



SEED MAPPING THROUGH PARTICIPATORY RURAL APPRAISAL (PRA)

A Step-by-Step Guide
for Documenting Traditional Varieties

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About JIVA

JIVA is an innovative programme funded by the National Bank for Agriculture and Rural Development (NABARD) supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, under the Indo-German Development Cooperation Project *Support to Agroecological Transformation Processes in India (SuATI)*. The SuATI project is implemented by GIZ together with the Ministry of Agriculture and Farmers' Welfare (MoA&FW), the Ministry of Rural Development (MoRD), and NABARD. The project is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) as part of the global BMZ Initiative *"Transformation of Agriculture and Food Systems"*.

Initiated in 2023-24, JIVA fosters agroecological transformation by adding natural farming processes rooted with agroecology principles to the existing watershed and tribal development projects. Financial support from NABARD under the JIVA programme is provided to project implementing agencies to:



Diversify crop systems with extended crop cover for a longer period



Rejuvenating biological processes



Integrating livestock and trees



Promoting natural methods of pest and nutrient management

Efficient management of rainfall and soil moisture through farmer-to-farmer learning and exchange



JIVA facilitates circular economy through recycling of crop residues, minerals and moisture, etc. as also supports enterprises for input supply and output management. Currently, the JIVA programme is being implemented by 49 Project Implementing Agencies across 20 states of India covering eight agroecological zones in vulnerable rainfed areas.

1. Introduction

Seeds are the foundation of farming communities, carrying within them generations of agricultural knowledge, cultural practice, and ecological adaptation. Over time, many traditional and indigenous varieties have gradually disappeared from farmers' fields, often without documentation or recognition of their value. This guide outlines a structured seed mapping exercise using Participatory Rural Appraisal (PRA) – a community-centered approach to document crop diversity, understand varietal trends, and identify seeds that require conservation attention. Conducted over three days, the exercise engages farmers, women, and elders as primary knowledge holders, and concludes with a community action plan for the revival and sustainable management of traditional seed systems.



2. Objectives of Seed Mapping

The objectives of seed mapping through the PRA technique are as follows:

- Documenting seed diversity over recent decades.
- Cataloguing different crops and their varieties.
- Recording seasonal patterns and land types for various crops.
- Understanding the usage and value of diverse seed varieties.
- Assessing availability and acreage of different crops.
- Identifying vulnerable crops and varieties for conservation and promotion.
- Exploring reasons behind the extinction or decline of certain varieties.
- Increasing efficiency for better utilisation of resources.
- Documenting the current cropping pattern and Package of Practices (PoP).

3. Process

Begin with a discussion with the community to arrive at a suitable time to conduct the exercise. Both female and male farmers, young and old, need to participate. Request them to bring a small quantity of seeds with them.

Generally, the seed mapping exercise is conducted over a period of **three days**.

1

Village Information, Crop Calendar Exercise (*Fasal Chakra*), Crop Trends Analysis, and Varietal Mapping

2

Four-Cell Analysis, Cropping Practices, and Seed Collection

3

Community Discussion, Evaluation, and Planning



4. Tools and Techniques for Seed Mapping

DAY 1: Village Information, Crop Calendar Exercise, Crop Trends Analysis, and Varietal Mapping

Broad Information About the Village

Before starting the Crop Calendar exercise, the following information is collected to gain a basic understanding of the village. Ask the participants to gather these details.

■ Village	
■ Panchayat	
■ Block	
■ District	
■ Total households (HHs)	
■ No. of HHs practicing agriculture	
■ Total cultivated land (in Ha)	
■ Is there a Seed Bank in the village (Yes/No)? If yes, please mention the name.	
■ No. of crops and landraces kept in the seed bank	
■ Contact person's name and contact details	

Thereafter, divide the participants into three equal groups (Group 1; Group 2; Group 3), with each group having an equal number of aged, women, and young farmers.



