Food Treasure of Tribal Community Banswara District, Rajasthan, India

LANSA
Leveraging Agriculture for Nutrition in South Asia

VAAGDHARA

INTRODUCTION

The global community is increasingly looking towards finding means of sustainable nutrition for the growing population across all countries. The emphasis is on identifying low-resource strategies acceptable to communities that do not put an unnecessary burden on the environment (Food and Agriculture Organization 1993). One suggested approach is the adoption of an ecosystem approach in agricultural management with an emphasis on traditional and indigenous coping strategies.

They predominantly depend on agriculture for their livelihood along with some contribution from forestry, and labor with minor contribution from diverse occupations. Studies have reported sub-optimal nutritional status of children and adults of this community

The tribal farmers of Banswara district in Rajasthan face a number of issues like hunger, starvation deaths, drought, and distress migration and so on. Since there is very little employment in the region, these farmers migrate elsewhere and work as labour on farms and perform other odd jobs. To help these communities to get back to farming and achieve food security, VAAGDHARA, a local NGO, has been promoting family and community based agro-ecological models of food production to help restore the crop biodiversity in the region and help women gain recognition in agriculture. The official idea of 'food security' is embedded in the supply of entitled quantities of rice/wheat (Public distribution system) from 'central pool' warehouses or provision of state-defined meals, which is based on the wheat and rice model, has never benefited the tribal farmers. By 2010, the diversity of indigenous crops by Bhil tribe in Banswara district had been reduced to 12-13 varieties. Farmers in this region decided that any alternative would have to be significantly different, and based on different ideas about food security and sovereignty, than those adopted by the PDS. With declining crop diversity, the average per capita intake of vital nutrients also declined.

Until a couple of decades ago, the indigenous Bhil community of Banswara district in the state of Rajasthan cultivated at least 25-30 different types of crops on the same piece of land. Things however changed with the advent of green revolution. With massive government promotion of the green revolution technologies through subsidies, monocultures of high yielding varieties replaced the indigenous mixed farming systems. In addition, the family also collects uncultivated food from trees around farm boundaries and forest area such as wild tubers, flowers, nuts, edible leaves and fruits. Owing to forest degradation, fragmentation of holdings, erratic rainfall patterns the area under cultivation has increased and diversity among crops has decreased resulting in decline in household agriculture productivity and loss of the indigenous seed varieties.

With LANSA's intervention, 600 farmer families resumed started focusing on crop and seed diversity. During this study food sovereignty march, focus group discussions (FGDs), key informant interviews – KII, youth interview, and elder farmer's interviews were used to assess the range of available foods and the contribution of indigenous wild foods to the regular diets of the Bhil community. Once rally was completed, the research team developed a participatory learning and action frame-work which started with a tool called "what we eat: what we produce" This helped explore different issues pertaining to seasonal availability and access to different local foods. The participants identified indigenous or "*desi*" foods gathered from the local environment and classified them in following categories:

1) *Tree based (jungle*), Farm boundaries, bunds, or gardens
2) *Bari* or kitchen garden
3) Cultivated.

The foods identified were categorized under various food groups based on their edible parts. A list of commonly consumed indigenous food items was compiled (including cereals, legumes, vegetables, leafy vegetables, seeds, fruits, and animal foods).

During the whole process of research, gradually with time food items continue joining the list. By this time community identified;

Table 1 Different categories of listed vegetation and their local names

Leafy vegetables:	Dhimda, dhimdi, rajan, lunkiya, imali, cow-pea, poi, methi, palak, dandi, rati bhindi, ambadi,
Green Vegetables:	Jhumka tori, serial tori, ghia-tori, tindori, chichari, chibadi, marela, pumpkin (4 varieties), okra local, bhata,
Weeds	Vanajua, lunkiya, puwariya, satadi, garmela, gonda
Fruits:	Timru, Ber, Jhad Ber, Khajur, Rayan, Imali, Mango, Ram-fal, Guava, Custard-apple, Jamun, Keekar, Banana, Papita,
Legumes:	Valore (6 varieties) Jalar, black-green gram
Paddy	Pathariya, kalikamod, jeera, colama, dhana-har, danger, desi-basmati, bijali and mal kamod
Millets:	Bavta (Finger Millet), kang (Fox-tail millet) hamlai (little millets), cheena (porso millet), Kuri and Kodra
Tubers	Arabi, ratalu, garadu, hakariyo, amba-haldi, haldi (turmeric), adu (Gingr), ambahaldi (white-turmeric)
Flowers:	Palash, gulmohar, mahua, kachnar,
Chicken	Kadaknath, desi, buter, teetar
Nuts	Bandar Bati, Ber,
Makka	Sathi-makka, gangadi makka, pohata makka
Bulbils	Kanda-gola (air potato)

Some of them have been tested for their nutritive values, local names, identification characteristics, mostly scientific names, choices, tolerance, seasonality and methods of use.

Taking Action

This documentation process enriched us in understanding the nature, environment, food and related culture of the Bhil tribe, but for the community it resulted in improved diet diversity. In the beginning, it was more at a knowledge level. During rainy season, couple of tubers and leafy vegetables and during summer, some fruits were included in the diet. Women could recall some of the recipes and practices that were almost forgotten.

Preservation activities like drying of leaves, *Badi* made from dried leaves and wet grinded pulses etc., appreciated and included back in the diet. On the basis of these experiences, a capacity building module Participatory Learning and Action PLA) module was developed focusing on nutrition sensitive farming system (NSFS) and tested with 30 groups of average 20 women each.

Along with ex-situ preservation, initiatives were taken up for propagation of identified diverse crops for Monsoon, winter nd summer three crop seasons. For example, plantation of local varieties of ramfal, mango, guava, jackfruit etc. were taken up in the homestead, cultivation of bavta, kang, and air potatoes was revived in 30 villages

LEAFY VEGETABLES

Leaf vegetables, also called **potherbs**, **greens**, **vegetable greens**, **leafy greens**, or **salad greens**, are plant leaves eaten as vegetables, sometimes accompanied by tender petioles and shoots. Although they come from a very wide variety of plants, most share a great deal with other leaf vegetables in nutrition and cooking methods of cooking. Nearly one thousand species of plants of edible leaves are known, but hardly few of them are in use in a specific region. Leaf vegetables most often come from short-lived herbaceous plants such as amaranth, spinach, coriander etc. Leaves of woody plants are also eaten as vegetables such as drumstick, kachnar etc.

