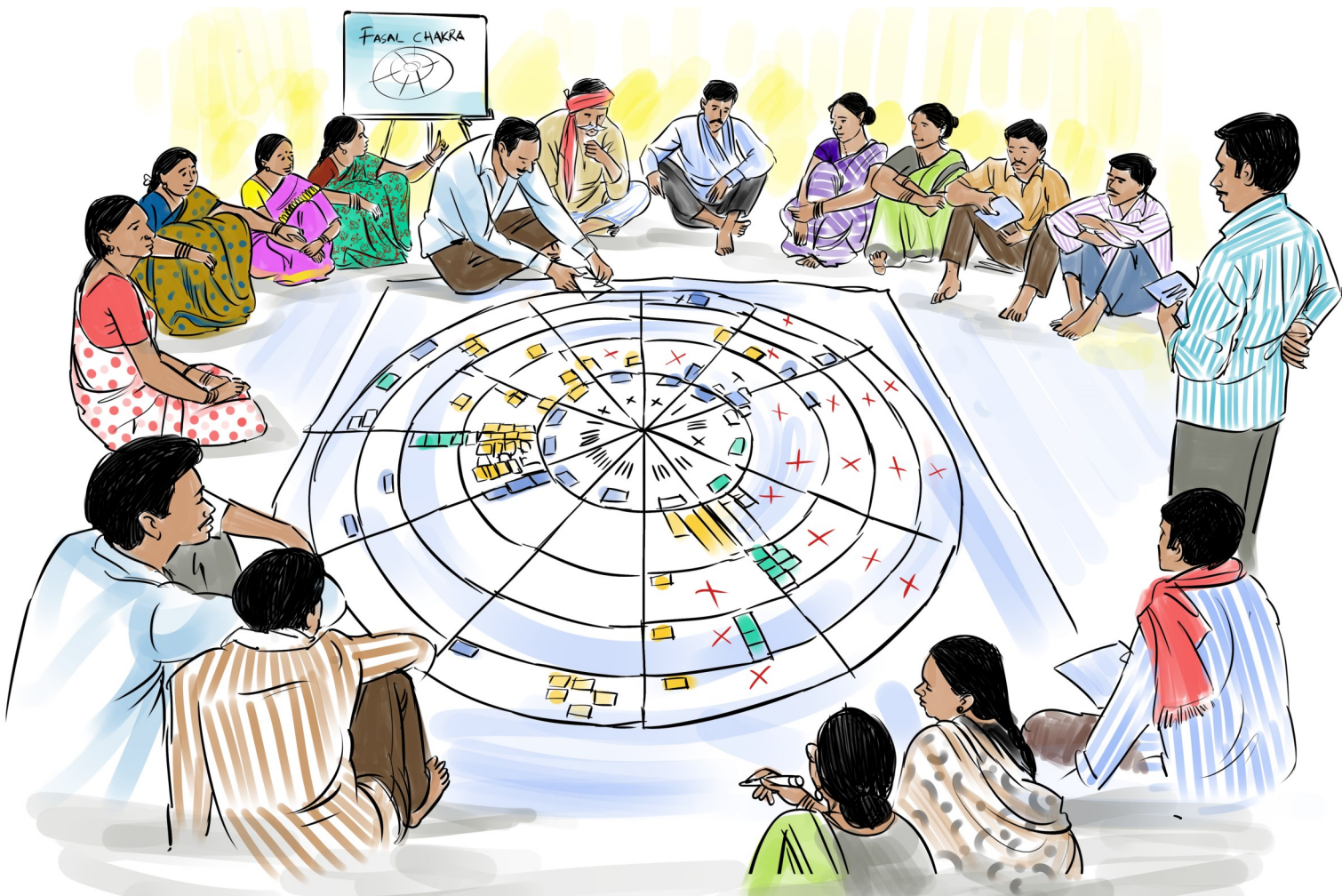




FASAL CHAKRA

A Participatory Method to Explore Crop Systems and
their Vulnerabilities in Relation to the Landscape

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Fasal Chakra

A Participatory Method
to Explore Crop Systems
and their Vulnerabilities
at Landscape Level,
Building upon the Community's
Indigenous Knowledge