1. Crop Calendar (*Fasal Chakra*) Exercise

In this exercise, participants of Group 1 (for field crops) and Group 2 (for vegetables and spice crops) will participate. For examples of field, vegetables, and spice crops, please refer to the *Annexure*.

This tool helps identify sowing and harvesting times by creating a timeline of crops across months and land types. It involves organising a community meeting, drawing a crop calendar, and discussing seasonality and land usage.

Methodology

- Draw four circles on a chart paper, of which the innermost circle will be used to map rainfall, and the remaining will represent different land types (e.g. homestead, upland, midland, and lowland). Divide each circle into 12 sections, each representing a local month. The sections can be equal in size or larger for months with high sowing and harvesting activity (Figure 1).

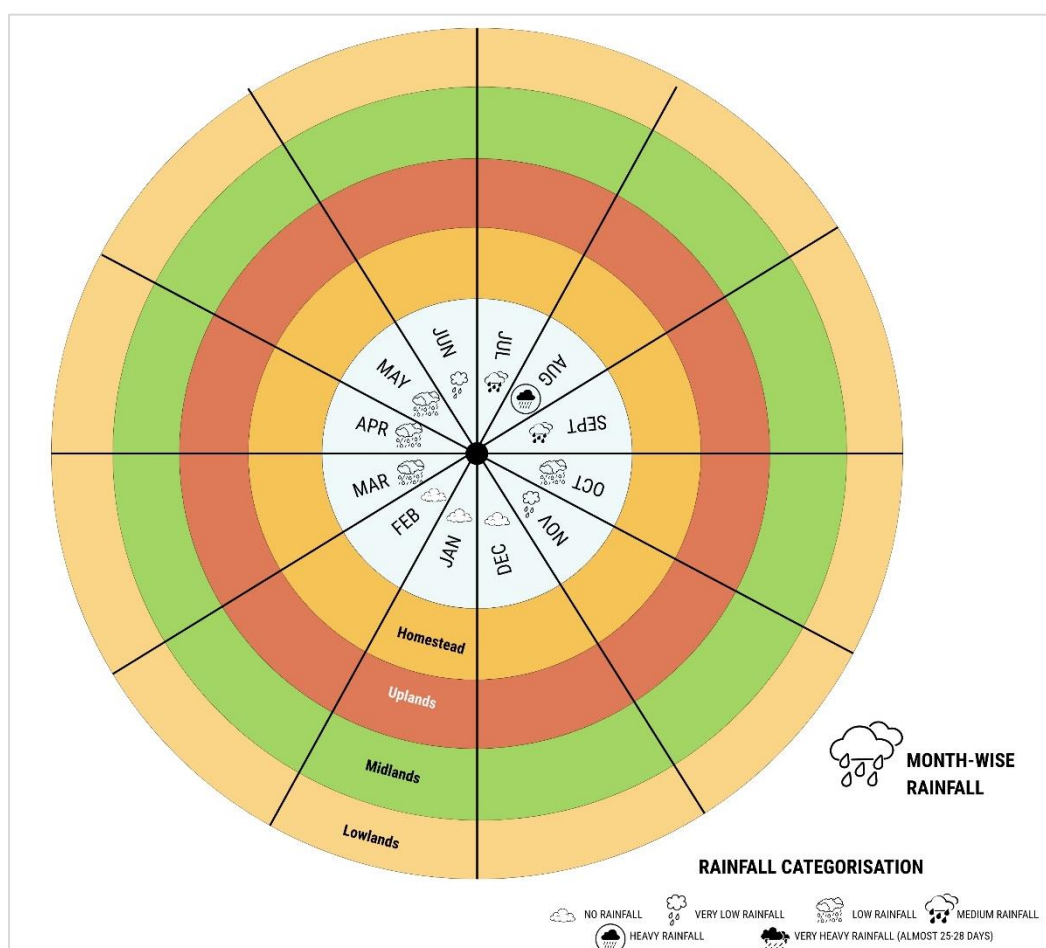


Figure 1: Crop Calendar

- Ask the participants to depict the local month-wise rainfall on the calendar in the innermost circle.
- For each crop, note the sowing and harvesting months, and place cards/seeds in the appropriate circle based on the land type and time of the year. For example, if lowland paddy is sown in July and harvested in November in lowland areas, place the lowland paddy card/seeds (if available with farmers) in the lowland circle under July for sowing, and under November for harvesting (Figure 2).

