Crops of Truth

Farmers' Perception of Agrobiodiversity in the Deccan region of South India

A study for the Using Agricultural Diversity Research Award of
International Development Research Centre (IDRC), Canada
by the Deccan Development Society, Hyderabad, India

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Production by ***BOOKSLINE,*** **Publishing for better life,**
A venture of SRAS Publications, B-45, Maheshwari Towers, Road 1, Banjara Hills,
Hyderabad – 500 034 India Tel.: 040-66618506, 23356210

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Farmers' Perception of Agrobiodiversity in the Deccan region of South India

by

P V SATHEESH

with inputs from

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IDRC CRDI CANADA

A study for the Using Agricultural Diversity Research Award of International Development Research Centre (IDRC), Canada by the Deccan Development Society, Hyderabad, India

The **Using Agricultural Diversity Research Award Program (UD)** of the International Development Research Centre, Canada, strengthens the capacity of local groups and institutions in South Asia to undertake applied research on the use of agricultural diversity to meet the needs of farming communities and protect the environment. Interactive and reciprocal relationships between the community and its knowledge on the one hand and the external environment and formal knowledge on the other is promoted to enhance the management of biodiversity-based livelihood systems. The program is governed by South Asians who constitute a Steering Committee of distinguished scientists and policy activists in India, Nepal and Bangladesh. They help bring together objective assessment of people's use eof biodiversity and an understanding of the policy, political and social implications of these uses. These perspectives in turn provide support and orientation through Awards to grassroots or field based research on using biodiversity. The Award helps people see the science behind people's action and the need for policy change.

The **Deccan Development Society (DDS)** is a grassroots organisation working with 5000 women farmers in the semi arid tract of the Deccan plateau. All these women are organised into *sanghams,* voluntary organisations of people at the village level. The Society has a vision of consolidating them into strong and vibrant organisations. A host of continuing dialogues, debates, educational and mutual learning programmes facilitated by the Society tries to translate this vision into reality.

Alongside this ideological role, the Society is also trying to reverse the historical process of degradation of the environment and people's livelihood systems in this region through a string of land-related activities like permaculture, community grain fund, community gene fund, collective land lease etc. These activities together with taking on the role of earthcare is also resulting in benefit to the people. They give women a new found dignity and profile in their communities and the larger polity.

Activities like Community Biodiversity Registry, anti-GM and Food Rights Campaign which the Society has lead in the region have resulted in coalitions like the AP Coalition in Defence of Diversity, a network of over 150 civil Society groups. The Society also functions as Country Animator for SANFEC.

The **South Asia Network for Food, Ecology and Culture (SANFEC)** is a network of grassroots activist organisations concerned with environmental issues in South Asia. It emerged during the lead up to the World Food Summit held in Rome, November 1996 and has since made contributions to debates on biodiversity, gender resource conservation and food security. Its approach focuses on food as the embodiment of material, ecological and cultural relations, not simply food as an object of consumption. This view of food is fundamental in the reconstruction and reordering of community relations, knowledge and cultural practices and integrally related to the construction of a future different from the consumerism and exploitative relations of our times. The leading organisations are from South Asia (Bangladesh, India, Pakistan, Nepal and Sri Lanka) but the network includes organisations elsewhere committed to working with food producing communities in South Asia. The network organises a SAARC Peoples' Forum in parallel to the periodic meetings of the South Asian Association for Regional Cooperation (SAARC).

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Foreword

In contemporary discourses, environmental and biodiversity concerns are normally portrayed as concerns of the scientific community. Part of the problem lies with scientists who have not taken active interest in correcting this misperception. We, in the Deccan Development Society believe that all biodiversity concerns belong to people, farmers, fishermen and forest dwellers, who have nurtured and enhanced such diversity through actions in the field which emanate from their enormous understanding of the issues related to biodiversity. But their knowledge and perceptions are hardly highlighted in scientific debates.

This small publication is a humble attempt to uncover the fascinating and multiple layers of such perceptions of farmers on agrobiodiversity. Though focussed on a small region in the vast Deccan plateau of Andhra Pradesh in southern India, most of the knowledge base uncovered in this study applies equally well to the entire farming community all over the world. Across castes, generations and gender, the knowledge systems that surround practiced biodiversity in agriculture can well be the clue to its conservation and enhancement.

A large number of persons have played a major role in this publication. Mr J Reddy, Mr Jayappa, Mr Balaiah, and Ms Rachamma from DDS merit many thanks. Apart from the authors and persons who contributed directly to this publication, the role played by Dr Daniel Buckles of IDRC, Canada and Ms Carine Pionetti, in looking at the drafts several times and making invaluable suggestions, has to be gratefully acknowledged. Dr Raghavendra Manvi who edited the language needs a special thanks. The photographs used in the publication, besides my own, are the work of Chinna Narsamma and Yesu. My grateful thanks to them.

My colleagues in the Deccan Development Society, Mr Giridhar, Ms Swaroopa Rani [who is also responsible for the graphs], Ms Jayasri who helped me in typing and laying-out of the draft report, and Ms Rojamma who supported us all through with necessary documents and photographs need very special thanks.

Made possible by the Using Diversity award instituted by the International Development Research Centre, Canada and undertaken by the Deccan Development Society, an NGO working in the state of Andhra Pradesh in South India, ***Crops of Truth*** we hope, will inspire increased interest in the critical role of this knowledge system in the biodiversity related debate.

P V Satheesh
Director, Deccan Development Society

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Introduction

Background

Indian agriculture, especially in the vast dryland belt covering nearly 65% of all farmlands of the country, is alive and robust thanks to crop diversity. The country is home to several thousand landraces of rice, sorghum, millets and oilseeds. The harsh environments and diverse production niches provide a challenging opportunity for farmers' creativity to select and adapt crop varieties to suit their environment and their community needs.

The Green Revolution model of agriculture, which started in India in the 1960s with a focus on varieties of seed that respond to high external inputs, resulted in widespread monocrops and the chemicalisation of agriculture, destroying in its wake much of the agricultural biodiversity of the irrigated tracts. Nevertheless, large pockets of rainfed agriculture not targeted currently by governmental proponents of the Green Revolution model, have continued to sustain not only their biodiversity, but also the farmers' knowledge associated with this biodiversity.

In view of the fact that the irrigated areas in the country have reached a plateau in production, not much can be expected from them in terms of further yield increase. Therefore, the policymakers in India, in their quest for national food security, have been seriously considering pushing through a Second Green Revolution in the dryland belts of the country. In tandem with this quest is the new threat posed by the globalising agricultural system, which in the name of increased production, advocates contract farming and the consolidation of holdings, which can lead to a new rash of monocultures, this time over in the drylands.

These twin attempts present an alarming context for Indian agriculture, whose experience of the four-decade-old Green Revolution model has been far from satisfactory. It has no doubt created small pockets of affluence in parts of the country where soils are well endowed and where water for irrigation is available at low cost, and chemical pesticides and fertilisers are subsidized by the State. However, these benefits have reached only the upper strata of rural society and have been instrumental in widening the rift between the rich and the poor in these societies. The Green Revolution has also caused untold deprivation to small and marginal farmers.

The last four decades have more than amply demonstrated that the hybrids and high yielding varieties of food crops, brought in by the Green Revolution model, have failed to yield significantly more per unit area than the traditional varieties, especially when these are grown under their own management conditions, by small and marginal farmers.

Meanwhile, the traumatic changes it has brought to the economic, political and ecological landscapes of the country are fraught with disastrous consequences. If these consequences spread to dryland agriculture, the country may have to pay a heavy social, economic and ecological price. A major socio-ecological price being already paid in dryland areas can be evidenced by the fact that various millets have disappeared from cultivation. A major ecological effect of this change is that more and more lands are being left fallow, at the mercy of the vagaries of nature and resultant degradation. In the district of Medak where the current study was taken up, the extent of current fallows is as high as 450,000 acres, all of which practised a vibrant biodiverse agriculture as recently as a decade ago. Consequently, the farming families' dependence on external supply of food grains is steadily increasing.

Consider the following trends: In 1998, in one district of the southern state of Andhra Pradesh, over 400 farmers committed suicide because they were unable to meet the input demands of the cotton monocrops they were growing. They spent money on everything: seeds, fertilisers, pesticides, and water for irrigation,

since all these were external inputs. Consequently their debts started mounting and at one point of time they understood that they would never be able to repay them. Having climbed the treadmill, they did not know how to dismount. The only way out for them was to take their own lives. Even in the agriculturally prosperous state of Punjab, several farmers committed suicide recently because they were unable to bear the mounting debt incurred to support their Green Revolution model of agriculture.

The globalisation of agriculture has brought another challenge before Indian agriculture. The policy circles are looking for a market solution to the problems brought in by the WTO regime. They would like to invest more in technofixes by bringing increased mechanisation, consolidating land holdings, installing corporate agriculture, and displacing over 20 million small and marginal farmers from agriculture.

Within this mindset, it is increasingly difficult to make the policy makers understand that there are inherent strengths in the traditional rainfed agriculture in India, which can offer the country a natural, comparative advantage. One of the most important of such advantages is the biodiversity it supports through the ecological means of production it adopts.

This study incorporates all these concerns and works towards defining the strengths of the traditional biodiverse agricultural systems in rainfed India, especially from the perspective of the farmers who still practice and preserve these systems.

This is urgent in order to find clues for conservation and enhancement of agrobiodiversity in the region. The study may also provide some policy guidelines for ways of encouraging the cultivation of a range of major and minor millets and pulses to ensure local food security.

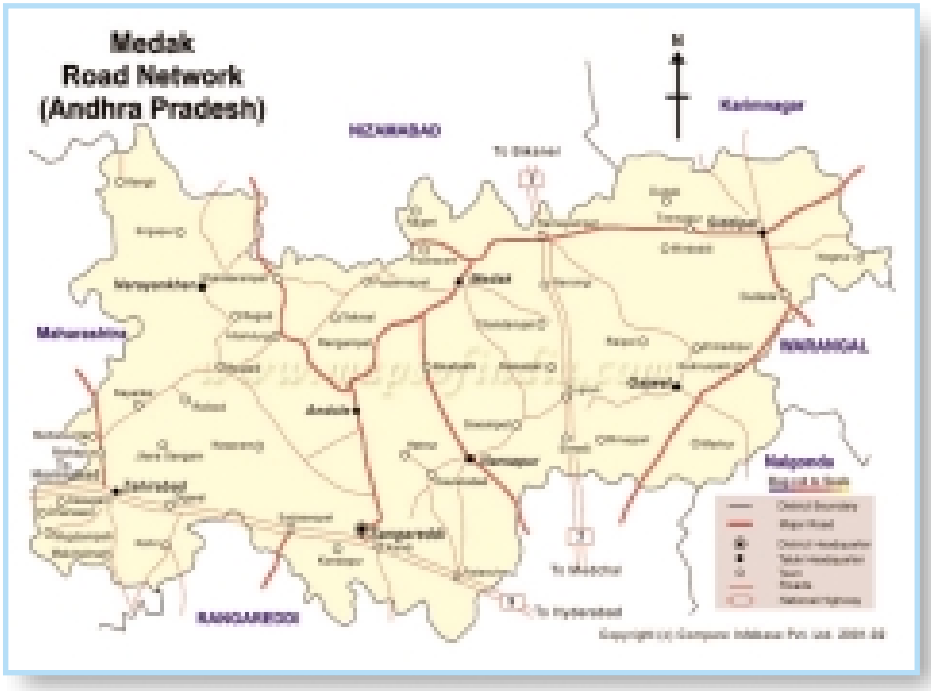
Women play an invaluable role in the cultivation and conservation of this biodiversity on dryland farms. Their role and knowledge are being steadily marginalised and undermined by the market forces. Unless documented soon,

there is a grave threat of the extinction of this knowledge. Such a documentation and analysis of women's role and knowledge may also help to establish policy guidelines that may place women's practices at the centre of Indian agricultural policies.

The present study is devised to respond to these challenges.

Scope

The area represented in this study is a part of the vast region of the Deccan plateau in South India. But, agro-ecologically, the area covered is the Zaheerabad region in the Medak District of Andhra Pradesh, through which runs the semi-arid tract, hosting some of the poorest populations of the country. It also represents the most degraded farm areas in India.



The Zaheerabad region is characterised by laterite red soils as well as alluvial black soils, and because of their character host a wide variety of agricultural crops including sorghum, a range of millets, pulses and oilseeds, all of which grow under rain-fed conditions. The diversity of this cropping system and its suitability to highly infertile soils receiving no irrigation or external inputs, makes it uniquely significant for the survival of ecologically sustainable agricultural systems.

As a matter of fact, the local populations call these crops *Satyam Pantalu* (Crops of Truth), a powerful imagery to signify the fact that these crops grow with virtually no inputs at all, surviving on the available sub-soil moisture. This perception guides the study of this biodiversity based agricultural system through a series of agro-economic, social, cultural and spiritual paths.