Communities have used leaves as food since time immemorial. Different types of leaves, depending from the place and the season, were part of the human diet since prehistoric times. With the passing of the centuries many of those traditional leaf vegetables have been replaced by leaves that are more tender, have a more neutral taste or that are considered more refined. The leaves that were part of ancient traditional diets are still to be found in the wild, sometimes at the edge of cultivated fields, or homesteads. Tribal regions like Banswara are places where one can find such trees and plants still around and communities using them as vegetables more frequently than other regions.

Unfortunately many of such plants are also called weed, As per standard definition a **weed** is a plant considered undesirable in a particular situation, or "a plant in the wrong place and a very appropriate example for this is dandelion, a common plant found all over world especially Asia, Europe and America, many a places it is considered as a weed in some context like grass lawn, but in other contexts it is used as a leaf vegetable or herbal medicine.

Besides cultivated, nurtured and collected food items from agriculture field, pastures, and kitchen garden, there are a good number of plants which are used by tribal community in the area as food items. Study team also came across many families, who are involved in drying and processing many leafy and other vegetables, during monsoon months and store them for dry summer months to supplement micro nutrient requirements of those periods.

Goddess PARVATI - APARNA

Tribal and other communities in India worships goddess Parvati, who is wife of the Hindu god Shiva - the protector, the destroyer and regenerator of universe and all life. One of her name is Aparna, the one who lived her life on leaves only. There is one ancient story associated with her life, indicating that once she observed continued fasting for longer duration and during those days she consumed leaves and only leaves. This ancient story also reiterates that leaves can play important role in nutrition, as it had done for Parvati giving her name "Aparna"

This section brings out some of the commonly found leafy vegetables of tribal Banswara, as listed in Table-2.

Table 2 Various leafy vegetables of the Banswara district

SL NO	Name of the food item	Genus	Species	English name	Season
1	*Channa leaves*	*Cicer*	*arietinum*	Saag	Rabi
2	*Chiel*	Chenopodium	Album	Bathua	Rabi
3	*Dhimda*	Amaranthus	Viridis	Amranth	Annual
4	***Rajan***				Annual
5	*Imali flower*	*Tamarindus*	*india*	Tamarind	Perennial
6	*Garmela (Mor)*	Celosia	Argentia	Silver cocks	Kharif
7	*Garmela (fleaf)*	Celosia	Argentia	Silver cocks	Kharif
8	*Gunda (mor)*			Cordia	Perennial
9	*Punwariya*	Cassia	Tora	Cassia	Multiple
10	***Bokna***				**Kharif**
11	*Ambadi-Lal*	Hibiscus	Cannabinus	Sorel	Kharif
12	*Ambadi-Hara*	Hibiscus	Cannabinus	Sorel	Kharif
13	***Vanajua***				**Rabi**
14	*Kachnar*	*Bauhinia*	*verigata*	Kachnar	Perennial
15	*Tindorei ke dere*	Trianthema	Monogyna		Annual
16	*Chavle ke dere*	Vigna	*unguiculata*	Cow-pea	Annual
17	*Pyaj ke patte*	Allium	Cepa	Onion	Annual
18	*Lahsun ke patte*	Allium	Sativum	Garlic	Rabi
19	*Ghuiya Patte*	Colocasia	Anti-quorum	Colocasia	Kharif
20	*Malan Bathua*				Rabi
21	*Karinjada*				Annual
22	*Sarso ka Saag*	Brassica	Juncea	Mustard	Rabi
23	*Sahajan*	Moringa	Olifera	Drumstick	Rabi
24	*Sathadi*	trianthema	monogyna	Punarnava	Annual
25	*Sathadi*	Bauhinia	Purpurea	Punarnava	Annual
26	*Dhimdi*	Amaranthus	Gangeticus	Amranth	Annual
27	*Luniya*	*Portulaca*	*Olerecea*	Purselane	Annual
28	*Sakar kand saag*	Ipomea	Reptans	Sweet potato	Kharif
29	*Palak*	*Spinacia*	*oleracea*	Spinach	Rabi
30	*Methi*	*Trigonella*	*foenum*	Fenugreek	Rabi
31	*Muli Patta*	Raphanus	Sativus	Radish pods	Rabi
32	*Sarso*			Mustard	Rabi

Kachnar Lear	Chandloi	Sahajan	Luniya	Karinjada	Ariv Patta

Punwariya	Sakarkand-Red	Hakariya	Spin-Dhimda	Satadi-red	Chiel Bathua

DHIMADI –DHIMDA-RAJAN

These are locally found green leafy vegetables commonly consumed by majority of tribal families fresh particularly during monsoon months and dried for off-season. Normally they are not cultivated rather collected from commons around homestead lands, but continued interaction during the study made good number of farmers to start growing them as part of kitchen garden.