- Engage participants in a discussion to analyse the findings, helping them understand seasonality and land usage patterns.
- Ask participants to **rank the crops** according to their importance and how widely they are cultivated by farmers. Provide stones/seeds of different sizes for the ranking exercise. Participants should place a relatively large stone/seed on a crop card or seed sample to show it is very important, and a smaller stone if it is less important. For example, large seeds such as velvet beans can be used to represent the most important crops, medium-sized seeds like kidney beans can indicate moderately important crops, and small seeds such as maize can be used to represent less important crops.

Figure 2: Crop Calendar depicting sowing and harvesting months

In this exercise, participants of Group 3 (for field crops, and vegetables and spice crops) will participate. This exercise can be conducted only for important crops of that region or for each crop grown in that region. The important crops will be identified by the participants.

Methodology

- Create a table listing traditional varieties cultivated now and those cultivated 10, 20, or 30 years ago (Figure 3).
- Document reasons for extinction or decline in cultivation, and explore possibilities of reviving lost varieties.
- Engage farmers to discuss whether they would cultivate these varieties again if seeds were available.

30 वर्ष पूर्व की जाने वाली	20 वर्ष पूर्व की जाने वाली	10 वर्ष पूर्व की जाने वाली	वर्तमान में की जाने वाली
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Figure 3: Crop Trend Analysis

3. Varietal Mapping

For this exercise, two groups with an equal number of participants will be created (Group 1 and Group 2). One of the groups will conduct the exercise for field crops, and the other group will conduct it for vegetables and spice crops. Crops can be selected based on the rankings for each crop cultivated in that region.

Varietal Mapping involves creating a table to document key characteristics of major crop varieties, including the variety name, origin, number of households cultivating it, acreage, yield, special traits (such as flavour or stress tolerance), market rates, and reasons for growth or decline. This helps in understanding the factors influencing the cultivation and conservation of specific varieties.

Crop	Variety	Origin	Seed source	Purpose of cultivation: Consumption/sale/fodder/ others	Specialties/ unique traits of the landrace	Yield (quintal/ acre)	Market price (INR) /kg (Paddy)	% of HHs cultivating (roughly)	% of the area (of total cultivation)	Reasons for growth or decline
Paddy	Gobin- dobhog	West Bengal	Home saved/ market/ exchange	HH consumption/sale/fodder	Scented, good in taste	16 -18	30 -35	60%	30%	Scented, high market demand, and price



DAY 2: Four-Cell Analysis, Cropping Practices, and Seed Collection

4. Four-Cell Analysis

For this exercise, two groups with an equal number of participants will be created (Group 1 and Group 2). One of the groups will conduct the exercise for field crops, and the other will conduct it for vegetables and spice crops. Crops can be selected based on the rankings for each crop cultivated in that region.

This tool categorises crop varieties based on cultivated areas and the number of households involved. It helps identify threatened varieties (those cultivated in small areas by few households) for focused conservation efforts.

Methodology

Four-cell analysis can be conducted on the ground with real samples of the varieties/crops, or on a large sheet of paper with cards.

- Make a large cross on the ground and distinguish the four categories or squares (*Figure 4 and Figure 5*).
- The meaning of the four squares is visualised by drawing different numbers of households and large or small fields.
- The following questions are asked to the participants to gather information on varieties/crop species (name, specific traits, origin).
 1. What varieties/crops are cultivated in large areas by many households?
 2. What varieties/crops are cultivated in large areas by a few households?
 3. What varieties/crops are cultivated in small areas by many households?
 4. What varieties/crops are cultivated in small areas by a few households?
- The participating group discusses the result, with special focus on the varieties grown in small areas and held by few households, as these are the threatened varieties. The group discusses actions to increase cultivation.