Specifically, we examine:

- Farmers' perceptions of agricultural bio-diversity and the variation in these perceptions based on gender, caste and age.
- Reasons both for the disappearance of diversity in dryland agriculture and the survival of some landraces.
- The farmers' [especially women's] unique understanding of their soil and crop types and the profound influence of local farming practices on the conservation and use of biodiversity.
- The benefits and disadvantages of traditional and hybrid seeds as identified by farmers. Farmers', especially women farmers' criteria for seed selection.
- The direct and beneficial relationship between biodiversity and people's livelihoods and lands.
- Women's control of seed in the service of food production for their families and communities. Their dietary practices, nutritional perceptions, and their relationship with agro biodiversity.
- Linkages between community culture and farming practices and the special significance of rituals and festivals as celebrations of biodiversity; the significance attributed by women to rituals related to agricultural diversity.

- Options for promoting dialogue and shared understanding of the value of biodiversity among farmers. The potential of a Biodiversity Festival to promote farmer-to-farmer dialogue.

Methodology

The Deccan Development Society has worked in the Zaheerabad region of the Deccan for a decade and a half. Our study involves farmers from more than 60 villages, most of whom are women. Their perceptions were obtained using participatory methodologies in order to make the study transcend the simple objective of data collection and work towards enhancement of horizontal communication and analysis on agro-biodiversity issues between the groups with whom DDS works.

There were some interesting and important methodological themes and issues that came up during the study. Different participatory tools were used to discover them. (Please see annexure for details of the groups that we had an opportunity to interact with, their villages and the dates).

The specific tools used were:

- Resource maps to understand what kind of soils promote what kind of crops;
- Matrix scoring to understand the multiple reasons behind the use of specific crops;
- Ranking to understand crop preferences;
- Seasonal calendars to understand the availability of food at different times of the year;
- Timelines to understand the availability and/or disappearance of specific crops.

Semi-structured interviews with farmers in the region were also part of the research process of interacting with them regularly, in order to understand the fascinating vistas of the traditional agricultural practices here. As their knowledge unfolds in front of our eyes, the wealth of practices they employ to

Theme/issue addressed	Methods used
• Landraces that are still under Cultivation • Soil conditions required • Crop durations • Crop qualities	• Mapping, Matrix, Exercises • Seasonality
• Reasons for changes in the agricultural scenario in the area	• Trend change • Pair-wise ranking • Flowchart
• Seeds: Quantities, Sowing • Times, Types of lands • Required moisture regime for germination	• Semi-structured Interviews • Matrix exercises
• Cultural and social linkages with various crops and seeds	• Semi-structured Interviews
• Traditional foods: Nutritional perceptions, local food culture	• Semi-structured Interviews • Matrix exercises

Photo: Yesu

A PRA with Dalit women farmers

survive in the dryland rainfed farming under extremely hostile and fragile conditions and the rationale behind them sounds more and more compelling.

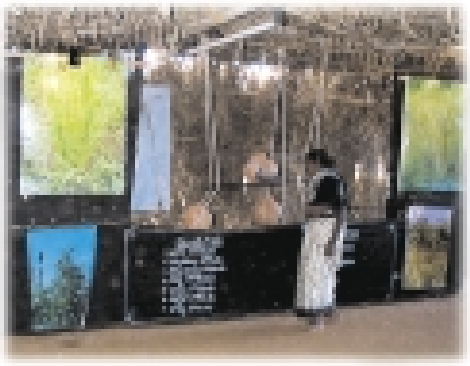
Focus group discussions were held to understand the relationship between different crop varieties and various rituals in which they are used and the myths related to them.

Finally, large group discussions of the findings were held during a huge Biodiversity Festival organised in February 1999 by the women's *Sanghams* (voluntary groups) working with the Deccan Development Society. The Paata Pantala Panduga or Festival of Biodiversity was a three day event involving more than 6,000 women farmers of the Zaheerabad region.

Each day a facilitated discussion of several hours took place in one of the many enclosures, involving no fewer than 500 women at a time. It, and the Festival as a whole, provided a unique opportunity to widely disseminate the findings among farmers and create a critical and broad-based discussion on the issues.

Instead of keeping the discussions at a sterile, intellectual level, the Festival, or jatra as it is known locally, converted them into a celebratory occasion. This ensured that the debate become a part of the cultural life of the community in the same manner that the practice of the biodiversity is. This spirit was continued subsequently by taking the Festival on the road the following year in a Mobile Biodiversity Festival.

Photo: Daniel Buckles



PAATA PANTALA PANDUGA : Festival of Biodiversity ; enthusiasm, innovative organisation of space, seed exhibits and recreation of women's biodiverse farms

All these tools and methods helped the Deccan Development Society engage farmers in a dialogue on biodiversity and to bring out their perceptions on a number of key issues related to agrobiodiversity.

People & Biodiversity

Diversity, Soils & Gender

Diversity cannot be discussed without understanding the farmer's perceptions of individual crops and their farming practices. The practice, cultivation and conservation of diversity at the farm level, includes the need for the farmer's control over knowledge systems related to seed selection, germination, sowing, and other cultivation practices. Therefore it was important to understand how much of these knowledge systems is still alive.

In a series of discussions and participatory exercises, these issues were taken up leading to an awareness of the critical need of the following requirements in order to carry out the study:

- An inventory of the traditional agricultural implements of the area
- A matrix scoring of the traditional pest control practices of the area
- Soil-building crops of the region
- Various seed sowing practices for different crops
- The traditional inter-cropping and mixed-cropping practices of the region and the rationale behind these
- The nutrient needs of various crops and their inherent productivity qualities, the number of sub varieties within each crop etc

Crop diversity in the Zaheerabad region is to be understood in terms of two main cropping seasons: *kharif* [rainy period or monsoon, from June till October] and *rabi* [rainless winter period from November to March]. Crop diversity is also closely associated with specific soil types, which have in a sense nurtured it. These soil types are:

- Red soils
- Black soils
- Sodic soils
- Rocky soils
- Submersible muddy soils

Each of these soil types hosts a range of crops during different seasons.

- Red soils: They are further divided into shallow soils, mixed soils, featuring a good capacity for water retention, and deep sandy soils, on all of which the following crops can be grown: sorghum (*Sorghum vulgare*), pearl millet (*Penisettum typhoideum*), little millet (*Panicum miliare*), sesame (*Sesamum indicum*), niger (*Guizotia abyssinica*), mesta (*Hibiscus cannabinus*), greengram (*Vigna radiata*), redgram (*Cajanus cajan*), and field bean (*Dolichus lablab*).

- Black soils: They are used to grow a wide range of *kharif* and *rabi* crops, including *rabi* sorghum, wheat (*Triticum vulgare*), sesame, greengram, safflower (*Carthamus tinctorius*), linseed (*Linum usitassimum*), chickpea (*Cicer arietinum*), field pea (*Pisum sativum*), little millet, finger millet (*Eleusine coracana*), foxtail millet (*Setaria italica*), groundnut (*Arachis hypogea*), and dry sown paddy (*Oryza sativa*).

Photo: P V Satheesh

A RICH BIODIVERSE FIELD : MIRROR OF FARMING IN THE DECCAN
Most farmers grow at least 12 crops at the same time and in the same space, answering their multiple needs

- Mixed soil: All traditional *kharif* crops are grown on these as well as certain *rabi* crops, such as sunflower, chillies, and castor.
- Sodic soil: Certain varieties of little millet and foxtail millet can be grown, along with horsegram and coriander (*Coriandrum sativum*).
- Submersible muddy soils: This soil type is best suited for dry sown paddy during *kharif*, and chickpea and lentils during *rabi*, if the water level has subsided.

Table 1. Crop varieties grown in the deccan

Common English Name	Botanical Name	Local Name	Names of intra species varieties
Amaranthus	Hibiscus cannabinus	*Pundi*	*# yerra pundlu [red]* *# tella pundlu [white]*
Black Gram	Phaseolus mungo	*Minumulu*	
Bishop's weed	Trachyspermum ammi	*Oma*	
Cowpea	Vigna catjang	*Bebbarlu*	*# tella [white] # yerra [red]*
Fieldbean	Dolichos lablab	*Anumulu*	*# tella [white] # nalla [black]* *# yerra [red]*
Finger millet	Eleusine coracana	*Thaidalu*	
Foxtail millet	Setaria italica	*Korralu*	*# tella [white] # yerra [red]* *# nalla [black] # mansu*
Green gram	Phaseolus aureus	*Pesarlu*	*# sundari # baandari # baalinta # manchi* *# kidki # pirki # theega # neelalu # girka* *# kondenga # ganga # kota # chemki*
Horsegram	Dolichos biflorus	*Vulvalu*	*# tella [white] # nalla [black]* # yerra [red] # burkha saaralu *[spotted brown]*
Kodo millet	Paspalum scrobaculatum	*Aallu/aarkalu*	
Little millet	Panicum milliare	*Saamalu*	
Niger	Guizotia abyssinica	*Gaddi nuvvulu*	
Paddy	Oryza sativum	*Vadlu/vari*	*# porka [grassy] # nalla [black] # yerra [red]* *# tella [white] # budda [dwarf] # pedda [large]*
Pearl millet	Pennisetum typhoideum	*Sajjalu*	
Proso millet		*Kodi saamalu*	
Sesame	Sesamum indicum	*Manchi nuvvulu*	*# tella [white]* *# nalla [black]*
Sorghum	Sorghum vulgare	*Jonnalu*	*# thoka [loose earheaded]* *# gundu [round earheaded]* *# yerra [red] # tella malle [white kharif]* *# akkachellendla # gareeb [poor people's]* *# athakodandla*

- Rocky soil: On this soil, only a few crops like sorghum, pearl millet and redgram can be grown.

It is important to note that the comparatively better lands with black soils tend to be owned or tilled by upper caste farmers, while Dalit farmers are usually confined to the red soils in the uplands.

In the world-view of Deccan farmers, crops are not gender-free. They are classified as *moga pantalu* [masculine crops] and *aada pantalu* [female crops]. All commercial crops like sugarcane, turmeric, ginger etc are *moga pantalu*, while all food crops are *aada pantalu*.

While formal, gendered understanding of agriculture informs us that while most commercial crops get taken over by men and food crops stay under women's management, it is very interesting to note that this concept is embedded in the very linguistic pattern of the region and has become linguistically institutionalised.

The fact that all food crops bear the feminine gender needs to be seen as a tribute to the capacity of women to take control of food production for their families and communities, and to ensure their food security.

Photo: P V Satheesh

FOOD CROPS AS FEMALE CROPS... Institutionalising gender biases

The deeper symbolic meaning of this gendered understanding of crops and soils is complex. The classification of less fertile lands as women's lands may also be linked to the values attributed to women. In local culture, a good woman eats less, eats less nutritious food and still produces children. If this value of self-sacrifice and patience with less and less is coupled with the position of women at the bottom of the social ladder, we get a clue as to why less fertile lands are perceived as *aada bhoomilu*. It is these same lands which produce a maximum range of crops and are home to diversity. Therefore, it is also possible for us to infer that the overriding feminine principle associated with red soils has less to do with their fertility than with the rich biodiversity they support.

Diversity and Farming Practices

Farming practices in the Deccan are intimately related to the intensity and quality of agrobiodiversity on farmers' lands. Whether ploughing is done by a tractor or an animal, whether the soil is fertilised by chemicals or farmyard manure, every option impacts the biodiversity on the farm.

Photo: Chinna Narsamma

WEEDING & DIVERSITY... A complex & intricate relationship

Weeding is one such important element in farming practice. An interesting issue that was raised by women farmers was the very definition of weeds. The women offered a wonderful perspective on weeds, which had no negative connotations. ***In their world-view, weeds were not villains.*** On the contrary, they enhance the diversity on the farm. As the women practise only organic farming, the weeds that grow on their farms acquire the nature of **beneficial** plants over a period of time.

The plants that grow among cultivated crops are hardly weeds. They are useful vegetative inputs in their lives: green fodder for animals or uncultivated foods for human consumption. The seeds of these weeds usually get recycled through farmyard manure (FYM) into which kitchen waste and waste from the cattle shed is thrown.

If a farmer uses farmyard manure to fertilise her farm, she benefits continually from these uncultivated foods which keep generating on her farm year after year. But once the shift is made to chemical fertilisers, this recycling through FYM is broken and the regeneration of uncultivated plants stops.

These are also ***sannam*** seeds – very delicate. Since FYM keeps soils loose and airy, tiny seeds can germinate through this layer. But if chemical fertilisers are applied, they harden the upper crust of the soil and make it impossible for the delicate seeds to break open the upper crust and come out. They meet their death in the lower depths of the soil.

The traditional plough does not upturn the soil too much and allows most of the delicate seeds to stay on the upper layers. But land which is ploughed by tractors pushes these seeds to the bottom of a deep layer of soil preventing them from regenerating.

The farmers, especially the women farmers who do most of the weeding, are very conscious of the relationship between weeding and diversity. They know that there are some varieties that need the land to be kept very 'clean' [*pakeeju*]. Therefore, weeding is done almost thrice over one crop season. There are

other crops which do not allow any weeds to grow. This translates into saving on labour inputs. Crops like little millet are usually sown at the end of the monsoon period, as a 'fall-back crop'. Since rainfall becomes very scanty by then, few weeds grow and weeding is not a necessity anymore.

Farmer Malgonda of Humnapur says of little millet: "*Kondaru kalusthaaru – yevaru kalavane kalavaru... gaddi anthane, panta anthane... deyyam panta... perigenante gaddini levanivvadu.*" [Some weed it (little millet), some don't. Its fodder and grains race with each other. Devil's crop! Once it grows, it doesn't even let weeds come up].

