

Biodiversity monitoring of *Uzhavar sandhai* in India

Case study for the EFRN E-Workshop on Participatory Monitoring and Evaluation of Biodiversity, 7-25 January 2002

Winfred Thomas¹

1. Introduction

The global scientific community and international markets today show a greater interest in agro-biodiversity. Ancient relationships in agricultural landscapes between various organisms and agricultural crops are progressively weakening. This weakening is further enhanced by indiscriminate use of pesticides, herbicides and by the replacement of wild varieties with high yielding crops and hybrids with Genetically Modified Crops (GMC). Ultimately this will lead to the loss of species from the traditional agricultural lands. Both population growth and market forces compel traditional agricultural countries such as India and China to adopt agricultural practices that are based on modern biotechnology in order to address hunger. Further, the globalisation process indirectly acts as a catalyst that changes policy towards promotion of an easy and official access of pesticides, herbicides and GMCs into developing countries.

Unfortunately, India still lags behind and is not yet ready to address this challenge. The proposed Biodiversity Act is still pending in our parliament. Most affected are farmers, who are still not informed about the possible impacts of GMCs on their local agro-biodiversity. Even though more than 80% of the Indian population is directly or indirectly associated with farming, Parliamentary procedures are increasingly focussed around other political and popular agendas. At this moment it has not yet been decided upon who will monitor local biodiversity. We are also not sure how to generate funds for biodiversity monitoring. Meanwhile, many individual organisations have developed their own models and are trying to understand the pros and cons of monitoring at local level. It is worth mentioning a few models such as Biodiversity Registers, District Biodiversity Cells, adapting school and college curricula to strengthen students' capacity to execute biodiversity monitoring in a comprehensive systematic manner. So far, the government has not accepted any of these methods as legally acceptable. Hence India is in its infant stage as far as biodiversity monitoring and related farmers' rights are concerned. It is high time to find institutions where biodiversity monitoring could be incorporated within the daily activities so the job gets done and less money and time is spent on it.

2. Local Agro-Market vs. Biodiversity Monitoring

Monitoring biodiversity of a given geographical territory that supplies a local market is an age-old practice. Due to various reasons our markets have become complex, unorganised structures. Commodities pass a number of middlemen before they reach the consumer. Therefore it is difficult to trace and identify the origin of a given commodity. In this context, the authors have identified "*Uzhavar sandhai*" as an organisation with a high whose potential for participatory monitoring of agro-biodiversity (vegetable crops). *Uzhavar sandhai* is a Fair Trade Organisation (FTO) that is owned by the Tamilnadu Government.

Uzhavar sandhai aims at organising local farmers and help them to maximise their income. It does so by providing a bridge between urban customers and rural vegetable growers. In this novel design, tracing the origin of vegetables becomes easy. Within one and a half year period since the programme started, it has become widely accepted as a small-scale

¹ Biodiversity Unit, Department of Botany, The American College, Madurai, India, winfee_in@yahoo.com

enterprise of traditional farmer communities. As was to be expected, the programme stimulates human capacity-building for self-organisation, especially for women within the agricultural community. Today they organise themselves under the banner “partners of a popular community enterprise”. This represents a tremendous change for the small-scale farmers. They feel that through *Uzhavar sandhai* they have become less dependent on moneylenders and middlemen. At present there are no less than fifty *uzhavar sandhai* throughout India that operate successfully, with up to 1000 farmers as contributing members.

3. Madurai Annanagar Uzhavar Sandhai – A case study

To identify possibilities for the transformation of the state-owned *Uzhavar sandhai* into an organisation that monitors agro-biodiversity and at the same time promotes fair trade between farmers and customers, we have selected the *Madurai Annanagar* unit for our study. In this FTO the local farmers harvest vegetables cultivated from nine taluks of Madurai District and sell it to urban households.

Table: 1. The in-built network of Annanagar Uzhavar sandhai

Resource base		Madurai	Dindugul	Theni
	Number of Taluks	9	1	1
Number of Panchayat	107	3	1	
Number of Villages	144	3	2	
Registered Farmers	1066			
Mean Customers / Day	5260			

The Annagar *Uzhavar sandhai* serves as a nodal agency where farmers of eleven taluks monitor vegetables and associated pests and pathogens using their traditional knowledge. Hence a large quantity of data from a wide area flows towards the *uzhavar sandhai* every day. Just like in any other government office, these data are stored in few registers and used for accounting purposes only. Therefore, we proposed an alternative model where the data could be carefully collected and then processed to help understand the status of agro-biodiversity of the eleven taluks that are located in three districts.