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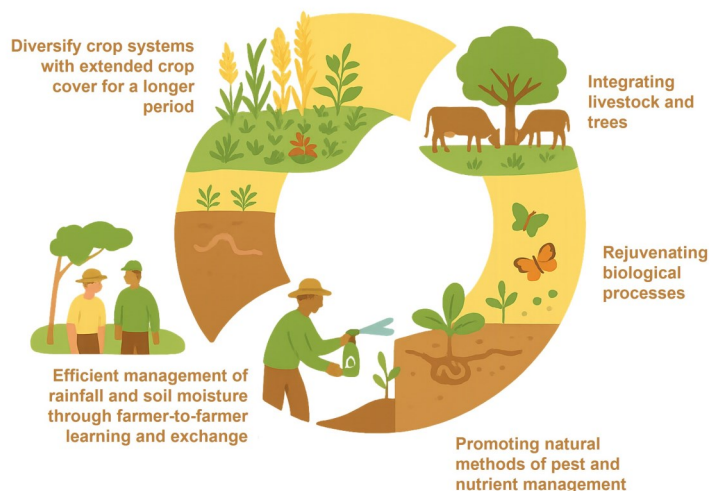
Abbreviations

BMZ	German Federal Ministry for Economic Cooperation and Development
CDB	Crop Diversity Block
CMSS	Community-Managed Seed System
FES	Foundation for Ecological Security
MoA&FW	Ministry of Agriculture and Farmers' Welfare
MoRD	Ministry of Rural Development
NABARD	National Bank for Agriculture and Rural Development
PMDS	Pre-Monsoon Dry Sowing
SuATI	Support to Agroecological Transformation Processes in India
WASSAN	Watershed Support Services and Activities Network

About JIVA

JIVA is an innovative programme funded by 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).

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:



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.

Fasal Chakra

A Participatory Method to Explore the Crop Systems and their Vulnerabilities at Landscape Level with the Community's Indigenous Knowledge

Understanding the crop systems and their relationship with the land types, local climate regimes and the food systems is an important aspect of agro-ecosystems analysis. The *Fasal Chakra* as a participatory method has evolved with the Watershed Support Services and Activities Network's (WASSAN's) field explorations in planning for natural farming with the communities.

The *Fasal Chakra*, meaning Crop Cycles, is a participatory method to explore these crop systems' interconnectedness with land/soil and climate systems, and their dynamics along with the community.

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Purpose

The primary purpose of the crop cycle exercise is to obtain a comprehensive understanding of the local agricultural system in relation to land types and climate. It helps planners, researchers, and development agencies gain insights into the types of crops grown in different land types and seasons, their duration in the field, and the periods when fields are left fallow. This information is crucial for exploring crop diversification options in natural farming with respect to the agroecological principles (*see box below*). It helps in making informed decisions on crop systems' diversification, planning agricultural interventions, and improving overall agricultural system productivity in the region.

Crop Systems in Natural Farming/Agroecology

The planning objectives for changing crop systems in natural farming are the following:

- ❶ Diversified and multi-crop systems.
- ❷ While the main crop continues to focus on income, crop diversification should additionally provide for:
 - Nutritious food for farm household.
 - Fodder for livestock.
 - Biomass for soil.
 - Income from supplementary produce that will meet the operational expenses so as to reduce the risk of loss of main crop.
- ❸ Cover the soil with live roots for 365 days or as long as it is possible.
- ❹ Turnover a good measure of biomass into soil for improving its health.

The journey to achieve these objectives starts with an in depth exploration of the status of the current crop systems with respect to the above principles, historical evolution and the risks involved in the current practice.

Process

The *Fasal Chakra* exercise generally takes about three hours time and is best done in an area where there will not be much interference from onlookers.