Diversity and Moisture Requirements

Based on a meticulous study of the moisture requirement of each crop and the rainfall pattern in the region, farmers have developed a complicated system of sowing specific crops during specific periods of the monsoon.

- Little millet could wait till the end of the season because of its hardiness
- Greengram and blackgram, which are comparatively delicate, need the first few heavy showers of the monsoon to nurture them. Therefore, pulse crops are sown during the first fortnight of the local calendar called **Mirgam**
- Little millet and Niger which demand the least soil moisture are sown in the fifth or sixth fortnight, in *Asaleru*, almost two and a half months after the onset of the monsoon, especially in years when monsoon rains fail to arrive.
- Crops like lentils are sown on low-lying areas where there is extra moisture present in the soil.

Diversity and Special Qualities

Some crops have special qualities and vulnerabilities, which are recognised, valued, and accounted for in farming practices.

QUALITIES	CROPS
No weeding required	Niger and sunhemp
Most prone to pest attack	Pigeonpea, fieldbeans and *Dolichos lablab*
Most labour involved [in processing]	Little millet and foxtail millet
High storability	Foxtail millet, Kodo millet and
The tastiest foods	Little Millet Pigeonpea *daal*, paddy [*porka*], pearl millet *roti* and foxtail millet
Suitable for rainy soil types	Pigeonpea
Most fertile soils needed	Chilli and sunflower
High commercial value	Pigeonpea and sesame
Highly productive[barkath]	Bishop's weed

In special biotic-stress related needs, crops like sesame are carefully sown on lands which have hardened due to cattle trampling. Since it is not grazable, sesame acts as a live crop fence and prevents cattle from coming into the farm. In addition it also yields a valuable oilseed.

Diversity and Household Needs

While many crop landraces have disappeared from the agricultural scene in the region, some landraces continue to be grown by farmers with particular needs and sets of resources. Recognizing these circumstances opens a unique window of understanding on the range of creative motives, which prompt farmers to make particular decisions to grow a certain crop in their field.

- **Soil types:** As noted above, soil type determines the crops that the farmer grows. For example, on black soils farmers invariably plant crops like Sai Jonna (winter sorghum), chickpea, mustard etc. On red soils, the preferred crops are *Pacha jonna*, a variety of monsoon sorghum, pigeonpea and hibiscus. Every crop mix depends upon the extent of each soil type on the farm.

Photo: P V Satheesh

GAREEB JONNA... Answering hunger

- **Need to raise two or more crops during a year:** In order to optimise the production from their farms, farmers go for the best crop mix within their multiple cropping system. For example, on black soils they grow green and black grams during the rainy *kharif* period since both are short duration crops. The crops are harvested in about three months after their planting, and a range of winter crops are planted in the same space. This allows optimal land use for cropping.
- **Crop durations:** The duration of the crop plays a determining role. For example, *Gareeb jonna*, an early maturing variety of sorghum is grown because it is harvested within three months of sowing. At this point of time, all the previously harvested grains will have been exhausted, and there is hunger at home. Similarly, all the dry fodder would be over and the cattle would begin to starve. Crops like foxtail millet and *Gareeb jonna* are grown to meet both these food and fodder needs. They mature in three months, and provide the urgently needed food and fodder.
- **Need for cash:** This is the main reason for growing crops like Bishop's weed.

- **Ensuring food security:** It is imperative that they grow crops like *kharif* sorghum, the main staple of the region, to ensure food security.
- **Need for fodder:** Since the farmers use a variety of fodder mixes for their cattle, they also need diverse varieties of fodder. The cattle are fed on a mix of green and dry fodder, straw, pods and husk. To meet this need, the fodder-feed mix has become a part of the cropping system in the region. Growing a mixture of sorghum, pearl millet, pigeonpea, cowpea, *Dolichos lablab* their fields, farmers ensure that they get green fodder [*Dolichos* creeper], dry fodder [sorghum and pearl millet stalk], pods [pigeonpea] and husks [cowpea].
- **Need for fuel wood:** Pigeonpea which is a major crop in the Deccan is not only a pulse crop and soil nitrogen fixer, but also an important supplier of fuelwood for the family.
- **Need for thatching/fencing material:** The decision to grow a certain kind of crop is also influenced by this need. For example, pigeonpea is grown not only for the pulses it provides, but also because the plant itself is used as fencing/thatching material by farmers. This spares them the need to purchase other material for this purpose since they are both expensive and increasingly scarce.
- **Need for fibre:** This is why farmers off to grow crops like Amaranthus and sunhemp. The fibre from these crops is used for making ropes that are employed in a number of agricultural operations as well as in making household furniture like cots.
- **Need for vegetables:** It encourages farmers cultivate crops like cucumber and cowpea as a part of their cropping system.
- **Special foods for specific festivals:** Thsi is a very important consideration for including in their crop menu, varieties like *Pyalala jonna* (popping sorghum) which is used in snake worship.
- **Rejuvenating soil fertility and 'strength':** The unique cropping system of the Deccan makes space for a variety of crops not just for their produce value, but also for their interaction with soils. For example, Niger is an oilseed grown on the hardiest and the least fertile patches of soil. Through its root

activity, Niger loosens the soil on which it is sown and fertilises it through leaf fall. Over a period of time, the farmer has not only enjoyed the produce of Niger for her oil needs but will also have reclaimed the least fertile patches of her farm to grow 'better' crops.

- **Storability:** Apart from all their other uses, crops like foxtail millet are grown because they can be stored long time without the addition of any pest repellent or the use of special storage techniques. This makes the farmer less tense since she can rely on the grain for several years.
- **Need for oil:** The people in the Zaheerabad region prefer cooking oils like safflower oil which is not only very tasty but also healthy since it has the least cholesterol content. Therefore cultivation of safflower is endemic in the region.
- **Need to prepare land for the next crop:** Crops like sunhemp are grown for this specific purpose. In black soils the major winter crop is sorghum and its cultivation demands that the soil is rested over the rainy season. During the period of resting, the farmer grows a short duration green manure crop which can be ploughed back into the land so that land becomes more fertile. Sunhemp is a major crop raised for this purpose.
- **Medicinal properties:** A large number of crops are also appreciated for their medicinal qualities. For example, mustard which is frequently used as a poultice to prevent serious infections.
- **To ward off/reduce pest incidence:** The Deccan farmers grow crops like marigold specifically for their pest repellant property. Grown between rows of crop, this keeps away nematodes and pests.

Diversity and Diet

Each grain has its place in the dietary needs and demands of the people. While some hardy grains answer the call of survival, some are used for ritual requirements. Some are fertility grains, while some meet famine needs. Early maturing varieties like foxtail millet and *Kaki Muttani Jonna* are *Aakali Panta* [Grains of Hunger]. They are harvested at that time of the year when the grain pots at home have gone empty and hunger is knocking at the door. These grains drive hunger away and provide succour to the farmers.

Horsegram and finger millet are crops which make the least demand on water or moisture. They also grow on lands which are least fertile. In the harsh environment of the semi arid Deccan, where famine often lurks at every corner, these crops offer much needed relief. The combination in which they are used in the local diet makes them not only belly-fillers, but are also highly nutritious [for example, horsegram was used to make *rotis* and eaten with uncultivated greens, and finger millet was cooked as porridge with raw sugar]. Used in people's diet in this fashion, these grains not only answer survival needs, but also go beyond their brief and provide the major nutritional requirements of people.

Photo: Chinna Narsamma

MEAL AT A DECCAN HOME... Food diversity inspired by crop diversity

While a gamut of hardy local grains answers peoples' most important needs, more delicate, less nutritious, and rarer crops like rice were reserved in the past for some festive occasions. Rice was called *Jeje Buvva*: worship Food. *"Jaram vastene buvva, jejeki ekteni buvva"* is a popular saying meaning, "Rice only when fevers come, rice only when worships are done."

It is interesting to note that most of the traditional recipes are not made of a single variety of grain but a ***combination of cereals, pulses and oilseeds.*** The daily meal of a traditional Deccan farmer consists of sorghum *roti* [bread], pigeonpea *daal*, uncultivated greens seasoned with oil and laced with powdered spices. The most interesting aspect of this meal is that every single element in it is grown on her own farm, however small it is. One can infer that the diversity on the farm is directly transferred into their kitchens.

In extended participatory exercises and group discussions, women give the following picture of various crops and their use in the dietary system of the region:

- Horsegram *rotis* and finger millet porridge were the staples during extreme famine conditions in the past.
- *Rotis* [breads] are made by mixing the flour of millets as well as pulses like blackgram.
- Rice was considered to be *Jeje buvva* - something offered to the gods and eaten only on special occasions, on festivals. At other times, people ate foxtail millet.
- A variety of sorghum called *Kaaki Muttani Jonna*,[which literally translates into the phrase, the sorghum that the crow does not touch] is supposed to produce *rotis* that are dark in colour and unappetising. But it is *Gareeb jonna* - poor [person's] sorghum – since it comes in handy when rains fail causing overall crop failure. This variety of sorghum is extremely hardy, does not demand much soil moisture and can be sown late in the season, if the monsoon fails to set in properly. To top all other qualities, this is a short-duration crop. It appeases the hungry, and is therefore known as *Gareeb jonna*.

Diversity and Nutrition

There are a number of important perceptions regarding nutritional qualities of traditional foods. The local classification of the nutritional status of each crop is based on the 'heat' and 'cold' elements present in the grains. Based on these, different kinds of foods are recommended for different human body

types, and for different seasons as well. For instance, finger millet, with its high 'heat' element is consumed in winter. On the other hand, little millet is a 'cold' crop and therefore eaten in high summer, in combination with buttermilk [diluted yoghurt] which is another 'cold' food.

Even the oil derived from certain oilseeds is rated by the villagers for different parameters: some are considered healthy, some medicinal and some harmful. They are also judged according to taste. Oil from safflower and groundnut occupies the pride of place among all oils. Some oils even get tags of extra-nutritional connotation tagged onto them, for example, sunflower, which is a new introduction in the region by the mainstream agriculture extension system, is blamed for all the negative behaviour of the young. Farmer Malgonda in Humnapursays, *"Nalla kusuma noonaytho telivi yekkuvaindi. Ee kaalamlo vankaraithe yekkuvuntivi naalugendlu"*. "Sunflower oil has made people extra smart. In this age, only if you are [aggressively] extra smart can you survive a few years longer".

Horsegram is believed to be very good for the human body — as good as it is to the lands on which it is grown. Winter sorghum and chickpea are also perceived as very nutritive grains.

Blackgram and *Manchi Pesari* – a greengram variety – sorghum and lentils are very good for consumption, especially for convalescents. *Manchi Pesari*, in particular, is a special food for post-natal mothers.

Gollollu [the shepherd community] prefer eating cooked whole-foxtail millet, because it is a *garmi tindi* [warm food]. They need this because they spend the nights outside on other people's lands in the cold, along with their herd.

Diversity and Seed Selection

Seed is the most critical link in the food chain and is the basis for all agriculture. Therefore, the criteria for seed selection are central to the diversity of the farming system. In order to understand these criteria, the study used collective and

individual oral histories so as to identify what farmers look for when they are selecting seeds. What emerged were four criteria:

- *Vaasana*, the odour: If the seed smells 'good', then it is kept for sowing.
- *Vanne*, the colour: The seed must have the right shade of colour.
- The grain appearance: The seed should not have any fungus nor the mark of any pest attack.
- The size: The grain should be 'fat' and healthy.

While entire earheads are selected as seeds for crops like sorghum, seed selection takes place through winnowing and handpicking for crops like greengram and blackgram.

The next stage after selecting seeds for their odour, colour, and size, is the task of determining the germination quality of the seed. Germination tests for seeds are the decisive factors in deciding which seeds should be used and which

Photo: Chinna Narsamma

WOMEN AS SEED SELECTORS... A traditional leadership role

discarded. In an extraordinarily interesting fashion, the Deccan communities have incorporated germination tests as a part of the ritual celebration of the festival of *Dasara*.

Dasara is the most important festival in the region. It is post-monsoon and the landscape, which is normally brown and arid, is covered with carpets of greenery. The streams are full, and flow with vibrant life. Most crops are ready for harvesting, and the farmers are relaxed. It is also the time of the year which marks the end of one season and the beginning of another: a continuity of life.

This is the time when farmers prepare to sow the *Pedda Panta*, the big crop for the winter season. *Dasara* heralds this season.

In preparation for *Pedda Panta*, the big cropping season, women perform a fascinating ritual called *Gattilu Koorchodam*. They go into isolation and sit *Gattilu*. This is a five to seven day ritual when, in their isolation, they worship *Amba Bhavani*, a form of *Durga*, the famous Hindu goddess. But beyond the worship of this Goddess lies another ritual, which is unparalleled for its creative brilliance. This is the element of seed worship and the observation built into this ritual. *[See box - Gattilu: The Germination Ritual, page 27]*

Through this method, farmers used to understand the relative merits of the seeds lying with various farmers in the village, and those seeds which had the highest germination qualities, would get the maximum requests for seeds from other farmers in the village.

Diversity and Culture

Each festival is the cultural manifestation of a particular season and a particular social and psychological condition. Some festivals are celebratory. Some are austere. Some are ostentatious, while some are reflective. According to the character of each festival, specific grains assume importance for use in that particular festival. The following table gives us a brief glimpse of the character of various grains, as perceived by the community in relation to their culture.