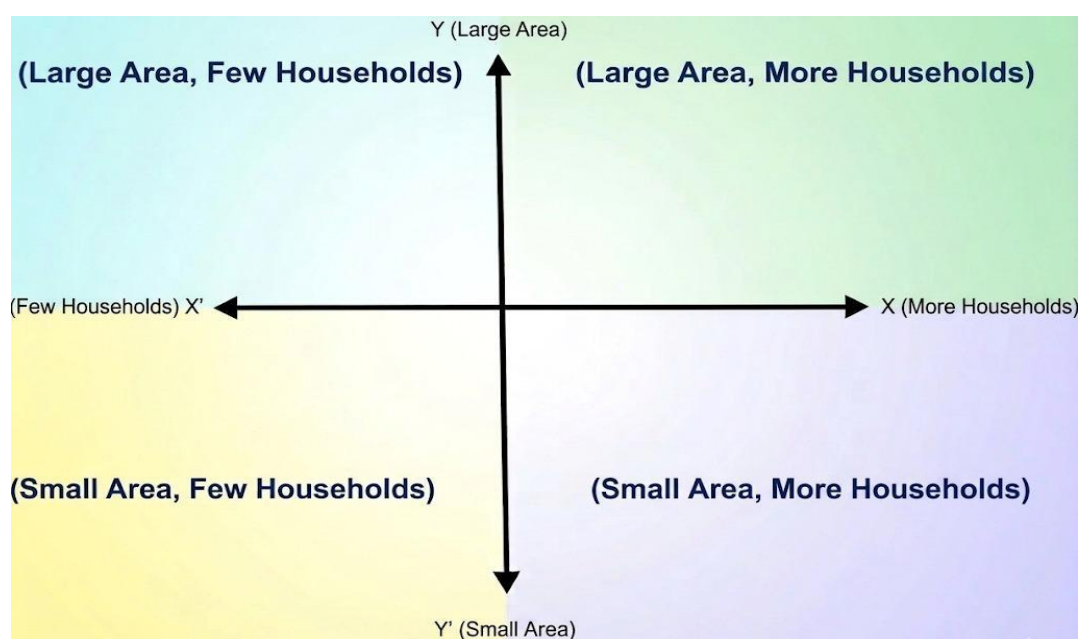


Figure 4: Four-Cell Analysis

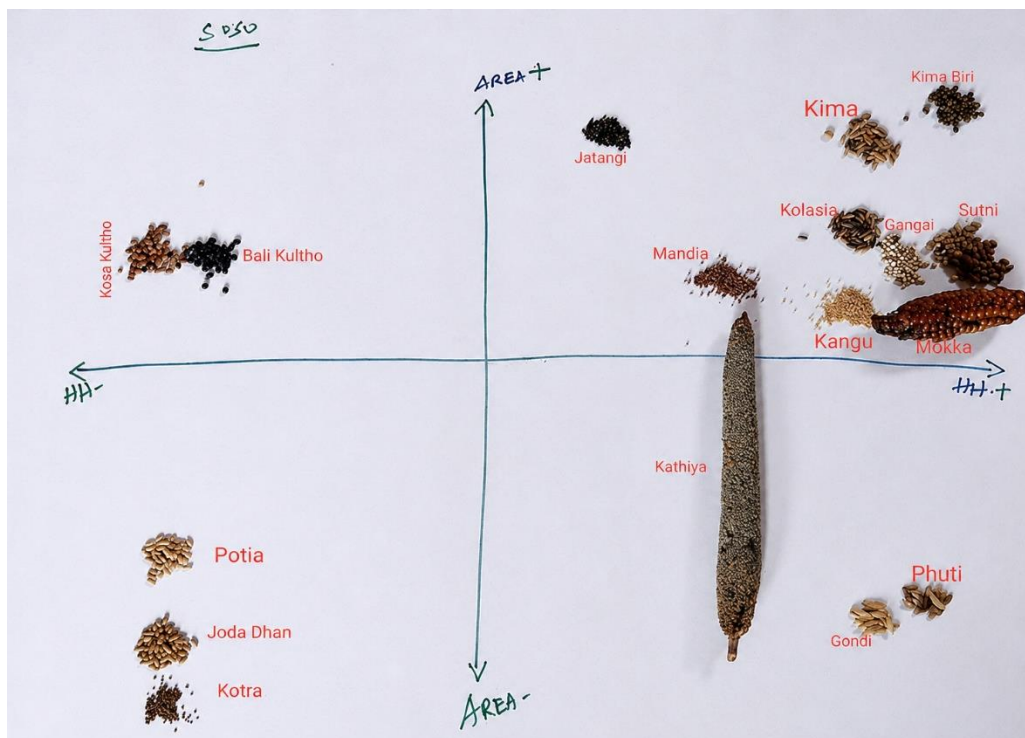


Figure 5: Four-Cell Analysis using real samples of crops



5. Cropping Practices

In this exercise, Groups 1 and 2 (for field crops), and 3 (for vegetables and spice crops) will participate to collate information on cropping practices. Crops can be selected based on the rankings for each crop cultivated in that region.

Cropping practices involve creating a knowledge document about the current agricultural practices followed by different farmers of the region.

1	2	3	4	5	6	7	8	9	10
Crop	Variety	Seed treatment	Seeding rate (seed/acre)	Sowing system (direct, line, transplanted in line, system of crop intensification (SCI))	Nursery management (if any)	Days to transplanting	Spacing (row-to-row (R:R) and plant-to-plant (P:P))	Intercrops (crop name and ratio of seeds used)	Fertilisers and manures (name and dose)

11	12	13	14	15	16	17	18	19	20
Weeding	No. of times irrigation done	Common pests observed	Common diseases observed	Pesticides used (name and dose)	Harvesting techniques (manual/machinery)	Yield	% of produce sold	Rate (INR)	Market (local market/agent comes to procure, etc.)

6. Seed Collection

Seeds need to be collected from the community for multi-location evaluation. During seed collection, passport data needs to be filled.

Passport data format

S. No.	Traits/details	Responses
1.	Crop name:	
2.	Local name of the traditional variety:	
3.	Crop category (cereals/millet/oilseeds/pulses/vegetables/others):	
4.	Name the place from where the seed is collected: Village, Block, and District	
