predators	-	Damselfly
Crop Age/ Crop Duration	3 months	150-180days crop
Method of separating	grains Threshing by bull	Seeds are separated by bulls
Yield	3 bags/acre	10bags per acre
Seed Storage	In Storage bin called 'Kuzhumai', in gunny bags, pots and in cloth bags	Stored in mud pots and gunny bags
Labourers	Nearly 42 persons	25-35 persons
Place of Sale	To local farmers or outside grocery shop	To local or outside buyers
Cost of selling	Rs.800/bag	Rs.400-600/bag
Preparation of food items	As rice, mixing rice flour and sweet and mixed with jaggery	Rice and murukku
Times of Consumption	Twice in 6 months	Occasionally or 4 or 5 times in six months
Fodder usage	Used as cattle feed	-
Medicinal usage	-	Calcium supplementary
Women participation	50% of women are participating	80% of women participation
Soil Fertility	Soil fertility increases for next cropping	Soil fertility decreses
Rain/water needed	4 times rain is needed	2 or 4 times rain needed
Percentage of people cultivating	one percentage of people are cultivating	2-5% of the people are cultivating
Extinct varieties	This variety is slowly disappearing	It is disappeared in many places.

The above data clearly gives the present of agro biodiversity in the villages. In that ıdangered or disappeared varieties mostly ldy crop are generally noted as Kichidi a, Bhavani, Vellakodi, Kothamalli nel, samudram etc., are not seen for more 15-20 years..

Similarly very few people follow the cinal practice of these crops. It was in ice for some years ago. eas very rarely people go for tional way curing their ses, but prefer mainly ıthic treatment. Similarly the varieties they prepared once, t in practice now instead in occasions they prepare such ties of food.

Once there were more ties of Pearl and Finger ts and Sorghum, but only a varieties has been cultivated . That too they prefer to vate company short duration varieties. r time of consumption of millets was also ced. Due to erratic monsoon crop rotation disrupted and hence the farmers prefer only t duration high yielding variety all the time, the traditional varieties were slowly ppearing.

The millets like Foxtail millets and Little ets are mostly disappeared in many of the ıges. The varieties of such millets have ady been extinct.

If we analyze the data collected from the districts we see that each district has its own variations within its geographical area. For instance, in ***Dindigul*** District, the land use pattern varies with climatic condition of the region. The northern region of the district is near the hill area where the farmers have shifted to fruits like Sappota (Chikoo) from paddy and millet cultivation. In the eastern region people cultivate flowers in a larger area. This area too was originally a paddy and millets area. The other two regions cultivate millets, pulses and paddy. Traditional paddy varieties are still seen in these regions.. Most of the farmers have their own seeds for next cultivation. as they still have the practice of tradition of storing and exchanging seeds. The consumption pattern of millets like sorghum, pearl millet and finger millet has changed considerably, especially in the eastern and southern parts of the district. Fifteen to twenty years back they consumed pearl millet twice a day but this has reduced to about once a month now. Whereas 20 years back, they could get and consume rice once or rarely twice in a day now they consume rice thrice or even four times a day, as it is available through PDS (Public Distribution System). Similarly sorghum was consumed twice a day, now is eaten hardly once a month.

Contract farming is quite common in south and southwest part of Dindigul near Vadipatti and Nilakkottai where Gherkins are

cultivated and exported in large areas.. Soil fertility is reduced, as there is no crop rotation. Land alienation is prevalent in some part of Vadipatti area. Landowners from outside have purchased around 700 acres for large -scale private farming. The local farmers who sold their land at low cost due to consecutive drought are now slowly realizing their mistakes.

The farmers do practice traditional herbal treatments and are quite knowledgeable with regard to the medicinal usage of the crops cultivated, which may not be used for chronic illness. Many farmers also know the method of preparing traditional food items using millets, but as rice has become the staple food they do not frequently prepare food items using minor millets.