- *Pyalala jonna* as popped sorghum for *Nagula Panchami*, a day on which snakes are worshipped as symbols of fertility and probably for their role in farming as controllers of rats and other pests.
- *Korralu* (foxtail millet) is cooked as *Paayasam*, a sweet pudding, on the day of *Peddala Amavasya* - the Hindu All Souls Day, the day on which the dead are remembered and worshipped. Chickpea is used for making *Bajji*, a fried snack for many festivals.
- Finger millet, peanut, and chickpea are used for making a sweet pancake - *Polelu*, for a number of festivals.

This already establishes a range of grains that achieve festival status and also represent a cultural expression. The popped sorghum on the day of *Nagula Panchami,* is an austere food, respectful austerity, to worship snake gods for fertility and for protection of crops from rats etc. Foxtail millet porridge, another austere food is offered with great respect to the departed ancestors on the day of *Peddala Amavasya*, the day of the ancestors.

Photo: P V Satheesh

AUSTERE FOODS... Popping sorghum; Foxtail millet

Gattilu : The Germination Ritual

Women mix together five most important seeds for the winter crop. These are mixed with ***untasted soil*** *of single crop-growing land: Sayi Jonna Chenu. The soil must not have been cultivated that year: land that has been kept waiting for a new crop. Into this soil they mix the seeds of winter jowar, lathyrus, chickpea and linseed: all crops which grow without longing for water. Water is the scarcest commodity in the dryland region. Therefore, any crop that can grow without water needs to be worshipped.*

This soil-seed spread is placed on a leafplate and two fresh pots are kept on it. Each pot is decorated with a piece of sugarcane and a jowar earhead: a bouquet of crops ready for harvest from the monsoon crop season. Auspicious betel leaves are spread all across and flower garlands adorn the pots.

Photo: P V Satheesh

Another pot full of oil is placed in front and an earthen lamp is lit on top of the pot. The lamp glows all through the day and night until the ritual days are over. Five measures of rice in dried coconut cups are kept around the pots. The entire scene is enchanting [Laka laka antadi].

The seeds for the ritual are brought either from the house of the Patel, the village headman, who traditionally is the seed keeper for the village. [The poor cannot afford to keep their own seeds. It is the job of the rich]. Alternatively, seeds are brought from those who are known to preserve seeds, or from their own seed baskets.

On the final day, when the seeds sprout, women in the community visit each other's houses and look at the seeds and compare how well the sasi (seedling) has grown. It is an indication for them to understand whose seeds have greater potency.

The seeds with the pots are taken to the farm and planted there with ritual observations.

However, peanut and chickpea, two grains that are considered rich, are also celebratory: you make sweet bread – *pole* – with them on celebratory festivals like *Ugadi, Dasara, Diwali*, and on a special farmers festival called *Erokka Punnami*, the day on which all the bullocks in the village are decorated and taken out in a procession at the beginning of the farming season.

Two festivals in the Deccan are pure celebrations of diversity. The *Soonyam Panduga* in December is heralded with a visit to the farm by the entire family of the farmer. They go singing around their farm. Several versions of the songs are available, *Olega Sagam Olega* and *Beliyo Jolave*, a song which urges the sorghum to grow well. Such songs are sung to propitiate *Bhootalli* (the Mother Earth), "who is pregnant at that time", and bears a host of crops: sorghum, pigeonpea, a variety of pulses, and a host of vegetables (*sabbanda kooragayalu*). It is that time of pregnancy when the Mother Earth craves to taste different things. To satisfy her craving, people cook *Bajjikoora*, a fascinating dish in which all the available vegetables (leafy and otherwise) and tender grains [including the green pods of pigeonpea, *Dolichos lablab*, chickpea, chillies, green peas, lathyrus, amaranthas and other leafy greens] are cooked together and offered to the Mother. The singing also is to please the Mother.

The expected result of all this is to persuade the Mother to think: "These people are making such an effort to keep me happy. Therefore, I too should keep them happy by making the harvest bountiful". Though this is the expected result, it is not negotiated as a crude business act. It is an act of love. An act of gratitude. An act of worship, and finally, an act of celebration.

The second festival which joyously celebrates diversity, is *Endlagatte Punnam*, a festival which precedes the harvesting of winter crops. On this day, men and women collect various earheads of crops from their farm. These earheads and special sweets, cooked rice are offered to the village goddess. It is an act of gratitude towards the Goddess who has showered her blessings on the farms and made it possible for a diverse produce.

Simultaneously, each housefront is adorned with *thoranam*, a string of earheads tied across the front door. The main grains constituting the *thoranam* are *Satyam Pantalu* the five Crops of Truth. Along with them, other crops in the farm also make it to the *thoranam*. The greater the diversity of the earheads, the prouder the household feels, and its status goes up in the community. It is the most fascinating and creative way of declaring your commitment to diversity.

Photo : PV Satheesh

ENDLAGATTE PUNNAM... Pure celebration of diversity

The Loss of Biodiversity

If all these qualities have been known and valued by people, why is it that diversity has declined and some landraces have been lost? Minor millets such as foxtail millet and finger millet have been fast disappearing from farmers' fields. *Manchu korra*, a foxtail millet variety that lives off dew, is no longer to be found in most villages. Similarly, the white variety of redgram, which has a particular medicinal value, has been displaced by newly introduced varieties of seeds in certain areas of Medak District. The area under *rabi* jowar, out of which a particularly tasty bread is prepared, has drastically decreased.

There is no single answer to this question. People come up with some pithy one liners in reply.

- *"Paisalu kattukuntunnaaru ippudu"* – [people] are bundling up money [thoughtlessly] these days. This is a very perceptive comment on the monetarisation of agriculture to the exclusion of everything else.
- *"Kaalam kaaka"* – because the rains don't come [as they used to] This is a very popular perception. There is a strong memory of the past, which had naalgu nelala kaalam [four months of rain cycle]. Many of the traditional crops need rains at the right time.
- *"Devunikeruka"* – God knows why. This is an expression of perplexity; in spite of the well known qualities, uses and needs of traditional crops, the question of why people are not cultivating them is truly perplexing for a number of farmers, especially for women.
- Neighbour's pressure: Another interesting reason is that even the ones who want to continue to grow traditional seed varieties cannot do so, if the

neighbours have all gone for mono-cropping or hybrid varieties. In such cases, *"Naluguri kannu dani meede"* - everybody has their eyes set on the crops – they would start stealing from the farm. This entails adequate watch and ward over the crop. Who has that kind of time?

Lengthy discussions with farmers over the course of several years have revealed patterns of farmer perceptions regarding the threats to diversity, which have been grouped below into seven categories:

a. Governmental policies and programmes
b. Media influence
c. Agricultural extension, which promotes monocrops and commodity crops
d. Market preferences
e. Diminishing cattle population and farm mechanisation
f. Chemicalisation of agriculture
g. Erratic and insufficient rainfall

Government Policies and Programmes

1) Social Safety Net Policies

The farmers single out the public distribution system as a major threat to their agro-biodiversity. The Government of India pursues a policy of providing cheap ration to the needy families across the country. This huge affirmative action provides each identified poor family with about 20kg of foodgrains per month at an affordable price.

While the programme has a laudable intention, the effect it has on drylands and their biodiversity has been lethal. Under the PDS system, the government has been selling only rice and wheat across the country for over three decades. This has affected the traditional food habits of people. Even those communities, which used to eat sorghum and millets, have gradually switched over to rice or wheat. This situation has adversely affected the production and consumption of sorghum and millets. In Medak district itself, over 100,000 hectares of croplands have stopped producing these traditional crops. Much of these lands have been left fallow.

Photo: P V Satheesh

FALLOUT OF PDS... Alarming increase in fallowisastion of farmlands

A major segment of the population, which is affected negatively by the way in which the PDS is implemented, is the young children. They get used to eating rice purchased from the ration shops and forget their sorghum breads and millet porridges. This change is further reinforced when they go to government hostels to study. Many of the poor households send their children to hostels during their years of schooling because it reduces the financial burden of raising them at home. In these free hostels run by the government, they are served only rice. There is no sorghum or millets in their menu. With their formative years characterised by a diet of rice, they refuse to accept sorghum and millets as they grow up.

2) Finance Policies

Agriculture in Zaheerabad is also moulded by the government's agriculture financing policies. It is easy to get credit and crop loans from State institutions for commodity crops such as sugarcane, horticulture and cotton grown as monocultures, while farmers who plan to grow millets and sorghum on their fields do not get similar support. Under this continuous pressure to shift to particular crops, farmers get disheartened and change their cropping pattern in accordance with the credit diktats of the banking and other lending institutions.

3) Seed Policies

Many focus group discussions, especially with women farmers, aimed at understanding whether the government seed policies had led to any particular shift from traditional seeds towards HYV/Hybrids. In fact the HYVs and hybrids are commonly known as *Sarkari Vittanalu* - government seeds.

A common argument emanating from the mainstream scientists and policy makers in support of hybrids is that they give better yields, and therefore would be welcomed by farmers. However, the women farmers react very differently to the issue of hybrid seeds. Strangely, there seems to be a kind of disaster association in their minds with the hybrid seeds.

In a focus group discussion the women said that hybrids were introduced during the Hyderabad Action. This was a time when the national government of India had sent its army to annex the state of Hyderabad, ruled by a Muslim ruler. This was also a time when riots between Hindus and Muslims broke out in the region and claimed hundreds of lives.

The Hyderabad Action took place in the early 1950s. Objectively, their view that hybrids were introduced at this time is incorrect as HYVs were introduced in the region in the late 1960s with the Green Revolution. Metaphorically, however, the association is with disaster, a perception that has little to do with actual historical dates but one that reflects a particular reading for a period in their history.

This association with disaster gets clarified when they start explaining their perceptions of the quality of hybrids. The main complaint is that 'hybrids' make soil lifeless: *praanam gunjukoni tintadi* - wrenches life out of the soil and gobbles it up. Some of the farmers, however, feel that 'hybrids' by themselves do not really cause any lasting damage to the soil. It is the package of practices prescribed in growing 'hybrids' [especially the use of chemical fertilisers on dry soils especially] which 'forces life out of the soil'. In the farmers minds there is no clear distinction between hybrids and HYVs. What is clear for them is the distinction between their own seeds and the seeds that have come from government sources.

However, there is a consensus that 'hybrids' are not good for consumption – either for humans or for their livestock. They cause allergies and *lanju*. '*Peyyiki chetu*' [not good for health]. Similarly, animals do not find the fodder from the hybrid crops palatable or digestible. It does not give the animal any strength '*peyyiki talagadi*'.

The high yield of hybrids, which is a positive quality for scientists and policy makers, is not so positive for local people. For farmers, hybrids yield **uncontrollably** like 'wild crops' – *aagam panta lekka pandutadi* - **not like decent crops.** They are also not seen as a crop, which is suitable for the small and marginal farmers. 'Hybrids were brought in by the upper caste farmers and the big landlords. Everyone was attracted to them because they were new on the scene - because one could make money. But anyway, hybrids are not grown for us - they are for sale - who knows where they go to and who eats them?'

Media Influence

The second major influence identified by farmers is the media, which is completely dominated and populated by the urban middle classes. This media constantly promotes elite foods like rice and wheat. The rural poor find their own foods marginalised by the media and start wondering whether they are inferior in status. Over a long period of time, this sense of inferiority has deepened and slowly they have started abandoning their own foods.

The special capacity of the millets and other crops which used to withstand harsh environments, instead of getting the credit they deserve, have earned them an identification of being 'famine foods'.

This has contributed to negative connotations. Eating millets and sorghum is identified with the poverty of the consumer because these foods do not find a place on the fashionable media. With the spread and dominance of an elite media, the traditional crops are losing their sheen.

Agricultural Extension

The third major factor to impact on agro-biodiversity is the state agricultural extension network, which has refused to recognise the inherent strengths of biodiversity in agriculture. They relentlessly promote monocultures and commodity crops and provide no extension services for other farming practices.

Market Preferences

Markets have been major players in the marginalisation of millets. During earlier times when markets were local and followed people's food tastes and eating preferences, there was not much conflict between what people produced and what the market accepted. But as markets are currently dictated by distant demands, millets have been consigned a very low priority. In order to produce for these markets, people have been forced to follow a cropping regime that does not include diverse varieties, and certainly not millets.

Diminishing Cattle Population

A particularly worrying problem that confronts the farmers in the region is the diminishing cattle population in their villages and on their farms. Much of the traditional agricultural practices demand farmyard manure (FYM) in which cow dung is the most crucial element. With no cattle around, there is no farmyard manure either. **Shortage of farmyard manure was the single most commonly repeated concern raised by the villagers.**

The decrease in the cattle population, and the resulting decline in the availability of FYM, according to the farmers, has been caused by a host of pressures:

- The decreasing pastures and village commons has been a major obstacle in owning and raising cattle. Richer landlords who, in the past, used to own pastures have sold them off to earn money. Many of the village commons have been allotted by the government to the landless for farming.
- With the increasing emphasis by the government on children's education,

many children who worked as cattle-herders earlier have gone to schools. Consequently, there are no herdsmen in the villages. As the better-off farmers have taken to mechanisation of their agriculture with increasing use of tractors, the animals have been sidelined.