Dhimadi

Dhimda

Rajan

It grown as an uncultivated leafy vegetable found in southern Rajasthan. Normally plant height is about 2 to 3 feet and radius of a full grown plant will be around 1 to 1.5 feet. It produces good number of seeds which are black color highly shining. Considering the popularity of these two leafy vegetable, among tribal families, particularly tribal dominated blocks of Kushalgarh, Sajjangarh, Gagad talai, Ghatol and Anandpuri,

Nutrients	Dheemdi	Spinach
Carbohydrate	62gm	3.6gm
Dietary Fiber	14gm	2.2gm
Sugar	3gm	0.4gm
Protein	13gm	2.9gms
Sodium	221mg	79mg
Potassium	3680.52mg	558mg
Vitamin C	47%	34%
Thiamine (B1)	0.32mg	0.078mg
Riboflavin (B2)	0.21mg	0.189mg
Vitamin B12	2.06mcg	0
Calcium	28%	10%
Zink	5.72mg	0.53mg
Magnesium	1572.84mg	79mg
Phosphorus	80.90mg	49mg

Nutritional benefits

VAAGDHARA undertook nutrition analysis and compared them with common spinach as given in table below and results show astonishingly higher quantity of different minerals and vitamins. Normally cooking is carried out by boiling in water and discarding water so as to remove oxalate and pungent smell it carries. Both these leafy vegetables are member of renowned family of "Amranthus", which is known as miracle food. Our research found out that it is called *A. viridis* is an annual herb with an upright, light green stem that grows to about 60–80 cm in height. Numerous branches emerge from the base, and the leaves are ovate, 3–6 cm long, 2–4 cm wide, with long petioles of about 5 cm. The plant has terminal panicles with few branches, and small green flowers. There occur other lesser used varieties of similar leafy vegetables with minor variations.

Satadi_White

Bokna

Luniya

Rati Bhindi

Pyaj ke patte

GREEN VEGETABLES

During the whole research programme team came across a large number of green vegetables, grown in the area. Some uncommon vegetables which are not marketed and consumed mainly by tribal families are listed in table-3.

Table 3 List of vegetables identified by community during the study as source of nutrition

SL NO	Name of the food item	Genus	Species	English name	Part consumed	Season
1	*Kikoda*	*Momordica*	*dioicia*		Fruit	Kharif
2	*Valore*	Dolichos	Lablab	Field beans	Fruit	Rabi
3	*Chhodi valore*	Dolichos	Lablab	Broad beans	Fruit	Rabi
4	*Mooli phal*			Radish pods	Root	Rabi
5	*Barbatti*	Vigna	Sesquipedalis	Cowpea pods	Fruit	Kharif
6	*Kandagola*	Dioscorea	Bulbifera	Tubers	Tuber	Kharif
7	*Ratalu*	Dioscorea	*Spp*	Tubers	Tuber	Kharif
8	*Garadu*	Dioscorea	*Spp*	Tubers	Tuber	Kharif
9	*Amar Kanda*	Dioscorea	Bulbifera	Spring	Fruit	Kharif
10	*Bandar Bati*	Holoptelea	*integrifolia*	Kind of fruit	Fruit	Perennial
11	*Safed-Kaddu*	Cucurbita	Maxima	Pumpkin	Fruit	Kharif
12	*Bada Kaddu*	Cucurbita	Maxima	Pumpkin	Fruit	Kharif
13	*Lal batti*	Cucurbita	Maxima	Pumpkin	Fruit	Kharif
14	*Chir boti - Makoi*	*Solanum*	*nigrum*	Kind of fruit	Field	Kharif
15	*Umbar*	*Ficus*		figs	Fruit	Perennial
16	*Ber*	Zizyphus	Jujube	Zizyphus	Fruit	Perennial
17	*Timru*	Diospyros	Melanoxylon	Kind of fruit	Fruit	Perennial
18	*Mahua*	Madhuca	Latifolia	Mahua, ripe	Fruit	Perennial
19	*Karounda*	Carissa	Carandas	Kind of fruit	Fruit	Perennial
20	*Dori tel*	Madhuca	latifolia	Mahua oil	seed-oil	Perennial
21	*Mahua*	Madhuca	latifolia	Alcohol	Mahua	Perennial
22	*Alu*	Solanum	tuberosum	Potato	Stem	Annual
23	Marela - round	Momordica	dioicia	Bitter gourd	Fruit	Kharif
24	*Karela Long*	Momordica	dioicia	Bitter gourd	Fruit	Kharif
25	*Changeri*	Oxalis	corniculata		Leaves	Annual
26	*Til*	Sesamum	indicum	Sesamme	Grain	Kharif
27	*Keekar*	pithecellobium	dulce	Tamra-Manila	Fruit	Spring
28	Amba Haldi	Curcuma	aambaa	whiteTurmeric	Tuber	Kharif

		
Jhumka Tori (ridge gourd)	*Bhanwar lat (*Fava beans*)*	*Kachari*
		
Batti Kaddu - Pumpkin	Lattu Tori (Sponge Gourd)	*Bel Tamatar* (Cherry Tomato)
		
***Desi Bhindi* (Local Okra)**	***Valen Kakari* (Cucumber)**	***Kaddu* – Pumpkin**
		
***Marela* – (Bitter Gourd)**	***Kikoda***	***Radish***
		
Tori (Ridge gourd)	***Hara Kaddu (Green Pumpkin)***	***Petha (Bhura Kola)***

CEREALS AND PULSES

In vagad people used to say "*genhu chhor makka khana, vagad chhor kahi nahi jana*" meaning we will maize instead of wheat but will not go from this place. This tag line has its roots in food system of Banswara which was synonymous with general food habit where maize was the main constituent of diet. But during study, exercise on what family ate within last three days, situation has changed and wheat has become major consumed food grains, thanks to public distribution system. Majority of other food grains which were part and partial of human food culture also moved from plate and reached to list of fodder (Table-4).

Table 4 List of indigenous food grains that were cultivated in Banswara region as part of food culture.