5.	Name of the farmer from whom the seed is collected:	
6.	Is it registered as a farmer variety with the Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA), 2001: Yes/No	
7.	Is it entered into People's Biodiversity Registers (PBRs) of Biodiversity Management Committees (BMCs): Yes/No	
8.	Seasonality (Kharif/Rabi/Summer):	
9.	Suitable soils (sandy/red/black/saline/alkali, etc.):	
10.	Suitable areas (high/medium/low/plain lands):	
11.	Suitable rainfall area (high/medium/low rainfall areas):	
12.	Crop duration (days):	
13.	Withstands dry spells:	
14.	Withstands floods:	
15.	Resistant to pests:	
16.	Resistant to diseases:	
17.	Seed rate/acre (kg/acre):	
18.	Yield/acre (based on your experience) (kg/acre):	
19.	Seed colour:	
20.	Does the seed have an aroma? (Yes/No)	
21.	Type of crops (shrub/creeper/climber/erect):	
22.	Grown under (monocrop/intercrop/mixed cropping systems):	
23.	If it is a mixed crop, which crop does it mix with?	
24.	Cooking quality (community claims):	
25.	Any known medicinal properties (community claims)?	
26.	Cultural importance (any particular ritual/festival, etc.):	
27.	Palatability of fodder to animals:	
28.	Germination test results (How many seeds germinated out of 100 seeds?):	
29.	Mixture % (Other crops and same crops seeds got mixed)	
30.	Moisture %	
31.	Is it a truthfully labelled seed?	

DAY 3: Community Discussion, Evaluation, and Planning

Sessions of Day 3 should be organised around 5 to 7 days after the completion of Day 2, allowing sufficient time for the team to document, compile, and analyse all the information collected during Day 1 and Day 2.