Chemicalisation of Agriculture

In a puzzling cause-effect-cause cycle, the diminishing cattle population and the reduced availability of FYM has made farmers depend more and more on chemical fertilisers. Chemical fertilisers are subsidised by the government, are available on credit and are easy to use. They also reduce the need for cumbersome transportation and application processes required of FYM. For one acre of farm, one needs to transport about 10-15 cartloads of FYM, whereas the equivalent in chemical fertilisers represents just a few bags. While you need four to six persons to load and unload the FYM and spread it on the farm, a single person can handle all these operations for the chemical fertilisers. Chemicals save farmers time.

Photo : Yesu

CHEMICALISATION OF AGRICULTURE... Threat to biodiversity

The costs of chemicalisation of agriculture is less visible but significant. In an unreliable rainfall regime such as Zaheerabad, millets and sorghum do not respond well to the application of chemical fertilisers, compared to FYM. This leaves farmers in a bind. They cannot grow these crops without access to abundant FYM, forcing many to abandon millets and the diversity regime of their farming practice. If they move to crops like cotton and sunflower that do respond to chemical fertilisers, they run the risk of incurring heavy debt in case of crop failure. Sometimes they pay with their own lives, as illustrated earlier.

Farmers also note that the use of chemical fertilisers and pesticides has created several new negative environmental impacts. They believe that the use of chemical fertilisers results in the loss of natural fertility and soil life (microbes), which in turn makes the revival of soils a difficult process. The use of pesticides impacts on the bird population and on the population of beneficial insects, leading to an increase in pests and diseases.

Insufficient and erratic rainfall

Another reason very often cited by farmers for declines in crop diversity is an increasingly erratic rainfall. Farmers fondly recall what used to be a *four month rain regime* earlier, and say that if the same pattern comes back, the diversity on their farms will also be back.

Gender, Caste, Age & Diversity

While all these perceptions regarding the benefits of diversity and the reasons for decreasing diversity emerge across various sections of the community, some fascinating variations manifest when one poses these questions to special groups like men and women, upper and lower castes, younger and older people. These trans caste, trans gender and trans generation perceptions bring out different visions of diversity and some fine nuances which may not be apparent on the surface.

In order to get a full appreciation of these issues, different participatory exercises were conducted among the following sections of the communitiy:

- Women from Dalit communities
- Women from upper castes and Dalits
- Men from a mixed group
- Young adults in the age group of 13-18

In each of these exercises, we got to see a new framework and group- specific insights into the nature and perception of different crop varieties.

PRA with Dalit Women

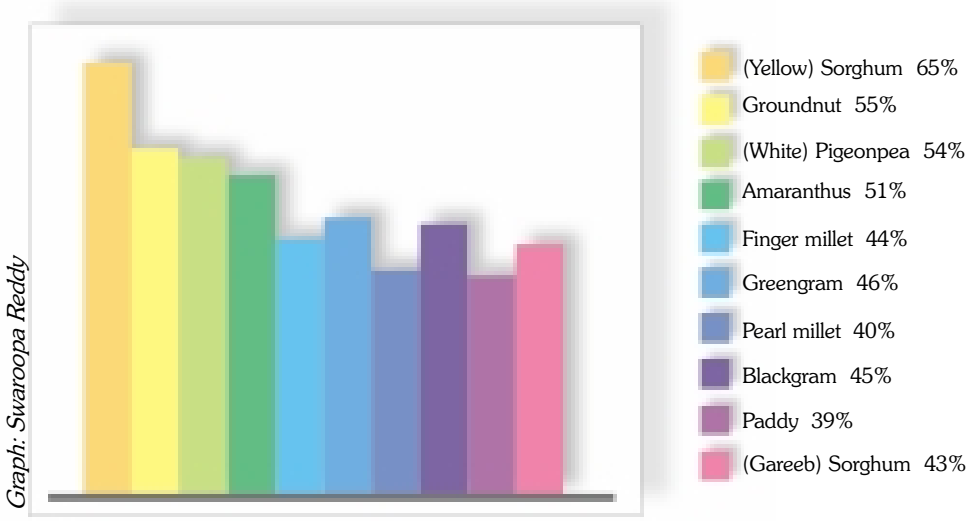
A special PRA was done with Dalit women, women belonging to socially disadvantaged classes, right at the bottom of the Indian caste hierarchy. All of them were small and marginal farmers earning less than $US1 per day. Therefore, all their perceptions came out of their long struggle with their lands, crops and lives, and the survival strategies they have evolved out of this struggle.

Twelve women who participated in this PRA scored twenty crop varieties, which they grow in *kharif*, the rainy season. These included a range of pulses,

millets, oilseeds and sorghum. Their parameters included a large variety of needs encompassing foods, fodder, fibre, ritual foods, dietary foods, employment generation, pest disease resistance, and adaptability to marginal lands etc.

In their scoring, the women made an emphatic statement that they would prefer to grow their own food crop varieties rather than cash crops. This argument is in complete variance with what is normally advocated by the policy makers, who argue that poor people must earn more money by growing commodity crops on their lands. For women of the poorest families, food security is the first priority.

Within the parameters of food security, their preferred food crop is *Pacha jonna*, the yellow sorghum, which anchors the diverse cropping system on their farms and meets most of their food and fodder needs. Though it yields less than the so-called improved varieties, women gave it the highest score.



Graph: Swaroopa Reddy

CROP CHART BY DALIT WOMEN... Sorghum leads all the way

On the other hand, *Voma*, Bishop's weed, which is grown primarily for cash and does not promote diversity, received the least score. At one stroke, the women

demolished the market logic by voting heavily for food crops and diversity, and produced a sharp and eloquent argument in favour of agrodiversity.

PRA with a Mixed Group of Women

Another PRA with women from both Dalit and higher castes produced another vision of diversity. This PRA was designed to start a dialogue between Dalit women, who suffer not only from their inferior social status but also from their position of being economically disadvantaged, and the higher caste women. The higher caste women are large farmers in the village. Their land holdings are at least eight to ten times larger than that of Dalit farmers. In terms of soil quality, the fertile lands owned by upper caste farmers are at least four times superior to the quality of marginal and low quality lands owned by the Dalits. Another important difference is in terms of irrigation. While 90% of upper caste farmers have irrigation on their lands, less than 10% Dalit farmers can afford it.

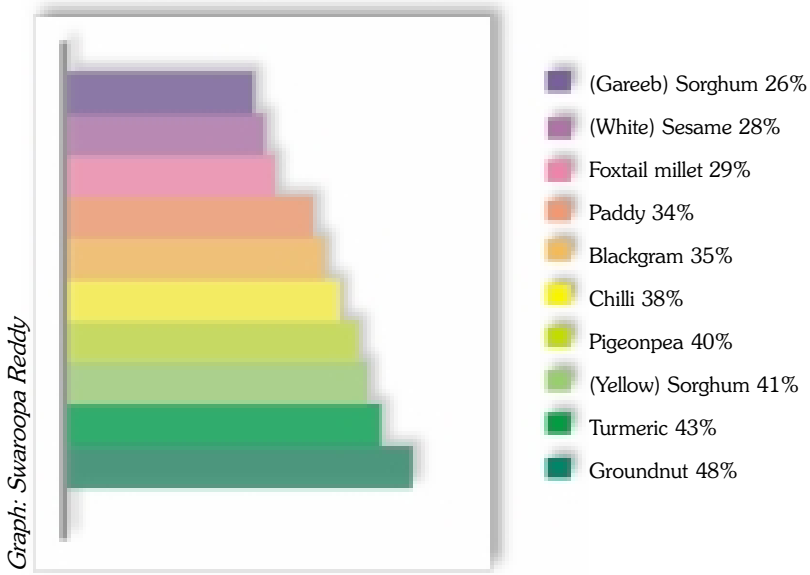
Photo: P V Satheesh

PRA WITH MIXED GROUP OF WOMEN... Unique gender bonding

In view of this wide socio-economic and agronomic differentiation between Dalits and upper castes, an interface between the women from these two sections of the community to understand their own positions vis a vis agro-biodiversity seemed exciting.

When this interface was organised, the expectations did come true. Twenty women, 30% of whom belonged to upper castes participated in this PRA. The critical differences came as expected in the crop varieties put in for analysis. The very first differences emerged when the upper caste women introduced cash crops like cotton, turmeric and ginger into the crop matrix.

For Dalit women, cotton was an anathema. Cotton is a high-input crop unlike their tradition of low-input farming. In fact, in the Zaheerabad region, Dalit women had initiated a vigorous campaign in 1994 against growing cotton because they perceived cotton as a crop which denied them continuous wages, food and fodder, besides inviting new pests into their farming system. As a



Graph: Swaroopa Reddy

RANKING CHART BY MIXED GROUP WOMEN... Cotton finds no place

result of their campaign, cotton cultivation had come down by at least 80% in their villages. Turmeric and ginger both need irrigation. And for dalits, they are farther than their most distant dreams. Therefore, all the new crops that were put on the matrix had very little relation to Dalit farming.

In spite of these apparent divergences born out of their belonging to different castes, there was an unique gender bonding when the results of the PRA came out. Transcending their caste and class barriers, the women heavily voted in favour of *Pacha jonna*, the food crop anchoring diversity. And cotton came last. In their ecological vision, the women had blurred their caste and class distinctions.

But the cultural dissimilarity, however, was not so easily forgotten. The most interesting part of the PRA came when a high caste woman declared that a minor millet like Proso millet was of no use in rituals. She was squarely challenged by the Dalit women who said that Proso millet was constantly used by them in their rituals. But the upper caste women maintained that Proso millet was used in the worship of devils and not gods. For Dalit women, there was very little distinction between gods and demons. For them, both represented supernatural powers, and it was this manifestation of a power beyond them that they worshipped. Therefore, whether a grain was used to worship a demon or a god, it hardly made a difference to them.

The argument took on all nuances of the social backgrounds that women came from. For Dalits there are no superior or lesser gods. But the upper caste women have a hierarchical understanding of gods. The minor millets do not serve their superior gods, so it was not in their matrix. But the Dalits insisted that it should find a place in the matrix. This fascinating perception of crops brought a new dimension to the role of crop diversity in people's culture.

Where Men Differ

While caste could not substantially separate women, gender does seem to have some impact on the perception of crops. A number of very interesting

results produced by an exclusive men's PRA defined these differences. The major variations between men's and women's ranking of crop varieties were as follows:

Photo: P V Satheesh

DIFFERING GENDER VISIONS... Men look at crops somewhat differently

- *Pacha jonna*, the yellow sorghum which was ranked highest by women in an earlier PRA, was relegated to the third place by men.
- While women had recognised *Pacha jonna* as a fertility-enhancing crop, men do not agree with that perception. They did not identify *Pacha jonna* as a soil fertiliser.
- Pigeonpea, according to them, is the best crop in terms of improving soil fertility.
- For women, *Gareeb jonna*, is a crop that responds to hunger. For men this quality is not important. For them it is an *inferior grain* because it cooks into a black-looking bread and hence occupies a lower position on their matrix.
- Whole Jowar cooked as 'rice or porridge did not find any favour with men. This is a question of status. If you have to eat a cooked wholegrain, it has to

be rice which looks white and shining. Jowar does not have these qualities. It is yellowish and looks soggy when cooked whole. Therefore men do not like it. But for women, this does not make a difference. Jowar, when cooked whole is a nutritious grain and therefore they gave it a good score.

- Men do not find any value in pickling Amaranthus. But to women this food has a very important value and hence it gets a good score.
- Women place a very high value on the ritual uses of the grains. In men's matrix, ritual use does not find any place in the parameter axis.
- Crops that do not demand high moisture have a great worth for women. In their coping strategy women very highly value crops that can be grown easily in their semi arid rainfed farming environments. To men who normally are known for chasing mirages, this particular quality has no appeal and hence they did not employ this parameter in their PRA.
- Disease proneness of a crop was an important parameter for women who highly rank the crops which are less disease/pest prone. For some reason, men did not.

Diversity and the Young

A PRA with young boys and girls aged 12-18 years old, regarding their knowledge about local crops and uses was very interesting.

Fourteen of them were girls while six were boys. It was amazing to see the wealth of information and experience that these children had about the local cropping systems.

When they listed out the number of crops that they knew, what emerged was a long list. This included several varieties of

Greengram	[*pirki, ganga, balinta, chemki, bandari, pilli, theega*]
Pigeonpea	[*white, red and black],*
Chickpea	[*black, white, neella and red],*
Sorghum	*[red, white, pyalala, thoka, suvarna, neela and yellow],*

Peanuts	[*chinna, pedda and neela],*
Wheat	[*katte, boda, mullu, neela*
Horsegram	[*white and black]*
Sugarcane	*[basat, 8014, bodhan, nalla, 419, yerra, manchi -pottelu punnamma*]
Chilli	[*doddu and sanna*]

The list also included sesame, niger, greenpeas, lathyrus, lentils, safflower, linseed, coriander, field beans, cowpea, foxtail millet, cucumber, little millet, two varieties of hibiscus, sunhemp, maize, bishop's weed, barley, mustard, ginger, turmeric, onion, paddy [*nalla, yerra, budda*], mustard, potato, sweet potato, carrot, garlic, and finger millet.