SL NO	Name of the food item	Genus	Species	English name	Season
1	*Pathariya (75 days)*	Oryza	Sativa	Rice varieties	Kharif
2	*Kolamba (90-100 days)*				Kharif
3	*Kali Kamod (120 days)*				Kharif
4	*Dimani (dhan)(90 days)*				Kharif
5	*Desi Basmati (105 day)*				Kharif
6	*Mal Kamod (75 days)*				Kharif
7	*Jeera (105 days*				Kharif
8	*Dhana har (90 days)*				Kharif
9	*Sathi-White(60-70 days)*	Zea	Mays	*Makka* (Maize)	Kharif
10	*Gangadi-Safad (90 days)*				Kharif
11	*Pohata - mix color(75days)*				Kharif
12	*Pili makka*				Kharif
13	*Jwar -lal*	*Sorghum*	*aurdinacium*	Sorghum	Kharif
14	*Jwar-Safed*	*Sorghum*	*aurdinacium*		Kharif
15	*Kuri*	*Panicum*	*sumatrense*	Little millet	Kharif
16	*Kodra*	*Paspalum*	*scrobiculatum*	Kodo millet	Kharif
17	*Cheena*	*Panicum*	*miliacium*	Porso millet	Multiple
18	*Kang*	***Setaria***	*italica*	Fox tail millet	Kharif
19	*Bavta*	Eleusine	Coracana	Finger millet	Multiple
20	*Samali- small*	Panicum	Miliare	Little millet	Kharif
21	*Sama - Large Size*			Little millet	Kharif
22	*Gehu- Lokwan*	*Triticum*	*sativum*	Wheat	Rabi
23	*Gehu-Vajiya(un irrigated)*	*Triticum*	*sativum*	Wheat	Rabi
24	*Gehu-Vajiya*	*Triticum*	*sativum*	Wheat	Rabi
25	*Jau*	*horduem*	*vulgare*	Barley	Rabi
26	*Jai (fodder)*	*Avena*	*sativa*	Oats	Rabi
27	***Tuar - lal***	***Cajanus***	***Cajan***	**Pigeon pea**	**Kharif**
28	***Tuar - Safed***	***Cajanus***	***Cajan***	**Pigeon pea**	**Kharif**
29	***Tuar - Gujarati***	***Cajanus***	***Cajan***	**Pigeon pea**	**Kharif**
30	***Jalar***			**Field beans**	**Kharif**
31	***Chana -Kala Bada***	***Cicer***	***arietinum***	**Gram**	**Rabi**
32	***Chana - Chhota***	***Cicer***	***arietinum***	**Gram**	**Rabi**
33	***Urad - Kale***	***Vigna***	***Munga***	**Black gram**	**Kharif**
34	***Mung-Khotadiya & creeper***	***Vigna***	***Radiata***	**Green gram**	**Multiple**
35	***Masoor- chhota***	***Lens***	***culinaris***	**Green gram**	**Rabi**
36	***Batli & Matar***	***Pisum***	***sativum***	**Pea**	**Rabi**
37	***Barbatti***	**Vigna**	**Sesquipedalis**	**Cow-pea**	**Kharif**
38	***Safed Chavla***	**Vigna**	***unguiculata***	**Cow-pea**	**Kharif**

MAIZE OF BANSWARA

In the agriculture map of India, tribal region of Banswara is known as producer of maize and green gram. It is also known for maize diversity. During the study we came across four varieties of maize, depending upon color, plant height and crop duration. There are local variations, but need in-depth genetic diversity mapping, which was beyond the scope of this study. Table-5 gives general information about these varieties.

Table 5 commonly found varation os local maize varieties in the Banswara area.

Features	SATHI	Yellow	Pohata - Mixed	Gagandi (White)
Photos			No photo available	
Plant Height	**2 to 3 feet**	**6-7 feet**	**3-4 feet**	**5-7 feet**
Water Demand	* * *	* * * * *	* * * *	* * * *
Cropping Period	**60-70 days**	120 days	**90-100 days**	**90 days**
Grain Type	**Thick**	Slim	**Slim**	**Broad**
Grain Colour	**White & Yellow both**	Yellow with red grains	**White and yellow**	**White**

Among tribal communities of Banswara consumption of maize itself has huge diversity Maize consumption among the tribal. It starts from eating soft grains of fresh corn; roasted corns, steamed corn, different varieties of bread (*paratha, bati, bafla, roti, paniya*), porridge, sweets (*laddu, kheer, jajriya*), vegetables (grated corn, corn grains), *ghat* and *rab (a preparation of curd and maize flour - based on fermentation)* to name some, again there are local variation. In the life, livelihood and food culture of tribal maize has a special place.

PADDY (RICE) OF BANSWARA

In India, Rajasthan is known as a dry state, a place of desert, but as against the common image of state, the district of Banswara is different because of it receiving highest rainfall in the state. During this short study and limited interaction VAAGDHARA could locate eight varieties of paddy in the district of Banswara, if continues we may come across higher degree of genetic diversity of traditional upland and low land paddy. The most interesting varieties from the area is *Dhana-har* which has round shaped grains and resembles like seeds of coriander thus named accordingly. Another variety is yellow-rice which yields yellow color when cleaned using water. *Kalikamod* is named so after its colour i.e. black (both out and inner coat). Dhimani is the variety which looks like wheat grains through smaller in size. The analysis of three samples of rice from area is given in table-8 gives interest findings that it carried the carbohydrate, protein, iron, sodium and potassium the important nutrients. In this area rice is consumed as Khiadi (porriage of rice and pulse), *Kheer* (sweet dish cooked out of rice and milk)

Table 6 Rice varieties from Anandpuri block of Banswara

Features	*PATHARIYA*	*COLAMBA*	*MAL KAMOD*	Dhimani
Photo – Paddy			No Photo Available	
Plant Height	60-75 cm	80-90 cm	80-90 cm	80-90 cm
Period	**90 days**	**120 days**	**90-100 days**	**120 days**
Outer Coat	**Brownish - Black**	**Brownish Red**	**Yellow-Brown**	**Brownish Red**
Inner Coat	**Red**	**Maroon Red**	**Brownish**	**Maroon Red**
Grain Colour	**White**	**White**	**White**	**White**
Grain Type	**Thick**	**Slim**	**Slim**	**Oblong**

Table 7 Rice varieties from Banswara but more common in Bagidora block

Features	Desi BASMATI	JEERA	Dhana-har	*KALI KAMOD*
Photo – Paddy				No Photo Available
Plant Height	60-75 cm	75 -85 cm	80-90 cm	75 -85 cm
Period	**90 days**	120 days	**120 days**	120 days
Outer Coat	**Brownish - Black**	Black	**Brownish Red**	Black
Inner Coat	**Red**	Black	**Maroon Red**	Black
Grain Colour	**White**	Greenish	**White**	Greenish
Grain Size	**Thick**	Slim & Small	**Round**	Slim