For **SMALL** group (brown sheets)

- | |
|-----------------------------|
| 1. 2 Brown sheets |
| 2. Sticky tape |
| 3. Thread |
| 4. Chisel marker |
| 5. Sketch pens |
| 6. Glue stick |
| 7. Colourful drawing sheets |
| 8. Small stones |
| 9. Flash cards |
| 10. Scissors/paper cutter |



For **LARGE** group (on the floor)

- | |
|-----------------------------|
| 1. Rangoli |
| 2. Chalk stick |
| 3. Thread/Rope |
| 4. Chisel marker |
| 5. Sketch pens |
| 6. Glue stick |
| 7. Colourful drawing sheets |
| 8. Small stones |
| 9. Flash cards |
| 10. Scissors/paper cutter |

Setting up the Exercise

■ **Participants:** The *Fasal Chakra* exercise is taken up with key persons in the village, both women and men, who have knowledge of the landscape. Involving elder women and men helps in understanding the trends. It is important to select a cross section of farmers who cultivate various types of land, i.e. upland, medium land, lowland, etc. in different parts of the landscape. A mix of people, both old and young, women and men, small, marginal and large farmers, add value to the exercise.

■ **Choosing a right location:** As said earlier, take a secluded place with enough space to accommodate all the planned participants since the exercise takes a good amount of space in the middle. Participants are usually organised into small groups for discussion. The interaction will be only with the key informants chosen for the purpose. Choose a spacious, calm and isolated place without much disturbance.

■ **Material required:** The *Fasal Chakra* exercise is best taken up on the floor as it helps the community, women in particular, to have a major role. In the absence of a clear floor area, it can be taken up on large brown sheets also as the area required is large. Stick four large brown sheets together.



1 Facilitation Requirements

The *Fasal Chakra* is an intense exercise and requires familiarity of the facilitator on the subject. For conducting this exercise three roles need to be assigned:

- a. An informed facilitator.
- b. A person who is documenting. Documentation is the key as a vast amount of location-specific information and knowledge flows from the participants.
- c. A person to engage with the participants, encouraging them to interact and share freely, and to support the facilitator.
- d. A boundary manager who keeps unwanted external persons away from the exercise.



2

Conducting the *Fasal Chakra* Exercise

■ **Know About the Land:** The exercise starts with understanding the landscape. It starts with the plenary question, 'What are the different purposes for which land is used in the landscape?'

This leads to listing of various land uses in the village. Note these on flash cards, mentioning one land use on each card. A resource mapping exercise may help in further detailing but for want of time keep it simple and focused. Use the local names as people identify and get to know the meaning of the local terms.

The following land uses may come up on the cards:

- Forests.
- Agriculture land near forest.
- Main agriculture land (upland, medium land, and lowland).
- Water bodies.
- Habitat.
- Agriculture land near habitat.
- Etc. as per the local land use.



The follow up question is more important.

- What are the different types of land occurring in the landscape?

This question in the plenary generates discussion on listing of various land types as they occur in the village. Relating these to the land use in facilitating the discussion will be useful.

List one land type on each card.



- **Exploring Land Types with Participant Groups:** Form small groups of the participants and give one (or more) land type cards to each group. The groups are assigned two tasks.
 1. **Detailing the characteristics of the land types:** This explains the differences between each of the soil types based on soil depth, location in the landscape, elevation, etc. The important question is why is 'one land type' named on the card different from the 'other'?
 2. **Detailing the crops and varieties (including local ones):** Capture the crops, their varieties, and the specific characteristics of the varieties cultivated in each land type, if any.

■ **Exploring Trends:** The groups will also be tasked to map the time trends in the particular land type:

- What are the changes happening in that land type?
- Are there any crop pattern shifts over time? If yes, what are those?
- What has triggered the crop pattern shifts in the land type?

Make the groups present their outputs in the plenary.

The above are important preparatory exercises for the *Fasal Chakra*. After completion of these exercises, we will have known:

- Land uses
- Different land types, and
- Crops and varieties cultivated in different seasons in each of the land types.