Erode district has two distinct agro climatic regions. North Erode is more of wetland area compared to south Erode. In the wetland area paddy is cultivated extensively and to a large extent groundnut and maize are also cultivated. Ambasamudram, Kothamalli samba, Vellaikodi, Chinna samba are the traditional varieties of rice cultivated in Erode district. Apart from the hybrid variety five local traditional varieties of Pearl millets are cultivated here. Women are the main actresses in cultivating millets and pulses. They are involved in the whole process right from sowing till separating the grains. But in some of the villages especially in Kuttikinathoor and the nearby villages' women go for quarry works as they earn better wages than agricultural related work. As agriculture is completely monsoon dependent, there is high degree of migration in search of work. Namakkal belt in Erode district, the widows are humiliated and made to wear white sarees compulsorily, which makes it easier for men to identify them as women without 'male support' and thus an easy target for taking advantage. There is a high degree of millet consumption in this area. People even sell pearl millet and finger millet porridge in the street as an alternate for tea and coffee.

In ***Salem*** district, eastern part is dependent more on tank irrigation and western part is hilly area where paddy, millets, pulses and cereals are cultivated. Central and western region is dry compared to the eastern and some central part. In dry land region traditional paddy varieties like Kar Nel, Bangalore Kar, Neikitchidi, Kullakar and Gundu Nel are cultivated. Turmeric, Garlic and Tapioca are cultivated in large quantity in tank-irrigated areas. Consumption of millets is quite high in the villages. women of the district participated in the PRA exercise and preparation of CBRs very enthusiastically. They gave extensive information with regard to all crops and cultivation practices right from sowing till harvesting. But their knowledge regarding

marketing is quite low. In the eastern region, in Kapaloothu village and surrounding areas, farmers cultivate millet and market the processed product of millets and pulses. Similarly they also market Black gram, Bengal gram and the like packing them in small packets. Such income generating activities are going on well.

In ***Trichy*** district, river Cauvery irrigates the Cauvery delta region. Paddy, Banana and Sugarcane are cultivated in large areas. The eastern part of Trichy is more into Paddy cultivation and western region goes in for Banana cultivation. Near Lalgudi region in Trichy district traditional paddy varieties like Zeeraga Samba (White), Thooyamalli, Sirugamani, Chinna kichadi, Periya kichadi and Chembalai are still cultivated. White and Red foxtail millet varieties are seen. Groundnut, Cotton and Coriander are cultivated in North Trichy. Women are involved in millets cultivation and participated keenly in the preparation of CBRs. Many farmers have gone in for organic farming though not for market but for their own consumption.

Major area of ***Pudukottai*** district is drought-affected. Some pockets are tank irrigated where paddy is cultivated. Dry land cropping includes traditional paddy varieties like Mappillai Samba, Osuva Kothalai, Gundu Nel, Cowni, Kuthiraival, Karunkuruvai, Vellakodi, Garudan Samba, Karthigai samba and Rubber samba. Five local varieties of Finger millets are grown in this district. The main problem in this district is migration of agricultural workers. As the farmers depend only on monsoon for cultivation, during off-season they migrate to various places for a variety of work. Some migrate within the state for construction work and for quarry works and for textile shops, some nearly 40 people from Udyalipatti, Thirupur villages each migrate to Surat and Bombay as salesmen for various business. The health status of the people is affected by this large-scale migrations and it was learnt that one person died two years back due toHIV+ive. This is because of the low biodiversity status in this district.

The status of some part of ***Madurai*** district is similar to Dindigul. Here participation of people especially women in the preparation of Community Biodiversity Registers was very good. They voluntarily came forward and were involved in facilitating the process of PRA. People as usual consume rice three times a day, People who cultivate millets or have access to get millets from other farmers consume it one way or the other. Greens from their fields usually considered weeds are sold in the market. In areas near Vadipatti farmers go in for fruit cultivation. South and southwest region are dry compared to north and eastern

parts. Foxtail millets, Barnyard millets are cultivated in this district. Three varieties of Foxtail millets (Red, Black and White) are commonly seen there. Vegetables like Brinjal, Lady's finger, Beans varieties and Tomato are cultivated here. These people are also quite knowledgeable with regard to the medicinal usage of millets and pulses; Foxtail millets are used for chest pain, and eye irritation. Similarly finger millets are used for chest pain, diabetes neck pain and cold.