Table 8 Nutritional values as per test carried out during study

100 Gms	Pathariya	Kali kamod	Columba
Total carbohydrate	**79 gm**	**80 gm**	**77 gm**
Protein	**9 gm**	**8 gm**	**12 gm**
Iron	**11%**	**9%**	**ND**
Sodium	**18 mg**	**14 mg**	**25 mg**
Potassium	**31.52 mg**	**57.46 mg**	**58.99 mg**

MINOR MILLETS

Millets are a group of highly variable small-seeded grasses widely grown around the world as cereal crops or grains for fodder and human food. These crops are hardy and quite resilient to varied agroclimatic adversities and play important role in marginal agriculture more common in hilly and semi-arid regions as important source of food grain as well as highly valued fodder. Many kinds of traditional foods and beverages are made from these grains in different regions and hence have important role in the local food culture. Nutritionally, they have high micronutrient content, particularly calcium and iron, high dietary fibre, higher amount of essential amino acids and low glycemic index and thus play an important role in the food and nutritional security of the poor. However, their presence in the Indian food basket had been declining over the years primarily due to wheat and rice being available at subsidized rates. These species are neglected in research and development and are not receiving the policy support they need and rightly deserve. This neglect is also causing the marginalization of farmers who have been traditionally depending on these crops for their food security and income. However, there is an increasing recognition of their favourable nutrient composition and utility as health food, in the context of increasing life style diseases. Thus, apart from their traditional role as a staple for the poor in the marginal agricultural regions, they are gaining a new role as crops for healthy food and for the urban high income people. The IFAD supported project "Enhancing the Contribution of Nutritious but Neglected Crops to Food Security and to Incomes of the Rural Poor: Asia Component – Nutritious Millets" was a good attempt in this direction.

In the Banswara region though millets are known, but grown to limited extent, mostly for fodder purpose except for *kang* (Fox-tail millet) and *Bavta* (Finger millet) by few families.

Local Name	*Common Millet Name*	*Purpose*
Bavta	*Finger*	*Human*
Kaang	*Foxtail*	*Human*
Cheena	*Porso*	*Fodder*
Hamlai	*Little*	*Fodder*
Kuri	*Brown top*	*Fodder*
Kodra	*Kodo*	*Fodder*

BAVTA/MAL (FINGER MILLET)

In other regions it is also known as some other names like Madua, Ragi, Nagali etc. Its botanical name is **Eleusine coracana**

It is an annual herbaceous plant widely grown as a cereal crop. It seems finger millet is a crop which binds whole world into one. It is rain fed, although yields often can be significantly improved when irrigation is applied. Heat tolerance of finger millet is high.

Nutritional benefits: It was so because of vitamin-C, B12, calcium, iron, potassium and magnesium. It is especially valuable because of presence of methionine, an amino acid, which is lacking in the diets of hundreds of millions.

The grain is ground and cooked into porridge, bread, papar, sweet, and many other preparations. Sometimes few people used it *Kheer* (sweet cooked with milk, grain and sugar). The straw from finger millet is used as animal fodder. Some people do make a flavored drink in festivals.


KANG (FOXTAIL MILLET)

Botanical name- Setaria italic



In some places they are also called kangdi. It is comparatively more common in tribal land of Banswara, as it is cultivated as mixed crop with maize in some low grade agriculture fields. It is an annual crop belonging to grass family but grown for human food and animal fodder. It has a slim, vertical, leafy stems which can reach a height of 120–200 cm. It is a warm season crop, typically planted in late spring. Its early maturity and efficient use of available water make it suitable for cultivating in dry areas.


On account of nutritional benefits it is a rich source of vitamins-A, many a people mixes it with white maize as their staple food. Besides it also provides vitamin-C, B1, B9 and B12 (which is rare in plant food).

CHEENA (PORSO MILLET)

Botanical name- Panicum miliaceum

Cheena is an annual grass whose plants reach an average height of 3 feet. It has a short growing season and low water demand. It is cultivated in rainy and spring season. It can be grown in different soil conditions. In this area it is mostly grown for the fodder purpose, but human consumption also.

Nutritional benefits: Rich in Sodium, Dietary Fiber, Vitamin A, C, B1, B3 and B12. Its USP is in its high content of Iron. In tribal preparation Cheena is cooked into porridge and bread. Sometimes few people used it *Kheer* (sweet cooked with milk, grain and sugar)



KURI (BROWN TOP MILLET)

Botanical name- Urochoa ramosa

Kuri is grown by tribal farmers but as fodder crop. It is cultivated on sloping marginal lands with rocky, shallow soils. It is adaptable to almost all upland soil. Grains are cooked as porridge, or bread. But due to low production and laborious processing it is mostly grown as cover crop only.

Nutritional benefits: Rich in Iron (12%), Dietary Fiber (4 g), Calcium (2%), total carbohydrate (36 g), Protein 5 g, and Fat 2 g. it provides 171 calories of 100 grams. In tribal preparation Kuri is cooked into porridge and bread.

KODRA (KODO MILLET)

Botanical name- ***Paspalum scrobiculatum***

Kodra is grown mainly for the fodder purpose on sloping marginal lands with poor soil thickness because of its drought tolerance.

Kodo is composed of 12.5 grams of protein, 86 grams carbohydrates and excellent source of fiber (2.2 grams). It contains good value of calcium (14 mg) Fat (2.2grams) and Vitamin C (22%) providing 309 calories of 100 grams.