3

Creating the *Fasal Chakra*

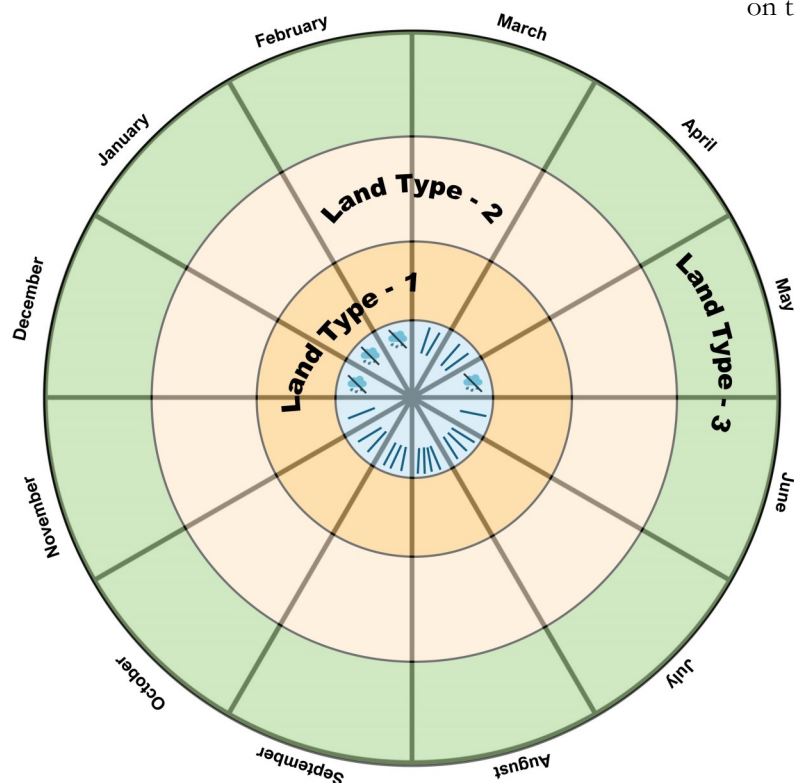
Information in the *Fasal Chakra* evolves in concentric circles as a visual for facilitation.

■ Preparation of Base Map

- Mark the centre of the concentric circles. Use a thread or a rope to mark the circles from the centre point for the concentric circles.
- Draw the innermost circle and the outermost one. The gap in between these depicts the area in the landscape.
- If you are using a sheet of paper, draw a large circle in the centre to represent the field or land area under consideration.

■ Drawing Concentric Circles

- Based on the number of land types you have (e.g. if you have three land types), draw concentric circles with different radii around the central circle.
- Always include one extra circle outside than the number of land types listed, i.e. for three land types, draw four concentric circles.
- The innermost small circle is to get information on the rainfall.



Preparing the *Fasal Chakra*



Month-wise Rainfall

Rainfall Categorisation



NO RAINFALL



VERY LOW RAINFALL



LOW RAINFALL



MEDIUM RAINFALL



HEAVY RAINFALL



VERY HEAVY RAINFALL
(almost 25-28 days)

■ Divide Circles into 12 Equal Parts

- Use a thread to divide each of the concentric circles into 12 equal parts. These divisions represent the 12 months of the year.
- Start with the central circle and continue outward, ensuring that all circles are divided into 12 segments each.

■ Label the Sectors with Month Names

- In the 12 segments on the innermost circle, write the name of a month. Preferably, use the local names for the months to ensure better understanding among the community members.
- Start with January (or the first month in the local calendar) and continue labelling each segment clockwise until you have covered all 12 months.

■ Month-wise Rainfall

- Ask the participants to depict the local month-wise rainfall in the calendar in the innermost circle. Make note of the various patterns that come up in the discussion.

Rainfall categorisation: (i) 0 - no rainfall, (ii) | - very low rainfall, (iii) || - low rainfall, (iv) ||| - medium rainfall, (v) |||| - heavy rainfall, (vi) ||||| - Very heavy rainfall (almost 25-28 days).

- Mark the rainfall data in the innermost circle. It is important to capture the frequency of occasional rains during April-June (summer) and beyond the monsoon.
- Also capture the weather conditions in winter, like dew formation.

4 Detailed Crop Systems Information

Divide the gap between the innermost circle used to depict rainfall and the outermost one into as many concentric circles as the number of land types identified. There will be Land Type Circles in which the information on each land type can be filled in.