In **Dharmapuri, Villupuram and Kancheepuram** districts, millets production is comparatively higher than other districts. Similarly people consume millets regularly. Finger millets, Pearl millets are consumed as porridge very often. Women are involved in the millets cultivation process.

Conclusion:

We see that the farmers in the nine districts of Tamil Nadu have moved from a traditional low input farming to a market driven high input conventional farming. In a rapidly globalized world, even the Resource Poor Farmers are forced to cater to the market demands.

Earlier the farmers cultivated a wide variety of crops but today increasingly they are dependent on cultivating few cash crops for the market. The shift from a traditional farming to modern farming has introduced a plethora of problems like debt, food insecurity, not of good quality food, pesticide attack, degradation of soil fertility, non-availability of non-cash food, non-availability of traditional seeds, intake of only carbohydrate and a few minerals with mono cropping etc., etc., which is especially detrimental to the Resource Poor Farmers. A diet consisting of minor millets, vegetables and greens from their fields took care of the nutritional needs but today they are able to eat only rice leading to nutritional deficiency.

In general it is obvious that the shift from the traditional crops to market driven crops has resulted in a complicated web of social, economic and environmental problems for the people. As paddy and cash cropping are water exploitative one, the continuous drought in the past three consecutive years made their life miserable by forcing them to migrate to various works and places and adversely force them to sell their lands or leaving it fallow. They have lost their interest in cultivating the fallow lands. Thus millets cultivation has gradually reduced. Similarly the farmers' attraction towards short duration, high yielding crops forced them to stop traditional crop cultivation and hence there is non-availability of traditional seeds also. This

has resulted in the status of endangered traditional seeds.

The communities as such though know the value of traditional crop varieties and its importance as drought resistant and saline resistant etc., feel that when others go for high yielding and short duration crops it naturally motivates them to go for the same and it has become a prestige issue also for them. Therefore there is mass conversion towards high yielding varieties and a sharp decline in the traditional crop cultivation. It is a pity that even if they are willing to cultivate it now, they do not have traditional seeds with them.

In order to increase production and keep up with the crops grown by the majority, the farmers take loans to buy seeds, fertilizers, pesticides, sinking open and bore wells, farm machinery etc., leading to increased indebtedness.

It is learnt that not only the food habits of urban mass but also rural people has changed. Rice has become their staple food. The one time rice intake with all time millets, pulses and cereals intake was changed as pulses, other cereals and millets not even once in a day and rice has become the only intake through out the day. This naturally has motivated farmers to go according to the market demand to cultivate rice. The large farmers and rich people also hence go only for paddy cultivation for their consumption apart from marketing purpose. This has paved way for the avoidance of millets and also traditional varieties.

When the depletion in biodiversity has an adverse effect towards the small, marginal and landless farmers on food insecurity, this has not anyhow affected the large farmers, instead uplifted the economic status by following only mono cropping and cash cropping. Similarly the companies involved in contract farming also have got high-income structure when there is depletion in biodiversity. The small and marginal farmers and landless labourers, when they sell their small piece of land due to the heavy drought condition, the large farmers buy it for further mono crop cultivation. For them it is not the biodiversity, which is getting depleted matters, but cash crop cultivation or mono crop cultivation is the motive. Therefore their source of income gets increased. Similarly contract farmers when they happened to buy most of the small farmers' land, go for a particular crop cultivation, which again has an adverse effect on soil fertility and food security.

The most affected group due to the depletion of biodiversity is the dalit people. Though the whole of poor people got affected as they face food insecurity, the dalit people are the most affected, as they are landless, and mostly depend on non-cash food biodiversity

depletion has made impact towards food security. As it is obvious that the aged and older generation people and mostly women only got acquainted with the consumption of millets, loss of biodiversity especially millets, traditional and local crop varieties, has threatened their food security. The food habit of younger generation people has changed from traditional millets and pulse consumption to rice consumption. The practice of traditional food consumption is prevailing only among older generation and among women.