HAMLAI (LITTLE MILLET)

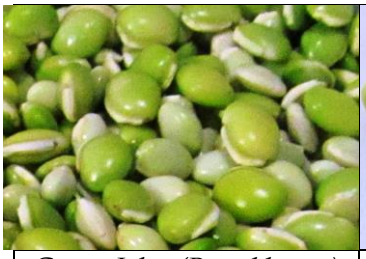
Botanical name- Panicum sumatrenes

Hamlai is grown by tribal farmers as dual purpose crop but as fodder crop on sloping marginal lands with shallow soils. Hamlai composed of 7.9 grams of protein, 69 grams carbohydrates and excellent source of fiber (8.2 grams). It contains good value of calcium (18 mg) and Iron (9.3 mg) providing 207 calories of 100 grams.

Grain are used as a boiled whole grain, porridge, or unleavened bread. It is reported to have good effect on digestions and improve women health.

PULSES AND LEGUMES

The district is also rich in pulses and legumes diversity, as given in table-2 item from srial number 27 to 38 belongs to pulse and legume family. Pigeon-pea is one which is cultivated as intercrop with maize, while cow-pea and broad-beans are cultivated as mixed cropping with it. They are consumed as vegetable, when green and hand processed to produce pulses. Nutritive analysis indicates that it is a rich source of ----------



Green-Jalar (Broad beans)

Green-Barbatti (Cowpea)

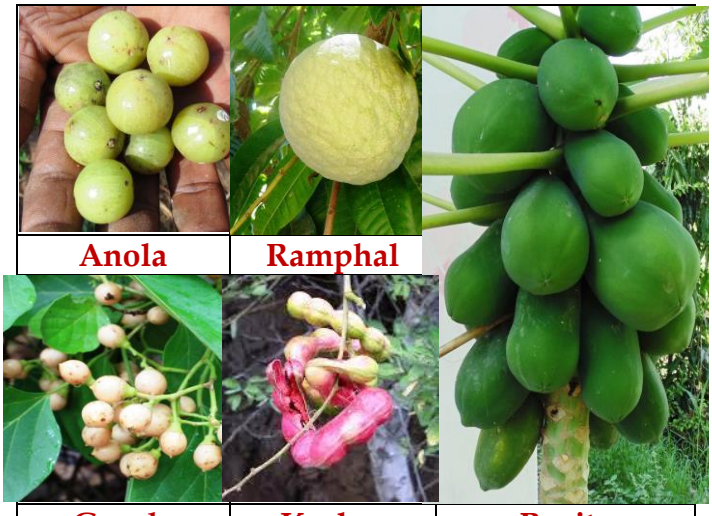
Dried Jalar grains used as Pulse

FOOD FROM TREES

Though Banswara district have very small area under designated forest, but there are small patches found spread over in the district. Trees source of uncultivated foods, like edible flowers, fruits, leaves, seeds, mushrooms, bamboo shoots, roots and forest areas also provides tubers, birds, honey etc.

In the district forest and trees provides many items mainly during summer, which are the dry months and many fruits they get before onset of monsoon, and monsoon rains spur creepers and leafy greens. Besides supporting a household's dietary needs, these uncultivated food items can also supplement family income, but in the district it is not practiced due to limited availability. Thus tribal food culture had not been limited to agriculture field only, but it includes all the spaces spread over within and around village and the homesteads. In this system food is not only cultivated but nurtured, conserved and collected also.

In the context of climate change, perennial food items could play important adaptation strategy. In this recognizing the existing and forgotten food items is important. Community listed Ber, Jhad Ber, Khajur, , , Mango, Ram-fal, Guava, Custard-apple, Jamun, Keekar, Banana, Papita,



Anola	Ramphal	
Gunda	Keekar	Papita
Rayan	Ber	Imali

KEHUNAR/KACHNAR

Botanical name : Phanera variegata

A popular ornamental tree and widely known for its medicinal preparation called "*Kachnar gugulu*", an ayurvedic preparation. It is also known in Indian literature referring someone with delicacy. In Banswara tribal people use its leaf and buds as vegetable curry with yogurt, onion and spices. It is considered as delicious and good for health.

Nutritional benefits: Rich source of sodium, iron and phosphorus.

Nutritional value per 100gm			
Total fat	2gm	Riboflavin	0.04mg
Saturated fat	1gm	Calcium	4%
Sodium	**632mg**	Iron	189%
Carbohydrate	22gm	Dietary fibers	3 gm
Protein	5gm	Zinc	8.1 mg
Vitamin A	2%	Magnesium	13.5 mg
Vitamin C	22%	**Phosphorus**	**537mg**
Thiamine (B1)	0.18 mg	Potassium	312mg
		Manganese	1.4 mg

It is a small to medium-sized tree growing to 20–40 feet, deciduous in the dry season. Leaves are 2 to 6 inch long, broad, rounded, and bi-lobed at the base and apex.

Its vegetable is prepared by boiling leaf and /buds for three to four minutes, discarding water. Later it is fried using oil and species as other curries are prepared.

KHAKHRA FUL1 (PALASH)

Palash (Dhak) flower a well-known compulsory ingredient of Holi, the famous festival of colour India.

It also has a saying "*Dhak ke Teen Pat*" Palash has three leaves only, which is an indication of situation which never changes.

During the food sovereignty march, tribal family at Jalimpura offered a decoction prepared out of palash flower, for many of the non-tribal participants it was first edible encounter with this miracle plant. Encouraged with this VAAGDHARA team tried to understand benefits of this preparation, and elderly women shared that this preparation helps in fighting heat-stroke during extreme summer time.

Its botanical name is Butea monosperma, also called **flame of forest, due to its colour and presence at the time of fall in the forest.** It is a medium-sized dry season-deciduous tree, growing to 15 m tall. It is a slow growing tree; young trees have a growth rate of a few feet per year. The flowers are 2.5 cm long, bright orange-red, and produced in racemes up to 15 cm long. Two colours are known in flowers i.e. yellow and oragnge

Leaves of this plant were traditionally used as food plates, unfortunately now those biodegradable healthy plates are replaced by non-biodegradable plastic and paper plates.

It has many medicinal uses as per Ayurveda like; seed for fighting infestation of worms in intestine and cream made of root oil as crack-cream. Other parts of plant used in many diseases i.e. diarrhea, dysentery, intestinal worms, diabetes, sore throat and in some skin disorders also.