For each Land Type Circle ask the group which has worked on that land type to mark the following on smaller cards:

- Crop name with duration in days; and approximate yield.
- Sowing time, weeding time, inter-cultivation and harvesting time is to be placed in the respective months when they are taken up. Use a specific symbol (e.g. 'H', 'X') to represent the harvesting month for that particular crop to save space.
- In case it is an inter/multi-crop system, capture the details of crop mix (ratio of seeds used), and the harvesting times.
- If rabi crop is also taken up, have cards for the rabi crop and capture the seasonality of operations, as well as sowing and harvesting windows.
- Ask specifically about the crop varieties including local names of the landraces, their preference with respect to duration, food systems and climate risk management.
- In the months when the land is vacant after harvest of the crop, place a stone against these months showing land is fallow and exposed to the Sun.
- If there are different types of crop systems within a land type, mark them in circles within the space left for that land type. Use different coloured flashcards for each crop system within the land type.
- Ensure consistency in using symbols for harvesting across all land types and seasons.
- Ask what percentage of each land type exists in the total landscape being studied. This gives a picture of the relative prominence of the particular land type. The facilitator may also ask an estimate of the area under each landscape.
- Continue this exercise to get information from all the groups, i.e. all the land types.

The final *Fasal Chakra* exercise will have the following on the visual:

- Monthly rainfall pattern including frequency of off-monsoon rains.
- Information on crops under each land type and in each season; timeline of their operations, sowing and harvesting windows of each crop.
- Varieties used in each crop including their names, duration and any special traits.





Give a Tea Break:

The exercise is very intensive and engaging; before going into the discussion on the basis of the exercise, give a short break.

5 Exploring Action Areas

When the *Fasal Chakra* visual is set with all its details, several areas of local concern can be elicited, leading to identifying specific action areas.

- **Risk Analysis:** Given the constraints of the land type and the current crop systems and rainfall mapped, ask
 - Where are all the risks along the crop cycles across the 12 months in each of the land types? After indicating the risks, ask for the relative ranking of the risks from highest to lowest (mark with different colours).
 - The subsequent question on 'How to mitigate the risks involved?' will generate discussion. Facilitated discussion can lead to identifying what changes we need to bring in crop systems and other mitigative actions.
- **Regenerating Fallows/365 Days Crop Cover:** The stones placed against the months in each land type depicting the fallow months provide a visual picture on how much of the landscape will be fallow and soil exposed to the Sun. Highlighting this, the facilitator may initiate a discussion asking the questions:
 - What will happen if the land is left fallow?
 - How best can we use those time periods where land is left fallow (in different land types)?
 - What are the constraints for bringing crops (including cover crops for soil), Pre-Monsoon Dry Sowing (PMDS), and others in the fallow periods?

The ensuing discussion may suggest action areas for exploring changes to crop systems to ensure there are maximum number of multiple crops across the year.

- **Soil Health Improvement:** The lead question on how is the soil health in each of the land types, its time trend and what is required to improve the soil health – helps in generating discussion on various crop system options for improving soil health.
- **Food Systems Analysis:** An exercise on marking the crops which are mainly used for household consumption helps in understanding the food and nutrition flow from farmlands to homes. A time trend analysis on the subject reveals the trends in nutrition flow from farms to families.
 - Discussion on the major nutritional issues in the village and how those can be overcome if food/nutrition crops are integrated with the crop systems triggers identification of action areas on changes to crop systems for better food and nutrition.
 - The discussion can be triggered on multiple subjects as per the need, and helps in stimulating discussion among the community and evolving specific action areas related to changes to crop systems. A detailed exploration of all such action areas may be developed further into specific programmatic action.



6 Summary

The *Fasal Chakra* is an exercise to understand the analysis of agro-eco systems with a focus on crop systems. Piloted and evolved in various programmes of WASSAN, the participatory method is now integrated into the JIVA programme as a tool for planning of crop systems in natural farming.

How well the interaction is facilitated, enabling the community/participants to share their knowledge and how much of it is captured in the documentation determines the success of the *Fasal Chakra* participatory method.