The traditional crops also yielded fodder or their farm animals, which in turn gave low cost farm- yard manure as fertilizer. Farmers also grew fodder grasses as intercrops or on boundaries of their farms, which helped in soil binding. A shift to mechanized farming and a change to short term high yielding hybrid varieties resulted in a decreased use of animals in farming and thus farm yard manure. So loss of biodiversity is not only a loss for mankind but also for cattle.

Suggestions:

Millets have the potential to survive even under adverse ecological situations. They can be successfully grown under very poor agro-climatic situation where the main food crops like rice, wheat, or even maize barley, etc., cannot be grown. The decline of cultivation and consumption of minor millets has had a damaging effect on the social aspect too. It is seen that mostly women were involved in the cultivation of minor millets, but with the change in the crops, the women agricultural workers are exposed to dangerous chemicals. One of the reasons for the decline in millet cultivation is that it is considered backward and outdated to be cultivating and consuming millets. Another major reason is that rice is easily available from the Public Distribution System and there is an easy market for rice, which is not the same with millets.

As it is obvious that erratic rainfall is the main cause of leaving the land fallow, it is suggested that if sowing is done in two or three phases of the same season, harvest will be carried out in the same manner in two or three phases. This can help crop to get rain in any of the phase to grow crops and could harvest the same before or after the rain in any of the phase. Therefore if not all the crop which will be lost due to unwanted rain or in need of rain, but may some crops which has been sown in a time where the harvest is could not been carried out due to the early or delay of monsoon (erratic monsoon).

Documentation of the traditional knowledge with regard to the local biodiversity, especially traditional crops, method of cultivation, storage, selection and usage is necessary in other areas of work.

Collect, conserve and distribute traditional varieties of crops will enhance the status of biodiversity in future.

Creating awareness on the nutritional advantage of traditional crops is suggested

Explore new organic markets and certification for such produce so that the farmer is able to get a competitive price.

Establish grain and seed banks to ensure seed and food security is encouraged in the villages where surplus grains and seeds are seen.

To support women agricultural workers to go in for value addition of millets as an alternative source of employment. Explore new organic markets and certification for such produce so that the farmer is able to get a competitive price

To work on policy level with the government departments and other think tank research organisations on issues of special support for organic farmers, procurement and distribution of minor millets through Public Distribution System with subsidies

Kudumbam organization has taken up a follow up study on the cultivation of minor millets in the fallow lands of four villages of 20 acres each and to establish seed and grain banks in those villages for storing the grains and seeds cultivated in the fallow lands.

Annexure 1

Biodiversity Register Questionnaire Format

1. Crops
2. Varieties of Crops
3. Soils of cultivation
4. Seed selection
5. Seed Treatment
6. Seed Source – Local and Outside
7. Amount of Seed per acre
8. Period of Cultivation
9. Intercrops
10. Space between crop/plant
11. Weed control
12. Number of Labourers needed for cultivation per acre
13. Weeding period, month and season
14. Usage of weeds
15. *Diseases*
16. Season of disease attack
17. Pests
18. Pest attacking season
19. Predators
20. Causes of crop loss
21. Crop age
22. Method of separating grains/ Threshing
23. Yield per acre
24. Fertility status – whether improving or deteriorating
25. Method seed storage
26. Usage of crops
27. Food items (varieties) for consumption
28. Fodder usage
29. Usage season
30. Other usages of crop
31. Fuel usage
32. Medicinal usage including which part is used as medicine
33. What are the major diseases it cures
34. Marketing place- local or outside
35. Market price
36. Times of consumption of millets as food
37. Crop related festival importance
38. Grain related festival importance
39. For how long/how many years this crop is being cultivated
40. Women's role in cultivation of this crop
41. Amount of water/rain needed for this crop
42. Any historical importance or salient feature of this crop
43. How many people are still cultivating this crop
44. If only few are cultivating what is the reason for that
45. If it is not being cultivated now or if it is a disappeared variety, when was it cultivated before
46. If it is not in cultivation, the possibility of the seed availability
47. Other information if any

ANNEXURE - II

KANCHEEPURAM DISTRICT

Ms. R. Vasantha
GUIDE,
No. 340, Periyavalli Kovil Road, Pazhavelil, Vembakkam Post, Chengalpet-603 111.