Its resin is collected as edible –gum and considered as one of the high nutritive ingredient for food preparation for women after delivery.

VAAGDHARA, undertook nutrition analysis of Palash flowers, which indicated that it is rich source of carbohydrate, protein, dietary fiber, vitamin-C and potassium.

Nutritional value per 100gm			
Total fat	2gm	Vitamin C	12%
Saturated fat	0gm	Calcium	6%
Trans fat	0gm	Iron	12%
Cholesterol	0mg	Zinc	2.14mg
Sodium	21mg	Potassium	2392mg
Total carbohydrate	74gm	Magnesium	369mg
Dietary fibers	11gm	Phosphorus	211mg
Protein	12gm	Manganese	1.15mg

TIMRU FAL (TENDU FAL)

The movement we question about some local fruit, people will speak about the timru, but when we ask, can we get one? When you ate it last? Reply will be negative, as they are hardly available in market and rarely found in villages too.

Why it is so? Because plant is also known as Tendu and exploited more for its leaves, which are used for making, *Bidi*, a rolled local model of cigarette. Tender leaves are plucked and used for Bidi business, and over exploitation of the tree for its leaves have resulted in leaving behind its use as fruit. Now it lies in the memory of peoples who are in their fifties and sixties in semi-urban areas. In the Banswara some of the villages still have remains in the form of dying trees like the one which we came across at village Padla-Miyasa and collected 10 kilograms of seeds for propagation. Hope we will be able to revive this for the future generation also.

Encouraged with this VAAGDHARA team tried to understand benefits of this preparation, and elderly women shared that this preparation helps in fighting heat-stroke during extreme summer time.

Its botanical name is Diospyros melanoxylon which is medium to large dry deciduous tree, growing to 15 to 25 m tall. It is a slow growing tree; young trees have a growth rate of a few feet per year and takes long time to grow to producing age. The fruits are 1.5 to 2.5 inch in diameter, bright saffron colored. Its leaves are also considered as good nutritive fodder particularly for small ruminants. VAAGDHARA, undertook nutrition analysis of Timru fruits, which indicated that it is rich source of Phosphorus, Sodium, Potassium, Calcium, Magnesium, Vitamin-A and Vitamin-C.

Nutritional value per 100gm			
Total fat	0.8g	Vitamin C	1.9mg
Saturated fat	0.35g	Calcium	202mg
Trans fat	ND	Iron	1.2 mg
Cholesterol	ND	Zinc	8.5 mg
Sodium	350mg	Potassium	262mg
Total Cab	30.2g	Magnesium	123mg
Dietary fibers	NA	Phosphorus	418mg
Protein	0.62g	Manganese	4.57mg

BANDAR BATI Diospyros melanoxylon

Bandar Bati (Monkey's Nut) is a nut, which is again part of tribal culture, but now known as children's time pass, (it seems as if children are wiser than adults. Its nuts are little tricky to take out and need passion, therefore people rather prefer to leave this rich food, which monkeys knows better.

Most of the villages in the tribal dominated region including district of Banswara have these plants as part of farm boundary and wasteland. It is hardy and can grow anywhere including stony waste, as in Miyasa village. Hope we will be able to revive this for the future generation also.

Encouraged with this VAAGDHARA team tried to understand benefits of this preparation, and elderly women shared that this preparation helps in fighting heat-stroke

during extreme summer time. It is a medium to large dry season-deciduous tree, growing to 12 to 18 m tall. The fruits are flat 1 to 1.5 inch in diameter. Its fruit is very much liked by small ruminants as nutritive fodder. Nutrition analysis of nuts, indicated that it is rich source of Fat, Protein, Potassium, magnesium, Vitamin-A and Phosphorus.

Nutritional value per 100gm - BandarBati			
Total fat	51.6g	Vitamin A	45 IU
Saturated fat	14.8g	Calcium	178mg
Trans fat	ND	Iron	1.6 mg
Cholesterol	ND	Zinc	64.8mg
Sodium	10.3mg	Potassium	360mg
Total Cab	21.7g	Magnesium	290mg
Dietary fibers	NA	Phosphorus	84.6mg
Protein	21.41g	Manganese	15.7mg

MAHUA (Madhuca longfolia)

It is a fast-growing tree that grows to approximately 20 meters in height, possesses evergreen or semi-evergreen foliage. The crown is rounded, much branched. The bark is grey, vertically cracked and wrinkled, exfoliating in thin scales. The leaves are alternate clustered at the end of branchlets. The leaf blade is simple, 10-25 cm long x 6-12 cm broad, oblong-shaped, rigid, thick and firm, wooly at the lower face and exudating a milky sap when broken. Young leaves are pinkish, reddish-brown. Flowers are borne on green or pink, furry bunches, each bunch consisting of 12 fragrant cream-coloured flowers. Its leaves, and flowers are very much liked by small ruminants as nutritive fodder

Mahua flowers, fruits and leaves are edible and used as vegetables. The sweet, fleshy flowers are eaten fresh or dried, powdered and cooked with flour, used as sweetener or fermented to make alcohol. The fleshy outer coat of the fruit is used as a vegetable.

Mahua seeds yield between 35 and 47% oil, which is used as substitute for ghee. Mahua flowers are also used to produce some sweet preparations. The petals of Mahua flowers are collected and sun-dried, they are either ground to flour and used to make various kinds of breads or also fermented for produce local liquor particularly during celebrations. It is more or less inexpensive and the production is largely done in home stills.

KANDA GOLA (Air Potato)

Botanical name- Dioscorea bulbifera

It has various common names air-potato, air yam, bitter yam, cheeky yam, potato yam. The air potato is one of the most widely consumed yam species. The air potato is one of the most widely consumed yam species. Characteristics: It is a creeper which can grow up to 20-25 feet tall. The plant forms bulbils in the leaf axils of the twining stems, and tubers beneath the ground. These bulbils and tubers are like small, oblong potatoes.