The focus of Day 3 is on sharing, discussion, validation, and planning:

- Present the documented findings (from crop ranking, seed practices, land preparation, etc.) back to the community in a simple and accessible way.
- Facilitate discussions to validate the data, ensuring that the information accurately reflects the knowledge and practices of the farmers.
- Encourage community members to reflect on the results, identify gaps, and prioritise crops, practices, or interventions based on their needs and preferences.
- Jointly prepare a community action plan that outlines the next steps, such as seed multiplication, conservation strategies, training needs, or collective activities.

By the end of Day 3, the community and facilitators should have a shared understanding of the findings, and a clear, practical plan for moving forward.



5. Way Forward from the Study

- This study will provide a comprehensive understanding of the agricultural practices, and current seed system in the study area.
- The information collected can be effectively used for better planning and for mobilising resources by submitting proposals based on the study report.
- Furthermore, the study is expected to generate greater interest among organisations and institutions working on the conservation and revival of folk crop diversity. It can also help initiate a broader multilateral dialogue with government institutions to acknowledge the long-standing neglect of these crops and to highlight their importance.
- The collected data can be analysed and published in different formats.
- Based on the study, less popular varieties can be identified for conservation, while more popular ones can be selected for multiplication. This process not only supports conservation but also helps expand the cultivation area of traditional varieties in the region.



Annexure: Examples of Field, Vegetable and Spice Crops

Crop Type	Example
Field Crops	
Cereals (Food Grain)	Rice, Wheat, Maize (Corn), Barley, Sorghum (Jowar), Pearl millet (Bajra), Finger millet (Ragi/Mandua), Foxtail Millet (Kangni), Kodo Millet, Oats, etc.
Pulses (Legumes)	Pigeon pea (Arhar/Tur), Chickpea (Chana/Bengal gram), Black gram (Urad), Green gram (Moong), Lentil (Masoor), Cowpea (Lobia), Horse gram (Kulthi), Moth bean, etc.
Oilseeds	Groundnut (Peanut), Mustard, Rapeseed, Sunflower, Soybean, Sesame (Til), Niger seed, Linseed, Castor, etc.
Commercial/Cash Crops	Sugarcane, Cotton, Jute, Mesta, Tobacco, etc.
Tuber Crops	Potato, Sweet potato, Tapioca (Cassava), Yam, etc.
Plantation Crops	Tea, Coffee, Rubber, Coconut, Arecanut, etc.
Vegetable Crops	
Leafy Vegetables	Spinach (Palak), Fenugreek (Methi), Amaranth (Chaulai), Cabbage, Lettuce, Coriander (Cilantro), Mint (Pudina), etc.
Fruit Vegetables	Tomato, Brinjal (Eggplant/Aubergine), Cucumber, Pumpkin, Bottle gourd (Lauki/Doodhi), Bitter gourd (Karela), Ridge gourd (Turai), Snake gourd (Chichinda), Capsicum (Bell pepper/Shimla mirch), Chilli, etc.
Tuber Vegetables	Potato, Sweet potato, Yam (Ratalu/Suran), Taro (Arbi/Colocasia), etc.
Root Vegetables	Carrot, Radish (Mooli), Beetroot, Turnip (Shalgam), etc.
Allium Vegetables	Onion, Garlic, Shallot (Chhota pyaz), Leek, etc.
Cabbage Family/Crucifers	Cauliflower, Broccoli, Knol khol (Ganth gobhi), etc.
Spice Crops	
Pepper	Black pepper, Long pepper (Pippali)
Aromatic and Leafy Spices	Curry leaves
Seed Spices	Cumin (Jeera), Fennel (Saunf), Fenugreek (Methi), Nigella (Kalonji), Caraway (Shahi Jeera)
Root and Rhizome Spices	Ginger, Turmeric, Galangal
Bark/Other Spices	Cinnamon, Clove, Cardamom, Nutmeg and Mace

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