Most of the children seem to be able to recognise the distinctive qualities/ features of each of the sub-varieties. Their experience also ranges over the entire gamut of agricultural operations in the region – ploughing, transportation and application of farm yard manure, sowing, intercropping, weeding, harvesting, threshing, winnowing...

When asked about the reasons for growing various crops [what does one get out of raising these crops?], the answers varied from the simplest functions to complex ones.

Greengram: For making *daal*, for allowing the pod mix to become the fertiliser for the farm, as feed for the livestock, for roasting the grains, for keeping aside a part of the harvest as a seeds for the next season, and as special nutritive food for new mothers.

Pigeonpea In addition to producing a tasty *daal*, it is used to prepare a special dish for festivals, *polelu*. It is also used as a special diet for convalescents to make *rotis*, to burn dried stalk as fuel wood, as thatching and fencing material, for making brooms…

Lathyrus	Creepers are fed to bullocks to give them extra strength.
Chickpea	Used in many special dishes- *jilebis, laddus*, etc - in addition to *daal*, for using the dried pod refuse in seed storage, for feeding buffaloes, for extra milk production, as a vegetable (its green leaves)...
Sorghum	Used in *rotis*, the stalk as dry fodder, the grain popped on special occasions like *Nagula Panchami*, as fuelwood, as fencing/thatching material...

The children have not yet suffered a loss of knowledge. The fact that they all come from poorer farming families, where they are a part of the family work culture did help. At the end of the PRA, there was a sense of hope that the young people would certainly be able to carry forward the mantle of agrobiodiversity in their agriculture if only they are allowed to do so and are not derailed by formal education, where these issues do not figure at all.

Biodiversity Festival

Through the PRAs, focus group discussions and individual interviews, an enormous amount of data on the understanding and perceptions of farmers on agrobiodiversity was collected. Once we had reflected on the experience, we realised it was time to share the findings with other farmers and develop a larger, regional perspective on agrobiodiversity. We chose to do so in a celebratory manner through a festival or *jatra*.

The *jatra* was built on a large open space measuring about five acres. At the centre of this space, a typical winter agricultural farm was created with all its diversity. On both sides of the field were erected enclosures created out of natural materials like grasses and reeds which are byproducts of crop diversity.

The seed room was a proud exhibition of the diversity of seeds in this region. Over 85 seeds representing various crop species and sub species of millets, pulses and oilseeds grown in the area decorated the room. On display, alongside the seeds were various methods of traditional ecological storage in woven baskets and large earthern pots.

The exhibitions were designed to share the findings of the study with about 4000 women and men who came in their traditional style on carts, tractors and with local village bands playing in attendance.

This process became evident in the interaction between the visiting farmers and their ecological sisters when they visited the seed rooms, looked at the variety of seeds exhibited and spoke to the women farmers who accompanied the exhibits. In this interface, information flowed freely on lost seed varieties, cropping patterns and the rationale behind them.

In another enclosure the interaction was much more direct and intense. Here six women from the DDS family who have maintained a vibrant diversity on their farms displayed the crop varieties they have planted this season and explained the reasons for their planting and the designs they have followed. A specially made music video which talked about the on-farm diversity practised by women had the viewers engrossed.

Photo : Daniel Buckles

BIODIVERSITY FESTIVAL... Providing a cultural context

The Ritual Room provided the cultural context for this diversity through the recreation of some outstanding agricultural festivals and rituals observed by farmers in the Deccan. These rituals manifest the deep reverence of the farmer for her soil and her livestock. They included *Penta Pooja,* the worship of compost heap, *Chaviti Pooja,* the worship of the farming tools on the most auspicious festival called the *Ganesh Chaviti* and *Erokka Punnam*, the day when farmers reverentially worship their plough bullocks.

The last of the reconstructed rituals was the *Endlugatte punnam*, the most delightful celebration of biodiversity in the Deccan. For the women, the

reconstructed rituals clearly established the link between their farms and crops and their cultural milieu.

Exhibition of traditional recipes and wild greens in another part of the *jatra* also established a lively dialogue and fond responses.

Organised like a typical cattleshed including the shepherd's high bed, the livestock enclosure displayed the wide variety of local breeds of cattle. There were small ruminants like goats and sheep and an amazing variety of local poultry, which are progressively becoming an endangered species raising alarm in biodiversity circles. The variety of local breeds, the local fodder and their diversity came back to the women as a shadow from the past.

And finally, the room where all the women who attended the *jatra* came together to discuss their impressions. This was the time to recall the issues raised in the *jatra,* discuss the economics of their kind of ecological agriculture and contemplate the way ahead.

Their discussion was facilitated by a team of traditional farmers who helped the visiting groups of women farmers from the 75 DDS *sanghams* to get over their collective amnesia about the enormous wealth of traditional seeds and cropping systems they have in their region. They also exchanged their own perceptions about the diversity in their farms.

During the three days of the *jatra* about 5000 women farmers participated in this discussion. At the end they were doubly convinced of the strength of their traditional cropping system and in chorus pledged:

"All of us will grow traditional crops on our lands"

Every evening in the *jatra* was a cultural evening with many troupes and performers presenting their songs and dances. Videos on ecological agriculture and biodiversity were also screened and discussed.

On the third day of the *jatra*, about 2000 women farmers and hundreds of guests from South Asia formed a human chain around the designed farm at the centre of the *jatra* site and took a pledge:

We pledge that we will continue to preserve and promote diversity on our farms
We pledge that we will ban chemicals from our farms

As the pledge continued to reverberate in the air, the Using Diversity research in the Deccan had reached an active conclusion.

It established that farmers have an unique perspective on their agro biodiversity. The women are eager to retrieve the lost diversity on their farmlands because they instinctively understand that such a retrieval of diversity is to regain their traditional control over their crop germplasms and their intellectual leadership in their communities.

What they need is a recognition and respect for their knowledge systems and increased research work on rediscovering the strength of their biodiversity based farming system.

Annexure

ANNEXURE I

Details of PRAs Done for the Study

PRA 1

Participants : A group of Dalit women, most of them farm labours and small landowners

Location : Village Pastapur, Zaheerabad Mandal, Medak District, Andhra Pradesh, India

Date : October 10, 1997

Theme: Certain rituals related to seed selection and testing; Celebrating diversity on land

Names of Participants **:**

Ms Khanjamalpur Ratnamma
Ms Hulgera Yellamma
Ms Cheelamamidi Laxmamma
Ms Ranjhole Tuljiamma
Ms Humnapur Laxmamma
Ms Raikode Gangamma
Ms Cheelamamidi Adivamma
Ms Nagwar Narsamma

PRA 2

Participants : A group of children and young adults, both boys and girls aged between 12 and 19 years

Location : Village Pastapur, Zaheerabad Mandal, Medak District, Andhra Pradesh,India

Dates : September 26 and 29, 1997

Theme: Children's understanding of the crop diversity in the region , their characteristics and uses

***Names of Participants*:**

Ms Algole Narsamma
Ms Kuppanagar Fatima
Ms Mariampur Sangeetha
Ms Chinna Hyderabad Syamala
Ms Algole Anasuya
Ms Zaheerabad Sumalatha
Mr Mamidigi Vijay Kumar
Mr Gunjoti Raju
Mr Singitham Balraju
Mr Nagwar Vinay Kumar
Mr Pastapur [Leader] Narsimlu
Ms Algole Sukeertha
Ms Kuppanagar Tasleem
Ms Chilkapally Yashoda
Ms Ranjhole Ananda
Ms Algole Mogulamma
Ms Pastapur Narsamma
Mr Shamshuddinpur Janardhan
Mr Gunjoti Sudhakar
Mr Singitham Devadas
Mr Pastapur [Perma] Narsimlu

PRA 3

Participants : Mixed group of women and men from different caste groups, landless people to land owning people

Location : Village Humnapur, Nyalkal Mandal, Medak District, Andhra Pradesh, India

Date : March 22, 1998

Theme: On seeds, seed varieties, diet-related aspects of various crops, land types

PRA 4

Participants : Mixed group of women and men from different caste groups, landless people to land owning people

Location : Village Boppanpally, Jharasangham Mandal, Medak District, Andhra Pradesh, India

Date : April 7, 1998

Theme: On seeds, seed varieties, diet-related aspects of various crops, land types

PRA 5

Participants : Mixed group of women and men from different caste groups, landless people to land owning people

Location : Village Khan Jamalpur, Raikode Mandal, Medak District, Andhra Pradesh, India

Date : April 4, 1998
Theme: On seeds, seed varieties, diet-related aspects of various crops, land types

PRA 6

Participants : Mixed group of women and men from different caste groups, landless people to land owning people
Location : Village Hoti - B, Zaheerabad Mandal, Medak District, Andhra Pradesh,India
Date : May 19, 1998
Theme: On seeds, seed varieties, diet-related aspects of various crops, land types

PRA 7

Participants : Mixed group of women and men from different caste groups, landless people to land owning people
Location : Village Rechintal, Nyalkal Mandal, Medak District, Andhra Pradesh, India
Date : May 30, 1998
Theme: On seeds, seed varieties, diet-related aspects of various crops, land types

PRA 8

Theme : On seasonality, on trend changes in agriculture and reasons for it, on crop diversity, on chemical and non-chemicial agriculture
Location : DDS Farm Science Centre, Village Didgi, Zaheerabad Mandal, Medak District, Andhra Pradesh
Dates : April 19, 1998 : with Kalmela women farmers - 50 women, all castes
April 21, 1998: with women farmers from Anekunta and Lachinayak tanda villages
April 22, 1998 : with women farmers from Eedulapally village
All castes, but small and marginal landowners; a few who were landless. 50% of Anekunta women were tribal women from the Lambada community

ANNEXURE 2

PRA with Dalit Women

Date: August 29, 2000
Venue : Village Pastapur, Medak District, Andhra Pradesh
Theme : Matrix ranking of diverse crops grown on their fields
Participants :

1. Laxmamma, Humnapur
2. Ratnamma, Humnapur
3. Sammamma, Bidakanne
4. Masangari Narsamma, Pastapur
5. Laxmamma, Cheelamamidi
6. Yellamma, Hulgera
7. Poolamma, Yedakulapalle
8. Swaroopamma, Yedakulapalle
9. Bagamma, Narsapur
10. Nagamma, Ranjhol
11. Balamma, Raikode
12. Ratnamma, Khan Jamalpur

All these women belong to socially disadvantaged classes at the bottom of the Indian caste hierarchy. All of them were small and marginal farmers.

The objective of their PRA was to rank in a matrix, a variety of crops grown on their fields.

Photo : P V Satheesh

A DIFFERENT VISION OF DIVERSITY: Dalit women rank their crops in a matrix

The crops included the following:

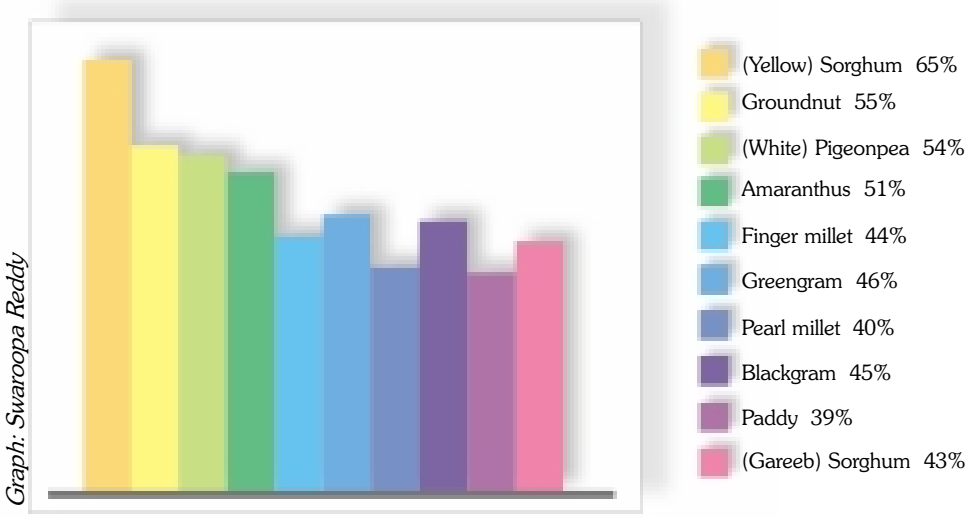
1. Yellow sorghum
2. White pigeonpea
3. Amaranthus: (two varieties)
4. Cowpea
5. Horsegram
6. White sesame
7. Foxtail millet
8. Sorghum [*Gareeb]*
9. Little millet
10. Niger
11. Greengram
12. Blackgram
13. Proso millet
14. Finger millet

15. Pearl millet
16. Groundnut
17. Paddy
18. Kodo millet
19. Bishop's weed

The parameters included the following use of crops:

1. Bread making
2. Fodder
3. Cattle feed
4. Fuelwood
5. Pulses
6. Fencing/thatching
7. Soil fertilitisation
8. Oil
9. Fibre
10. Green leafy vegetables
11. Seasoned food
12. Ritual foods
13. Rice
14. Pickling
15. Health/convalescence
16. Porridge
17. Commercial value
18. Wages creation
19. Pest/disease resistance
20. Non-moisture demanding
21. Non-soil fertility demanding

The women used a scale of five for their evaluation of the crops using five as the highest score and zero as the lowest. Every decision was preceded by extensive discussion. Sometimes they needed to vote their choice.