Mr. Krishnamoorthi
DGSEA, Vilvarayanallur, Pakkam Post, Maduranthagam Tk., Kancheepuram Dt.,

Mr. M.G. Dhanabal
RHADA, Kannimangalam, Chithamur Post, Cheyyur (Tk), Kancheepuram-603 313.

Mr. R. Ranganathan
TEDE TRUST, No.16, Vanigar Street, Tirupporur, Kancheepuram-603 110.

Mr. Dhayalan
RDS, 191-A, Nehru Nagar, Thirupporur Kootu Road, Vallam Post, Chengalpet-603 001.

Mr. Shanmugam
GMS, No.28, Vanigar Street, Thirupporur, Kancheepuram Dt.,

Ms. Yasotha
HEADS, Vedanthangal Post, Maduranthangam, Kancheepuram Dt.,

Mr. S.P. Mahalingam
SEC, Block Development Office Road, Shanmuga Nagar, Padappai - 601 301.

VILLUPURAM DISTRICT

Ms. S. Kousalya
VCDS, Vellakulam Kilsiviri Post, Tindivanam Dist - 604 301.

Sis. Regina
HRC, Rawathankuppam, Auroville Post, Vanur Tk., Villupuram-605 111.

Mr. M.G. Francis Xavier
RCT, Kodungal Road, Mugaiyur Post, Thirukoilure Tk, Villupuram-605 755

Mr. S. Arulanand
ACT, Kodungal Road, Mugaiyur Post, Thirukoilure Tk., Villupuram-605 755

Mr. P. Arumugam
MSCD, Avudayarpattu Post, Vikkravandi Via, Villupuram-605 652.

Mr. K.G. Ratchaganathan
SEED TRUST, Irunthai Post, Madapattu Via, Ulundhurpet Tk., Villupuram. Dt.,

Mr. R. Ramachandran, Secretary
SSS, Kaveripakkam Village, Marudu Post-604 405. Vandavasi Taluk, Thiruvannamalai Dt.,

Mr. M. Selethaian
ACD, Arangandanallur & Post, Thirukoilur Tk., Villupuram - 605 752

Mr. V. Abel
GREPS, S. Eripalayam Gate, Semakottai Post, Panruti Tk., Cuddalore.

Mr. L. Joseph
NEL, 15, Theysurpet, T.V. Malai Road, Gingee, Villupuram - 604 202.

DHARMAPURI DISTRICT

Mr. G. Nagarajan
IRDT, Thirumalvadi, Giddampatti, Paparapatti Via, Dharmapuri - 636 809.

Mr. Kumaresan
CID, K. Vetrappatti Post, Karur Tk., Dharmapuri -636 902.

Mr. Mohan Kumaravel
RIDS, No.5, APCT Complex, Periyamaptty (Po.), Dharmapuri - 635 810.

Mr. K. Paulraj
CLAP, Indoor, Dharmapuri District.

Mr. K. Annamalai
FEED Trust, M. Nadupattu, Mathur Via, Pochiampally Tk, Dharmapuri - 635 203.

Mr. Dharmalingam
RDS, No.46, Indira Nagar, K. Vadathur (Po.), Papiredipatty (Tk), Dharmapuri.

Mr. M. Vasakar
Gandhi Sevalayam, Kadamadi Village, Palacode (Po), Dharmapuri-635 810.