Air potato has been used as a folk remedy to treat diarrhea and dysentery as it is rich source of sodium and potassium. It can be used as local medicine in treatment of conjunctivitis.

Nutritional value per 100gm -Kandagola			
Total fat	1gm	Calcium	1%
Sodium	**235 mg**	Iron	67%
Total carbohydrate	27gm	Zinc	6.02mg
Dietary fibers	1gm	**Potassium**	**697.2mg**
Protein	1gm	Magnesium	18.2mg
Vitamin A	1%	**Phosphorus**	**116 mg**
Vitamin C	2%	Manganese	4.2mg

Comparison- when compare with potato and sweet potato it contains higher levels of minerals i.e. iron, zinc, sodium, potassium and manganese. Ayurveda also refers about the use of Dioscorea as *Varahi-kanda,* a treatment for impotency.

AMAR KANDA (Air Potato)

It is another variety found locally and consumed, but by very few people from Sajjangarh block reported its availability in the area. Some people also reported that there are poisonous varieties in forest area, thus slowly-slowly people have collected edible varieties and planted them along the farm boundaries.

The tubers of edible varieties often have a bitter taste, which can be removed by boiling or roasting in wood-ash. They can then be prepared in the same way as other yams, potatoes, and sweet potatoes.

In the area two tubers Ratalu and Garadu are considered as delicacy. They are also member of Dioscorea family which are grown in the area for human consumed. Another tuber is Elephant yam which is normally collected from forest area but not cultivated.

INDIGENOUS FOOD PROCESSING

Banswara district is part and partial of humid to semi-arid agro-climatic conditions consequently during the fall (winter) and dry period (summer) there are times when it is difficult to get food items particularly vegetables and pulses, which provide micronutrients and vitamins.

At times due to more workloads they get less time for cooking, thus they have developed recipes and processing to fulfill these requirements.

Drying and storing: In order to store abundant production of some items during monsoon months to fulfill demand of green vegetables during summer months traditional tribal families follows this approach which is local called *Sukhamani* (Drying). Common Sukhamani in the area is that of leafy vegetables and some of the green vegetables are listed here.

Leafy Vegetables	Other vegetables
Chickpea, Rajan, Chiel bathua, Fenugreek, Dhimadi, Rati-bhindi,	*Okra, Kachri, Semfali,* Pumpkin, *Tenda,*

Besides drying other method for storing food items for summer months is that of making *achar, papad, papadi* and *badi.* These are some of the preparation which are part and partial of their food system.

CONCLUSION

In the context of climate change, uncultivated foods could be play important as adaptation. The multiple functions of forests need to be acknowledged such as releasing oxygen, precipitating rain, recharging groundwater, conserving fertile topsoil, buffering against droughts and floods are also about securing food for local communities.

With food security and nutrition high on the agenda, it is crucial to understand the contribution of forests and trees to a food secure and nutrition-sensitive future. 'Uncultivated' foods are not just about satisfying hunger, but about savoring the people's relationship with their immediate environment.

During the study seed requirement for re-establishing some of these crops and vegetables for adapting to indigenous food system was assessed as part of PLA exercise. A large number of seed and seeding material was exchanged by community within groups but some seeds were procured from adjoining regions also. These crop varieties were revived within one cropping season. Presently, the community-based seed bank is initiated with seeds of 100 types of indigenous plants and crops it includes millets, maize, pulses, vegetables, tubers, flowers and fruit.

Women farmers have been playing a major role in the revival of indigenous crops, management of the community-based seed banks and conservation of the indigenous agro-biodiversity. Our study demonstrates a wide diversity of indigenous foods available and consumed from the natural environment of the Bhil tribe. Specifically, a number of micronutrient rich plant foods were part of their daily dietary intake. The preferred and commonly consumed food items identified were particularly rich in iron, calcium, vitamin A, vitamin C and folate. The food items which were analyzed in the laboratory as part of the study were also found to be good sources of one or more micronutrients. The nutrient analysis of *Rajan, Dhimda, Dhimdi, saag* revealed a high iron and dietary fiber content. The local environment of the Bhil community thus presented a rich and ready source of indigenous plants that were used for maintaining good health and treating illnesses.

Due to ignorance, by large number of people in communities, these food resources are slowly-slowly at the diminishing trend. Support and advocacy for their increased consumption can be an important strategy to improve nutritional status within this tribal group. Participatory listing and identification of these foods could also be a way of building awareness among community and also helping them in identification of underutilized items and advocating their incorporation into the diet.

In the context of promoting consumption of indigenous foods for improved nutrition, kitchen gardens for cultivating these nutrient rich foods can be effective strategies.

In addition, the promotion of the continued use of these foods in the diet of the whole family rather than shifting to more "modern" diets will prevent the advance of the dual burden of malnutrition through natural means.

Secondly, the propagation of the consumption of these foods provides a buffer against the increasing displacement of traditional dietary patterns by marketed, processed foods. While, we have discussed the nutritional aspects of some of the foods items identified, an effort to take nutritional analysis of many more such items and appraise their true potential for providing improved nutritional security would be a desirable activity to obtain information on the contribution of these foods in daily diet for under privileged community in this region.

LOOKING BEYOND

This document is small but critical step towards revival of nutrient rich indigenous foods in this tribal community which could be used for quantification of nutrient intake in this community.

To the best of our knowledge, no previous study has looked at the anthropological, dietary and nutritional aspects of the indigenous foods in the tribal of Banswara in an integrated manner.

We would also like to highlight the immense scope of further study in this geographical area with such tremendous environmental biodiversity. These data could be a repository of information for botanists, agriculturists and nutritional experts alike and form a valuable resource for researchers and for the community to build upon and preserve.

Cultivated and uncultivated foods jointly help in addressing under-nutrition among small and marginal farmers. The efforts has helped initiate thought process in the minds of people. But it will rally demand for production base is regained and ecosystem is re-established, the diversity of foods can never be met.

Photo 1 Decoration made of seeds of indigenous food items of Banswara during 1st seed fair