Graph: Swaroopa Reddy

CROP CHART BY DALIT WOMEN... Sorghum leads all the way

In consultation with each other, they placed a certain number of stones on the prescribed box against each crop.

When their complex scoring was over they started analysing it. What emerged was a result which was strongly in favour of food crops and diversity.

Yellow sorghum, which anchors the diverse cropping system on their farms, got the highest score. Bishop's weed, a cash crop which does not promote diversity and has no food value receded to the last position.

The women demolished market logic and produced a sharp and eloquent argument in favour of agrodiversity.

ANNEXURE 3

PRA with a Mixed Group of Women

Date : August 29, 2000

Venue : Village Pastapur, Medak District, Andhra Pradesh

Theme : Matrix ranking of diverse crops grown on their fields

Participants :

1. Tirupathamma, Pastapur
2. Anjamma, Pastapur
3. Paramma, Pastapur
4. Lakshmamma, Pastapur
5. Tuljamma, Pastapur
6. Parvathamma, Pastapur
7. Nagamma, Ranjole
8. Santoshamma, Ranjole
9. Suremma, Edakulapalli
10. Poolamma, Edakulapalli
11. Balamma, Raikode
12. Yellamma, Hulgera
13. Manemma, Devarampalli
14. Sankaramma, Devarampalli
15. Chandramma, Bidakanne
16. Sammamma, Bidakanne
17. Ratnamma, Humnapur
18. Lakshmamma, Humnapur
19. Manemma, Khanjamalpur
20. Lakshmamma, Chilamamidi
21. Pedda Narsamma, Pastapur
22. Bagamma, Narsapur

As a part of the research design, a PRA was done with a mixed group of women : some high caste women who represent richer farming families and some from the Dalit castes representing the socially and economically marginalised sections of society.

In the fragmented economic and social structure of the Deccan villages, the Dalits represent the poorer sections of the society depending upon marginal and degraded lands for their agriculture and wage labour for their livelihoods. The upper castes own larger pieces of better lands and occupy the higher echelons of the socio-economic strata in the rural society.

In the present PRA, the expectation revolved around a different perception of agrobiodiversity that might be brought into the study by the high caste women who represent a different farming segment.

Right from the beginning this fact became evident. The high caste women introduced a set of new crops into the matrix. They included cotton, turmeric and ginger. All of them cash crops and were absent from the matrix done by the Dalit women earlier. Turmeric and ginger are irrigated crops and can only be cultivated by better off farmers

Photo : PV Satheesh

HIGHER CASTE WOMEN IN A PRA ON CROP MATRIX:
*D*ifferent visions, varied understanding

who can afford irrigation. Since most dalits are economically disadvantaged, they cannot afford to acquite irrigated sources. Hence, in their crop vision irrigated crops find it hard to find a place. Cotton is a high input crop and therefore cannot be practised by poorer farmers. This explains the absence of these crops from the matrix of Dalit women while the high caste women can bring it into their matrix.

The high caste women also introduced a few additional parameters into the matrix. Use of crops for rituals was a new parameter which did not find a place on the Dalit matrix. In the religious hierarchy, the higher caste people celebrate more rituals and use a number of worship materials. Therefore, for them the use of crops in rituals becomes quite significant. This factor also dictates the presence of biodiversity on their farms.

The way this was represented in the matrix was fascinating in itself. In the parameter axis a woman put a stone, decorated it with ritual colours and worshipped it to install divinity into

Photo : PV Satheesh

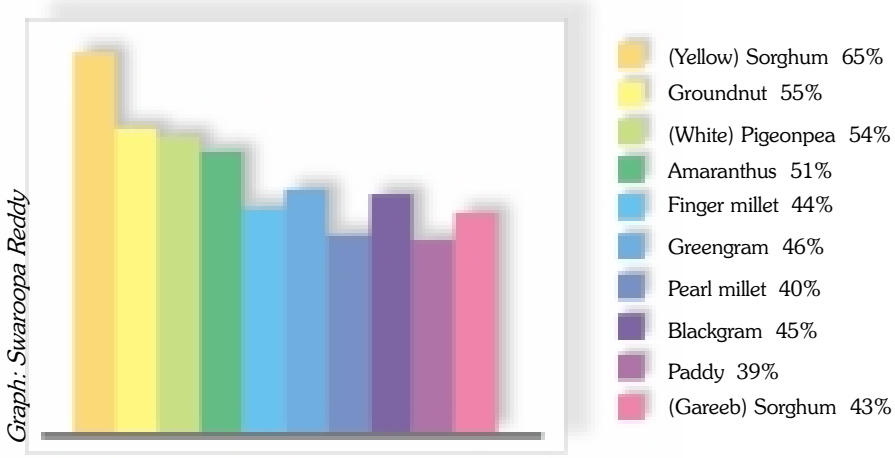
A HIGH CASTE VISION OF CROPS:
Cotton and turmeric, two major commodity crops find a place in the matrix

the humble stone. This installed divinity was totally real for all the participating women and no one took it as only symbolic.

As the PRA progressed, the upper caste women began to put their stamp on it. They give *korra*, foxtail millet only two marks while the dalit women, in their PRA had accorded it a very high score. In contrast, the upper caste women gave higher score to cash crops, known as male crops in this region.

One of the most interesting arguments came when a high caste woman declared that a minor millet like prose millet was of no use in rituals. She was squarely challenged by the Dalit women. The argument took all the nuances of the social backgrounds that women came from. For Dalits there are no lesser gods. But the upper caste women have a hierarchical understanding of gods. The minor millets do not serve their superior gods. This fascinating perception of crops brought a new dimension to the role of crop diversity in people's culture.

Nevertheless, when the final count was done, sorghum still reigned high. In spite of social and economic divisions between the two sets of women, there existed a common gender bond when they looked at the intrinsic quality of crops. Cotton, which is a monocrop, is hated by both sections. They strongly felt that cotton serves a very narrow purpose of cash earning. It has no use for man or animal. Moreover it ruins the soil. In their ecological vision of agriculture, the women transcended their caste and class barriers.



Graph: Swaroopa Reddy

CROP CHART BY DALIT WOMEN... Sorghum leads all the way

ANNEXURE 4

PRA with Men

Date : August 31, 2000
Venue : Village Pastapur
Theme : Men's perception of traditional crops/varieties
Participants :

Kummari Anjaiah, Indore
Golla Naganna, Nagwar
Begari Sangappa, Hulgera
Golla Hanumappa, Pastapur
Shadul Saab, Raghavapur
Golla Anjanna, Shamsuddinper
Begari Ramappa, Hulgera
Chinna Penta Reddy, Pastapur

Photo : PV Satheesh

DIFFERING GENDER VISIONS:
Men and women look at crops somewhat differently; Men at a PRA for Crop Matrix

Crops Evaluated

1. Sorghum [Seven varieties : *Rikka Pacha, Tella Malle, Thoka, Gundu, Erra, Atta Kodendlu*, *Gareeb*]
2. Pearl millet [Two varieites: *Local, external*]
3. Greengram [Five varieties: *Ganga, Kitki, Manchi, Balinta, Chamki*]
4. Pigeonpea [Five varieties: *White, Black, Medium, Red, Spotted*]
5. Foxtail millet [Three varieties: White, Red and Black]
6. Paddy [Four varieties: *Nalla budda, Tella budda, Porka and Erra*]
7. Groundnut [Two varieties: Small and Big]
8. Sesame [Two varieties: White and Black]
9. *Dollichos lablab* [Three varieties: Black, Red and White]
10. Cowpea [Two varieties: White and Red]

11. Horsegram [Two varieties: Black and White]
12. Finger millet [Two varieties: Red and White]
13. Proso millet
14. Little millet
15. Kodo millet
16. Niger
17. Amaranthus [Two varieties: Black and Red]
18. Maize
19. Castor [Two varieties: Big and Small]

Parameters Evolved

1. Medicinal/convalescent
2. Seasoning
3. Cooked as bread
4. Porridge
5. Pulses
6. Cooked as rice
7. Fodder
8. Fuel
9. Feed
10. Fertility for soil
11. Fencing/thatching
12. Ritual food
13. Commercial value

Results

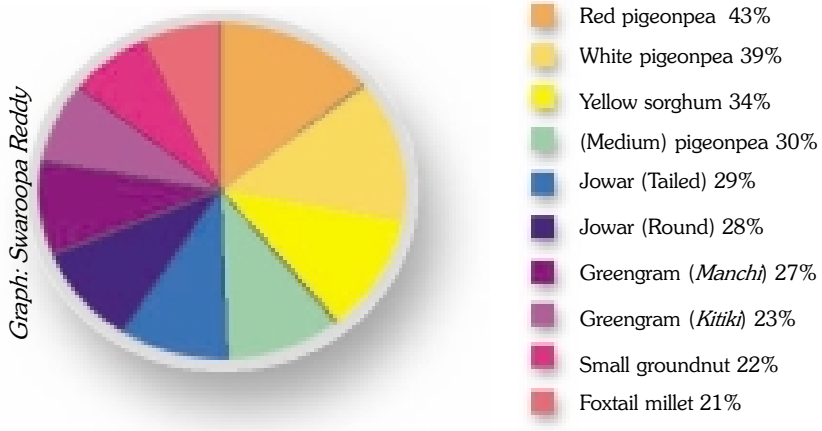
- Men rated pigeonpea highest
- The variety chosen by them among the pigeonpea vareities to head the table was the red variety. Contrary to expectation, this rating was because of the better taste of this variety though the white vareity commands higher market value. The men see an added value in this variety for its use as fuelwood, convalescent food and cattlefeed, as well as its role in enhancing soil fertility
- Interestingly, higher yield which is normally said to attract men's preferences, did not entice men when they ranked *Thoka jonna*, a variety of monsoon sorghum higher than *Gundu jonna*, another sorghum variety which in terms of grains, yields much higher

Differneces in the Perceptions of Men and Women

- *Pachajonna*, the Yellow sorghum which was ranked highest by women in an earlier PRA, was relegated to the third place
- While in an earlier PRA women had recognised *Pacha jonna*, the monsoon sorghum as a fertilising crop, men do not agree with that perception. They did not score for *Pacha jonna* for fertilising soil

- Pigeonpea according to them has the highest fertilising property
- For women, *Gareeb jonna*, is a crop that responds to hunger. For men this quality is not important. For them it is an *inferior grain* and hence occupies a lower position on their matrix
- *Jowar* cooked as a rice did not find any favour with men. Again a question of status. But for women, all jowar can be cooked as rice and gets a good score
- Amaranthus did not find value as a pickle for men. For women this is a very important value and hence gets a good score
- In an earlier PRA, women had placed a very high value for the ritual use of the grains
- Crops that do not demand high moisture had great value for women. In their coping strategy women value very highly those crops which can be grown easily in their semi arid rainfed farming environments. Therefore, non moisture demanding crops had a higher value for them. For men who normally are known to chase mirages, this was no consideration when they evolved the parameters
- Disease proneness of a crop was a parameter for women who scored the crops which were less disease/pest prone. For some reason, men did not

RANKING AS A GRAPH



Graph: Swaroopa Reddy

ANNEXURE 5

Crop Matrix Details ...***report of a PRA done by the scientists of DDS with groups of women***

As a part of the study, the scientists of the Krishi Vigyan Kendra [Farm Science Centre] of the Deccan Development Society did a number of PRAs with women. This report is a detail of one such PRA on Crop Matrix.

Crop Matrix is an exercise meant to give an understanding of the different aspects of crops grown in the village and the different parameters that characterize these crops. The participants are women *sangam* members from Edulapally village. As a beginning, the participants introduced themselves along with their main occupation.

1. Mogulamma
2. Narsamma
3. Gandamma
4. Veersangamma
5. Rajeshwaribai
6. Poolamma
7. Aagamma
8. Muthamma
9. Nagamma
10. Paramma
11. Susheelamma
12. Shareefabee
13. Malanbee
14. Yahujabee
15. Raziyabee
16. Moulanbee
17. Jadabee

Most of these women work as agricultural labour, two of them as landless labour, while only one of them earns purely from agriculture without doing any labour work and one is a washer woman.

The following are the series of the questions posed to them with the subsequent questions based on a clue from the earlier questions:

- *Why not the whole village go for korra crop in kharif?*
- *What are the other crops of 'food value' and if so what is their proportion of growing?*
- *How can rainfall decide the cropping pattern of a region?*
- *What are the crops that can be grown in case the monsoon onset is late?*
- *Why do they mix two or three crops, especially under dryland conditions?*
- *What is the order of crops coming to harvest in rabi and kharif?*
- *Why cannot we harvest greeengram from all lands in black soil?*
- *If money is available in plenty what are the limiting factors to productivity?*
- *Why do crops like niger have low cost of cultivation?*
- *Can all the crops have the same weeding requirement?*
- *What are the other limitations to productivity?*
- *What are the crops that are less infested by insects?*

- *What are the pest treatment methods for highly infested crop species?*
- *How does rainfall influence the occurrence of a pest/ disease?*
- *Are good rains and good soil the only criteria for good yield, if not, what are the other parameters?*
- *Does crop distribution also depend on soil type?*
- *Does fertility differ with soil type and similarly, the crop planning?*
- *Does season have to do anything with yield?*
- *Is the quantity of yield and subsequently its market value the same for all the crops?*
- *Does yield differ from crop to crop and has it anything to do with duration?*
- *Does duration differ with crop species?*
- *Is the input and output in terms of money the same for every crop and if not, how does the cost of cultivation differ with each of them?*

After posing questions on these lines, the various issues discussed were again briefly summarized and the parameters were then characterized by them one by one. Then they were asked to represent the various parameters on another axis to which the following figures were drawn for each one of them.