ERODE DISTRICT

Mr. A. Periyanayagasamy
JEEVA JOTHI, 190/152, Housing Unit, Ellis Nagar Post, Dharapuram - 638 657.

Mr. J. Mathalai Selvam
CEED, 3/22, Puduvadavalli, Sathiyamangalam, Erode District - 638 401.

Mr. R. Chandrasekaran
HILLS, Kadambur Post, Sathiyamangalam, Erode District - 638 503.

Mr. K. Antony Samy,
THE NEW ERA, Porulur (Po.), Kallimandoyam Via, Oddanchadram Tk, Dindigul District.

Ms. M. Sarala
WORD, 442, Tiruchengode Road, Pallipalayam, Erode Dist - 638 006.

Mr. Jayaselan
REEDS, Plot No. 10, Sivasakthi Nagar, Ellis Nagar Post, Dharapuram-638 657.

Mr. Xavier
P.S. REEDS,
1/24, North Street, Gobipalayam, Alukuli Post, Gobichettipalayam Tk., Erode-638 453.

SALEM DISTRICT

Mr. Gnanasivam
District Rural Social Welfare Sangam,
Teacher's Colony, Edappadi Road, Sankari (Tk), P.O. No. 706, Salem Dist - 637 301.

Mr. K. Rajendran
SIS, Pannapatti Post, Omalur Post, Salem District - 636 305.

Mr. Rajendran
DEEPAM PEOPLE'S SOCIETY
Opp. Police Station, Yercaud, Salem Dist.

Mr. Srinivasan
TAMILNADU GANDHI RURUL SOCIAL DEVELOPMENT,
N. Pudupatty (Po), Namakkal Dist - 637 020.

Mr. Vijayan
SHTCPD,
Vella Kovil, Yercaud - 636 601. Salem Dist.

Ms. S. Kala Lakshmi
NRDA, Oduvankurichi - 637 406.
Rasipuram Tk., Namakkal Dist.

TRICHY DISTRICT

Mr. P.A. Ignacy
AHIMSA, 1,207-C, Sona Complex,Trichy Main Road, Vaiyampatti, Trichy District-621 315.

Mr. E. Shivaji
PPDES, 168, V.O.C. Nagar, Nachalur Post, Karur Dist - 639 112.

Mr. V.A. Chinnappan
RURAL GROWTH TRUST
No.1, ADR Complex, Near Kemps Town, Good Shed Road, Trichy - 620 001.

Mrs. Ursula Nathan
T.R.D., Kavalkaranpatti (Po), Thogaimalai Via, Kulithalai Tk., Karur Dist - 621 313.

Ms. F. Beatrice Vanaja
Flat B. Adhiyaman Towers, 2nd Cross Kambar Street, Kumaran Nagar, Trichy-17.

Ms. Jesintha
VOICE Trust, 18, Thathachariyar Residency Mambala Salai, Tiruvanaikoil Post, Trichy - 5.

Smt. V.A. Pachaiammal
RACE TRUST, Valanadukaikatti, Madurai Main Road, Piramapatti (Po.), Manapparai Tk., Trichy Dt.- 621 305.

Mr. Sivanesan
T.W.A., Sobanapuram Post, Thuraiyur Tk, Trichy Dt.

Mr. K.R. Raja
VDC, No.6, 6th Street, Gandhi Nagar, Manachanallur, Trichy (Dist.) - 621 005.

Mr. M. Ramamoorthy
GMKN, Thirueengoimalai (Po), Musiri (Tk), Trichy (Dt) - 621 209.

PUDUKOTTAI DISTRICT

Mr. Danil Kumaran
VENTURE Trust
Post Bag No.2, Mettusalai, Illupur - 622 102.
Pudukottai District.

Mr. Oswald Quintal
KUDUMBAM
17, Highways Colony, Subramaniapuram, Trichy - 620 020.

Ms. Manjula Velan
VELICHAM, 67/H, Balakrishnapuram, Keeranur - 622 502. Pudukottai Dist.

Ms. Victoria
IRCS, No.64, S.M. Colony, Cavery Nagar, Pudukottai Dist.