Table 2. Stored and under-utilized data

NATURE OF THE DATA	DATA SOURCE	AUTHORIZED AGENCY
Village profile and Farming Activity	Uzhavar Sandhai -Madurai	Horticulture and Agriculture Departments
Panchayat profile and Political / Revenue details	Taluk offices -Madurai east -Madurai west -Madurai south -Thirumangalam -Vadipatti -Alanganallur -Usilampatti -Chellampatti	Rural Administrative and Development office.
Product profile and market economics	Uzhavar Sandhai -Madurai	Uzhavar Sandhai Administrative officer
Pest management	Horticulture Department	Horticulture Department
Taluk Maps	Rural Development office of Madurai District	Senior sectioning and planning officers
Village Maps	Panchayat office	Village Administrative officers

The current study is focused on identifying the source and owner of available data and on promoting free flow of data sets from its origin to a computerised database designed and located at The American College. The database is named as **Madurai Zone I Database**. In future it may be possible to connect all operational *uzhavar sandhai* to a suitable computer network. This would allow for systematic monitoring and updating of the data related to the agro-market and agro-biodiversity. The results and inferences generated from these data could then be used to forecast changes in both market trends and agro-biodiversity. It also has a tremendous potential to incorporate the data into a geographical information system and use remote sensing to generate maps.

Table 3. The structure and size of Madurai Zone I Database

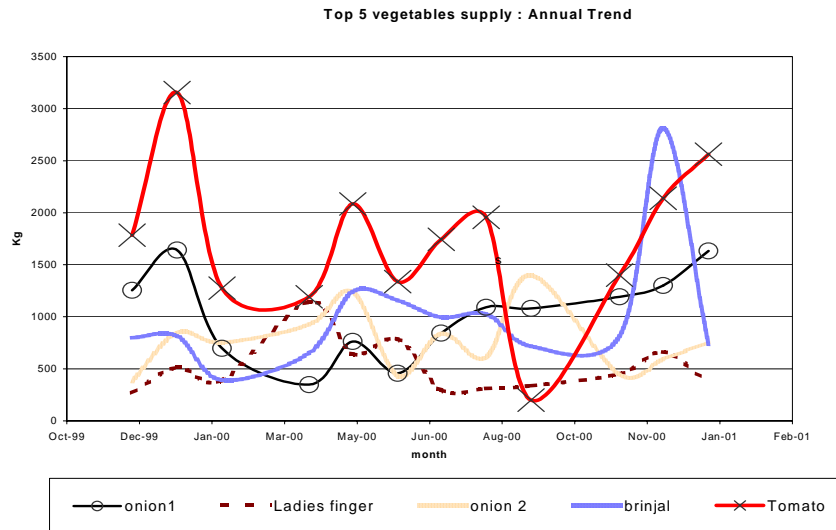
TYPE OF DATA		NO.OF RECORDS
Geographical	District	1
	Taluk	9
	Panchayat	301
	Village	1315
Farmer and village profile	Farmer	1066
Uzhavar Sandhai performance	Vegetable input	15331
	Market economics	5209
Associated Pest and Pathogens	Pest	144
	Pathogen	79

So far, the Madurai Zone I Database contains more than 20,000 records collected from November 1999 to February 2001. The data can be processed, analysed and presented in a table or graph. It is still under construction. It ties in with user-friendly software called "Map Maker" and "Stella". These novel software packages enable specific data analysis and model development to predict future trends.

Analysis of the data collected from the Madurai Zone 1 shows that Madurai Annanagar *Uzhavar Sandhai* is healthy with regard to continuity of supply and income.

Continuous Supply of vegetables

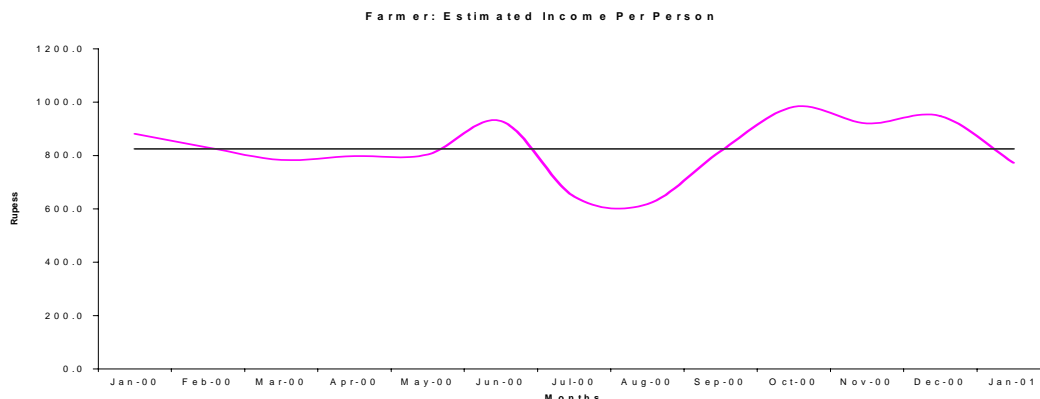
The top five most common vegetables found in the Madurai Annanagar market are produced locally and supplied to the market throughout the year.