Yield	A red heap representing harvest of produce
Net returns	A Rs.10 note in yellow color, as this color represents prosperity and is a symbol of auspicious occasions
Insect attack	A typical drawing of front and rear parts of the insect with middle abdominal portion
Rainfall	Dots to represents rain drops
Weeding	Figure of sickle in yellow and blue
Soil type	Spherical figures of violet to represent black soils, red for red soils and blue for waste/fallow/gravely soils
Soil fertility	Spheres of green colour to indicate fertile soils, brown to indicate black or medium fertile soils and blue circles to indicate low fertile soils
Moisture availability	A typical figure of a field in blue to represent inlet and outlet channels with moisture in between the fields
Pest treatment	A man holding sprayer with a water bucket nearby in blue colour
Hardiness	Figures of a healthy man and lean man (after drought occurs)

After this, scoring for each parameter for each crop was done by the members for all the parameters. However, as yield and net returns were positive parameters in the sense that the crop that gives highest yields in terms of quantity can be given higher points and vice-versa (the same is the case with net returns) they were the ones most

Photo : Yesu

WOMEN DOING A RESOURCE MAPPING OF THEIR SOILS AND CROPS: New visions on weeding, yields

easily done. But from the 3rd parameter starting with pest incidence much of the checking has to be done by the facilitator as they are all negative parameters (the crop having less incidence gets higher points and crop with higher incidence gets less points).

Table of Crops Grown in Different Seasons

Kharif (monsoon)	**Rabi (winter)**	**Summer**
Yellow sorghum-*Sorghum vulgare*	Chickpea-*Cicer arietinum*	Sugarcane-*Saccharum officinarum*
Sesamum-*Sesamum indicum*	Safflower-*Carthamus tinctorius*	
Foxtail millet-*Setaria italica*	Winter sorghum-*Sorghum vulgare*	
Pearl millet-*Pennisetum typhoidium*	Lathyrus-*Lathyrus sativus*	
Paddy-*Oryza sativa*	Lentil- *Lens esculentus*	
Greengram-*Vigna radiata*	Wheat-*Triticum vulgare*	
Blackgram-*Vigna mungo*	Linseed-*Linum usitassimum*	
Redgram-*Cajanus cajan*	Mustard-*Brassica juncea*	
Niger-*Guzitia abyssinica*		
Coriander-*Coriandrum sativum*		
Bishop's weed-*Trachyspermum roxburghianum*		
Sunflower-*Helianthus annus*		
Groundnut-*Arachis hypogea*		
Little millet-*Panicum miliare*		
Finger millet-*Eleusine coracana*		
Cotton- *Gossypium herbacium*		
Vegetables		

The arguments on soil and crops was further logically continued so that they farmers could arrive at the various parameters that contribute to the farming and management of these crops. The parameters fixed at the end of the discussion were

● Yield ● Returns ● Pest incidence ● Rainfall ● Intercultivation ● Soil type ● Soil fertility ● Moisture availability ● Duration ● Pest treatment ● Resistance to drought

The matrix was then chalked out with all the *kharif* crops on one axis and the parameters on another axis. The *kharif* crops were then arranged one by one based on the number of days they take for harvest irrespective of the time of sowing for which the order was as follows:

1. Korra - Setaria italica
2. Greengram - Vigna radiata
3. Blackgram - Vigna mungo
4. Sesamum - Sesamum indicum
5. Paddy/Ragi - Oryza sativa/Eleusine coracana
6. Yellow jowar - Sorghum vulgare
7. Bajra - Pennisetum typhoidium
8. Coriander - Coriandrum sativum
9. Redgram - Cajanus cajan
10. Groundnut - Arachis hypogea
11. Sama - Panicum miliare
12. Niger - Guzitia abyssinica
13. Sunflower - Helianthus annus

Scoring

After this the participants started scoring for each crop based on the above parameters.

Yield

The farmers were asked to score different crops based on their yielding ability irrespective of soil and management condition. Crops like groundnut, coriander, paddy and *korra* were marked by the farmers as crops that have high yielding ability as they can come up in any soil type while crops like *sama*, niger, sesamum, *bajra* and *ragi* would inherently yield less irrespective of soil and management practices. Crops like blackgram, *jowar* and sunflower would, however, have the medium range of yield. Even though greengram and redgram were treated equal in scoring, the low score for redgram is due to the pod borer attack and its requirement for high and equidistributed rainfall, while in the case of greeengram it is the soil type which hinders its yielding ability.

Net Returns

Based on the market value of these crops, the order of the crops is:

● *Coriander/redgram* ● *Sunflower/sesamum* ● *Greeengram* ● *Blackgram/groundnut* ● *Jowar* ● *Paddy* ● *Sama/Niger/Bajra/Korra* ● *Ragi*

The lesser market price for minor millets is one of the discouraging factors for decrease

in its cultivation and is mainly grown for household requirements which fairly suggests that these farmers do believe in their nutritional qualities.

Pest Incidence

When this point was discussed, farmers expressed that except for redgram and sunflower pesticides were not used for other crops. However, the differentiation still exists among the various crops in scoring, as they are affected by pests and diseases of minor importance. Crops which are not infected by pests and diseases are given maximum points. They are in the following order

- *Korra*-absolutely pest and disease free
- Ragi-absolutely pest and disease free
- Paddy-affected by a disease that leads to chaffy grains
- Bajra and *sama*- infected by bugs after formation of inflorescence
- Sesamum and niger-infected by aphids at eary stages
- Greengram-affected heavily by aphids at early stage
- Blackgram-affected heavily by aphids at early stage
- Sesamum and niger- infected by aphids at early stages
- Groundnut and coriander-infected by leaf spots
- Redgram and sunflower-heavily infected by Heliothis and wilt

Rainfall

This parameter is mainly interpreted as the number of rains required for germination, establishment and moisture requirement over the crop period. It also indirectly hints at the water requirement needed for the various crops. From the scoring made, the order is:

- Korra- needs lesser rains and moisture
- Sesamum-lesser compared to *korra*
- Niger- requires rains much higher than sesamum and *korra*
- Jowar/bajra/groundnut/redgram/*sama*-require higher moisture and more number of rains and are of longer duration
- Greengram/blackgram/sunflower-require higher amount of moisture in the soil upto harvest for good yields
- Paddy/*ragi*-these are the crops which require higher amount of rains, soil moisture and if provided, a lesser degree of submergence

Weeding

The ranking of various kharif crops based on the number of weedings needed for each crop, time of weeding and the amount of weed infestation varied with crops.

- Sama and niger-do not need weeding
- Blackgram and sesamum-need one weeding
- Greeengram, *bajra*, coriander,sunflower and *ragi*-need one or two weedings but second weeding is an optional one.
- Jowar-needs two weedings
- Redgram-needs two weedings
- Korra and groundnut-need two compulsory weedings
- Paddy-needs more than two weedings

Soil Type

This parameter was mainly tried out to know the adaptation of different *kharif* crops in different soil types (black, red, red gravelly, slopy lands, sandy soils, red clay loams). Crops which will come up well in all the soil types were given higher scoring and vice-versa. The order is:

- Yellowjowar, *bajra*, groundnut, redgram and niger- these crops will grow well in any kind of soil and the yield depends only on fertility and depth of soil
- Safflower and *sama*- come up well in all soils except in gravely and rocky soils
- Sesamum and *korra*-come up well in all soils except sandy soils
- Paddy+*ragi*, coriander-come up only in soils that has good soil depth and hold more moisture. Black soils are more preferable
- Greeengram and blackgram-black soils are highly preferred by these crops

Soil Fertility

Soil fertility forms one of the important parameters for crop distribution. Some crops need higher fertility of the soils while some of them can come up well even under marginal and low fertile soils. The lower the fertility requirement of a particular crop, the higher is the scoring given to such a crop as it would be highly advantageous for a dryland farmer to curtail his manuring requirement and reduce the cost of cultivation, thereby improving his cost benefit ratio. This kind of an analysis further leads to better crop planning based on soil fertility and brings marginal, fallow and waste lands under cultivation. The ranking given to crops based on the scoring is as follows:

- Sama, niger, *korra*- are capable of coming up under marginal fertile conditions and need no special manure or fertiliser for their growth
- Greeengram, blackgram, sesamum, *jowar, bajra,* coriander require medium fertile lands and also fertiliser input upto one bag of fertiliser or 30 cartloads of manure
- Paddy, ragi, groundnut, redgram, sunflower-require either highly fertile soils or fertiliser and manure inputs on a larger scale mainly due to their longer crop duration

Moisture Demand

This parameter mainly gives us information on the water requirement of the crops in their whole crop growth period. The higher the water requirement of the crop, lower would be its scoring and vice-versa. The order hence would be:

- Niger, *korra*, sesamum, coriander and *sama*-all these crops have least water requirement and will come up well with the first two to three rains at the start of monsoon season
- Jowar, bajra, sunflower, blackgram, greeengram require higher amount of soil moisture than minor millets and require more than two to three rains for their establishment after germination and for their subsequent growth
- Paddy/ragi, redgram, groundnut- require more number of rains during their crop growth to ensure higher amount of soil moisture

Duration

Crops also differ with respect to the duration as early crops are harvested within three months while other crops are harvested after six months. However, the shorter duration would definitely help the dryland farmer as he could go for more number of crops in a given season and could best utilise soil moisture to its maximum extent, hence the higher points of scoring to such crops:

- Korra comes to harvest within three months
- Greeengram, blackgram-come to harvest after *korra* and has a slight higher crop duration compared to it.
- Sesamum, *jowar*, paddy/*ragi, bajra*, groundnut, niger, sunflower- all these crops have slightly higher crop duration (four months)
- Coriander, sama- need more than four months for their harvest
- Redgram-needs six months for its harvest

Pest Treatment

Pest treatment is not done for most of the crops except for redgram, groundnut, coriander and sunflower. Hence all the other crops were given more or less equal scoring. The crops which are effected by aphids were given a scoring of nine. The order is:

- Korra, greeengram, *jowar, sama, ragi* are not affected by any of the pest or disease and absolutely no treatment would be done
- Blackgram, sesamum, paddy, niger, *bajra*-may be slightly affected by aphids, wilt, non-filling of grains, but no treatment would be done

- Sunflower, groundnut, coriander, redgram - affected by pests like pod borer, leafspots and pesticide would be sprayed for such crops

Hardiness

- This parameter was based on the assumption of the crop survival under drought conditions when soil conditions are unfavourable and temperatures are too high. Out of all the *kharif* crops, the following are the ones with some element of hardiness in them:
- Korra, *jowar, bajra,* niger would survive after thinning
- Sama and *ragi* could survive even if the cut slips of the plant were transplanted after uprooting from the original place

	Pest incidence			Moisture need			Soil quality						Fertility needs			Duration			Hardi-ness		Weeding		
Crops	F	M	H	L	M	H	All soils but deep	All soils except sandy	All soils except rocky	Prefer black soils	Prefer deep soils	Only black soils	L	M	H	S	M	L	H	M	N	L	H
Korra	X			X				X					X			X				X			X
Ragi	X			X		X				X					X		X		X			X	
Paddy		X				X				X					X		X						
Bajra					X		X							X			X			X		X	
Sesame		X						X									X					X	
Groundnut		X				X	X								X		X						X
Coriander		X								X				X				X				X	
Niger		X			X		X						X				X			X	X		
Sama		X				X			X				X				X		X		X		
Pigeonpea			X				X								X			X					X
Sunflower			X												X		X					X	
Sorghum					X		X							X			X			X			X
Safflower									X														
Greengram												X		X		X					X		
Blackgram												X		X		X					X		

Crops of Truth

The globalisation of agriculture presents a new challenge to Indian agriculture, forcing the policy circles to look for a market solution to the problems brought in by the WTO regime. Consequently, there would be more investment in technofixes through increased mechanisation, consolidation of land holdings, installation of corporate agriculture, and displacement of over 20 million small and marginal farmers from agriculture.

In contrast, the inherent strengths in the traditional internal input based, low resource using rainfed agriculture in India can offer the country a host of natural, comparative advantages. One of the most important of such advantages is the biodiversity it supports through the ecological means of production it adopts.

Crops of Truth is a study that incorporates all these concerns and works towards defining the strengths of the traditional biodiverse agricultural systems in rainfed India, especially from the perspective of the farmers who still practice and preserve these systems and offer exciting clues for conservation and enhancement of agrobiodiversity in the region.

The invaluable role that women play in the cultivation and conservation of this biodiversity on dryland farms and their knowledge are being steadily marginalised and undermined by market forces. Unless documented soon, there is a grave threat of the extinction of this knowledge. Such a documentation and analysis of women's role and knowledge may also help to establish policy guidelines that may place women's practices at the centre of Indian agricultural policies.