The *Fasal Chakra*
Exercise Conducted
During the
Participatory
Planning Workshop
at Changariya
Village, Mandla

Using *Fasal Chakra* for Planning Crop Systems: A Case Study in the Mandla District of Madhya Pradesh

The *Fasal Chakra* exercise was used for developing the landscape level crop systems along with the community as a part of the ProSoil programme supported by GIZ India, and implemented by the Foundation for Ecological Security (FES). The tribal villages are in the Mandla District of Madhya Pradesh, which experiences high rainfall. WASSAN supported FES in developing the natural farming transformation methodology.

■ **Eliciting the Land Types:** At the start, using the Google Earth map the different land types and their occurrence in the village was discussed. Four land types were identified in the interaction which were distinct in terms of the crop systems.

- **Homestead land** (*Badi khet*): Primarily for maize and vegetable production.
- **Lowland** (*Jhilla land*): Stream bed terraced paddy lands cultivating long-duration paddy varieties due to higher moisture content in the soil.
- **Medium land** (*Motto land*): Utilised for regular medium duration paddy varieties during the kharif season and pulses during the rabi season.
- **Upland** (*Barra khet*): Suitable for kodo/kutki and blackgram cultivation.
- Some of the lands were fallow for a year as a part of crop rotation.



■ **Trend Analysis** of the historical cropping pattern in each land type brought out that farmers used to cultivate different varieties of millets, pulses, oilseeds, and vegetables as per the land type, however had gradually shifted to monocrops.

■ ***Fasal Chakra*** exercise carried out subsequently helped in developing a detailed understanding of the agriculture and food systems in the landscape; and subsequently in arriving at an action plan for crop diversification.

After the *Fasal Chakra* exercise, several observations were made about land use. The inner circle lowland (*Jhilla*) remains fallow for six to seven months after paddy harvest, with bunds empty during this period. In the medium land (*Motto*), 50% of the area is uncultivated for six months, and the entire land lies fallow for three to four months. Bunds here are also without any vegetation. Paddy is broadcasted. The upland (*Barra*) is mono-cropped with *kodo/kutki*/blackgram and was left uncultivated for seven months each year. In

contrast, the homestead land (*Badi*), similar to upland but located near homes, is cultivated year-round with various crops like maize, mustard, and vegetables, depending on moisture availability, allowing for around ten months of cultivation annually.

■ **Action Plans:** In the discussions with the community, six different models/ initiatives emerged.

These were implemented in the following season with promising results in *kharif* 2022.

1. The ***Badi Khet Model (Homestead land)***, emphasising line sowing of maize inter-cropped with seasonal vegetables and evergreen trees, was adopted by 70 farmers, covering a total area of 10.77 hectares. This approach optimises land use and resource management, promoting sustainable agriculture in the region.
2. The ***Barra Khet Model (Upland)***, encouraging crop diversification in upland areas with a mix of long and short duration crops like blackgram/kodo/kutki was adopted by 52 farmers, covering 19.72 hectares of land. This model focuses on enhancing soil health and productivity.
3. The ***Pre-Monsoon Dry Sowing (PMDS) Model***, highlighting the use of multi-species and diverse crop varieties incorporated into the soil at the time of sowing of main crop was adopted by 86 farmers and implemented in 40 hectares of total land. This approach boosts soil fertility and water retention, ensuring productive yields during the cropping season.
4. The ***Paddy Line Sowing with Bund Plantation Model***, replacing traditional transplanting with systematic line sowing, was adopted by 164 farmers, covering 62.12 hectares. This method ensures better yield and easier weeding, contributing to enhanced agricultural productivity.
5. The ***Fallow to Fodder Model***, transforming fallow lands into fodder cultivation, had gained traction with 25 farmers, covering 7.02 hectares of land. This model promotes livestock fodder security, providing a sustainable solution for fodder scarcity in the region.
6. The ***Community-Managed Seed System (CMSS) through Crop Diversity Block (CDB) Model***, was adopted on 0.5 acre of land. One CDB of paddy had 42 traditional varieties. Of them, 29 were germinated and on the field day three varieties were selected by the farmers for further multiplication.

The *Fasal Chakra* as a methodology is now regularly practiced in all programmes of WASSAN and is also included in the action planning process of NABARD's JIVA programme.



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