The data could be further investigated with regards to the variety cultivated and the pests and pathogens associated with each crop. A one-year systematic study on all the eleven taluks might reveal hitherto unknown correlations between pest and pathogen population, and various factors like rainfall, temperature, humidity or others. By aggregating and pooling the data of consecutive years, the picture will become more clear and it will become easy to estimate the pest and pathogen populations for any given period of time. It is also possible to identify the in- or out-flux of pests and pathogens in and out of the study area that are caused by human activities, such as indiscriminate use of pesticides or herbicides.

Steady state generation of income

The mean income of a farmer is an indicator of health of *uzhavar sandhai*. According to our database, each farmer produce an average turnover of Rupees 805 per year.



Although more than one thousand registered farmers are recorded in the documents of *uzhavar sandhai* on average only 165 farmers turn up at the market every day. The rest of the farmers send their products to the market through others who are willing to go to sandhai and sell it for them. Hence, on average, 600 farmers participate directly or indirectly. It has been estimated that they earn at least 150 rupees per family per day. This is more than twice the amount that a farmer receives when he or she sells the same products to a commission agent or middleman.

Key indicators used for the appraisal of the performance of the *Uzhavar Sandhai* are listed in table 4, below. It shows that the selling and buying is more or less in balance. Biodiversity monitoring is hidden. When proper tools and techniques are used it is possible to transform the *Uzhavar Sandhai* into an organisation that can take care of both fair trade and agro-biodiversity monitoring, and simultaneously act as watch tower for people who are interested in use and conservation agro-biodiversity.

Table 4. Key indicators for Performance of Uzhavar Sandhai (Nov. 1999 – Jan. 2001)

Month	Mean Sales/day	Farmer and vegetable correlation	Farmer and customer correlation	Income/day	Buying Potential	Mean Customers	Mean Farmer	Vegetable and customer correlation
Jan-00	150703.1	0.8	1.0	881.3	26.6	5264	171	0.8861
Feb-00	176496.8	1.0	1.0	829.9	21.7	8135	213	0.9929
Mar-00	129436.9	-0.7	-0.4	783.3	26.0	4988	165	0.4868
Apr-00	160832.5	0.9	0.7	798.4	23.7	6781	201	0.9443
May-00	131871.4	-0.9	-0.4	804.1	26.0	5080	164	0.0531
Jun-00	159358.6	0.9	0.8	929.2	28.8	5540	171	0.9935
Jul-00	102714.8	0.6	0.8	646.0	24.4	4216	159	0.1661
Aug-00	99344.8	0.8	1.0	618.0	22.2	4478	160	0.8748
Sep-00	133885.5	0.9	0.9	816.4	26.8	4990	164	0.9947
Oct-00	123769.4	-0.8	1.0	982.3	33.4	3706	126	-0.8080
Nov-00	147886.9	0.6	1.0	920.0	30.7	4810	160	0.6672
Dec-00	168710.5	1.0	1.0	947.8	28.4	5936	178	0.968291
Jan-01	114354.5	0.9	1.0	772.7	28.6	3997	148	0.78624
Nov-99	112270.8	1.0	1.0	1247.5	29.3	3835	90	1.0

ANALYSIS ON STRENGTH AND WEAKNESS OF UZHAVAR SANDHAI

STRENGTH

1. As supply and price of vegetables are inversely proportional to each other they indirectly control the number of farmers selling commodities to *Uzhavar Sandhai* and the number of customers. So there is a mutual correlation between farmers and customers and hence their number is highly stabilised.
2. The farmers of *Uzhavar Sandhai* earn an average income of Rs 805 per day, which is more than the income of other farmers. Moreover, the transport of agro-products is not charged to *Uzhavar sandhai* farmers.
3. The price of vegetables in *Uzhavar sandhai* is 10% less than at local markets.
4. The location of *Uzhavar Sandhai* strengthens its performance since it is at the junction of the developed and developing area. Interviews revealed that consumers

prefer to buy vegetables in *Uzhavar Sandhai* because of its location, the easy access and for the freshness of the vegetables.

WEAKNESS

1. Price fixation is done with reference to the price of central market, which indicates its weakness, since price fixation in an organised market must be done independently.
2. The price of vegetables increases when the supply is below the mean. This has been proved true in all the top 5 vegetables sold in *Uzhavar Sandhai*. When the supply of tomato is below 500 kg, the price was Rs11.8.
3. Supply fluctuates with seasonal variation. This in turn determines the price of the vegetable. Hence an effective strategy to stabilise the supply and forecast demand is needed.
4. *Uzhavar Sandhai* does not have a facility to store surplus products.

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