Mrs. Lilly Rajkumar
ANBU Trust, Thirukolakudi Post, Nerkuppai Via, Sivagangai.

Ms. R. Kanaga Bai
GRAMIYA, 122, Kannan Nagar, Pudukottai Dt.

Ms. Rani
LORD, 83, Maraimalai Nagar, Pudukottai Dt.

Mr. Doss
WORD, Vallathirakottai, Alangudi Tk., Pudukottai Dt.

Mr. Raja Mohamed
GREEN VISION
17/A, Sakottai Road, Puduvayal, Sivagangai.

Mr. Ganapathy
SAKTHI, Veerapatti, Puliyur Post, Killukottai Via, Pudukottai Dist.

DINDIGUL DISTRICT

Mr. L. Peter
REAL, M2/179, R.M. Colony, 12th Cross, Dindigul - 624 008.

Ms. S. Kalaiarasi
SWESTIC, 864/3, Anna Nagar 3rd Street, Salaiputhur Po, Oddanchatram, Dindigul Dt.

Mr. L. Antonysamy
CEDA Trust, 98-A, Kooturavu Nagar, Beschi College Post, Dindigul - 624 710.

Mr. J. Sagayaraj
POPE Trust, Kamatchi Nagar, Malaipatty Road, Thottanuthu Post, Dindigul - 624 003.

Mr. R. Shanthi
RWO, Sundarapuri, Nallamanarkottai Post, Dindigul

Mr. R. Balasubramanian
ACT, 21, Treasury Colony, Beschi College Post, Dindigul - 624 001.

Mr. S. Chandrasekar
REDA Trust, 21, Thiruvalluvar Main Road, Shanmugapuram, Palani, Dindigul - 624 602.

Mr. Pandian
RASI, Errakkapatti, Samuthirapatti Post, Dindigul - 624 001.

Mr. Diraviaraj
Y-NEEW, 14th First Street, Sasthiri Nagar, Dindigul Dist.

Mr. P.M. Mohan
CIRHEP, 12-1-1A/11, SAM Complex, Nilkottai - 624 208. Dindigul Dist.

Mr. Muthu Samy
ECHO Trust, Main Road, M. Vadipatti (Po), Nilakottai (Tk.), Dindigul Dist. - 624 211.

MADURAI DISTRICT

Mr. A. James Rajasekaran
PARD, 4\1018, Annai Abirami Street, Sithivinayagar Koil Street, Thasildhar Nagar, Madurai-625 020.

Mr. P. Manikamoorthy
POWER PROJECT, 7-1-59, Kallar Street, Cholavandhal-625 214, Madurai Dist.

Mr. M. Paramasamy
SHEPHERD, 97, Ayyanar Colony, Thanakkankulam, Madurai-625 006.

Mr. M.M. Sundharam
INDEX, 11-A, Achamuthamman Koil Street, Thiru Nagar-625 006. Madurai Dist.

Mr. K. Karadi
SSRD, Thethur Post, Vadipatti TK., Madurai Dist.

Dr. S. Chellapandian
CHETHANAVIKAS,
Kadachanendal, Madurai Dt.

ANNEXURE - III

ABBREVIATIONS	EXPANSION
CBD	Conservation of Biodiversity
CBR	Community Biodiversity Registers
CWS	Centre for World Solidarity
DDS	Deccan Development Society
GMO	Genetically Modified Organisms
Ha	Hectare
HEIA	High External Input Agriculture
HYV	High Yielding Variety
IPR	Intellectual Property Rights
LEIA	Low External Input Agriculture
LEISA	Low External Input and Sustainable Agriculture
MSL	Mean Sea Level
NGO	Non Governmental Organisation
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
RPF	Resource Poor Farmers
SC	Scheduled Caste
Sq.Km	Square Kilometer
ST	Scheduled Tribe
UNESCO	United Nations Educational, Scientific and Cultural Organisation

Conserve biodiversity
and
improve food security

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