

Landscapes and Agroecology : Participatory Planning Methods





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REPORT CREDITS

The participatory planning tools for agroecological and landscape - based planning presented in this report are grounded in over 25 years of field experience by WASSAN (Watershed Support Services and Activities Network). These tools have been developed, tested, and refined through continuous engagement with communities, local institutions, and partner organizations across diverse agroecological regions of India.

TITLE OF THE REPORT

Landscapes & Agroecology: Participatory Planning Methods

DATE OF PUBLICATION

JULY 2025

LOCATION

Hyderabad, Telangana, India

EDITORIAL TEAM

- Lead Authors: Ms. Prachi Patil and Mr. Ravindra Adusumilli
- *Co-authors:* Mr. Malyaj Shrivastava, Dr. M. L. Sanayasi Rao, Dr. M. Pavan Kumar, Ms. Diksha Alok and Mr. Monuhar Pegu

DESIGN AND LAYOUT

- *Graphic Design and Layout:* Mr. Nemani Chandrasekhar, WASSAN
- *Visuals:* Mr. M. Sreekanth, WASSAN

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ACKNOWLEDGEMENTS

This collaboration between HEIFER-INTERNATIONAL, PASSING GIFTS PRIVATE LIMITED and WASSAN evolved from a discussion with Mr. Mark Chandler on the tools for landscape and agroecological transformation at the conference of 1000 Landscapes organised by EcoAgricultural Partners in 2024. Agroecological transformation has multiple challenges; one of them is how we understand the local context from the local knowledge of the communities and evolve responses to the issues they identify.

Subsequent discussions with the Passing Gifts PL team led to formulation of a program to form a learning group to practice some of the Participatory Methods that WASSAN has developed over time in their work areas in Odisha and Bihar. The WASSAN team led by Ms. Prachi Patil and Dr. Sanyasi Rao (Sunny) facilitated this process along with other team members. The learning exercises culminated in a two-day workshop at ICRISAT Hyderabad where the theoretical framework was explored. This document evolved in the process as a practitioners' guide to use the participatory methods of exploration of landscapes & agroecology.

It was a good learning opportunity for the WASSAN team. On behalf of our entire team, I extend our sincere thanks and warm regards to the Heifer/Passing Gifts team — especially to Dr. Mark Chandler, Ms. Rina Soni (Country Director), Dr. Rabin Niraula, Ms. Sonmani Choudhary (Program Director), Mr. Akshaya Biswal (Program Director), Dr. Shyam Katta (Program Director), and the entire team.

Ravindra Adusumilli &
Prachi Patil



ABOUT HEIFER-INTERNATIONAL and PASSING GIFTS

Heifer International operates in 19 countries, including several in Asia, such as India, Nepal, Bangladesh, and Cambodia. Its mission is to end hunger and poverty by providing smallholder farmers with livestock, training, and access to markets while fostering sustainable practices that protect natural resources. The organization's "Caring for the Earth" priority emphasizes regenerative agriculture, climate-smart farming, and environmental sustainability, ensuring that agricultural productivity does not come at the expense of the environment. By supporting smallholder farmers, who cultivate small landholdings and represent a significant portion of the agricultural workforce, Heifer drives inclusive economic growth and environmental resilience.

In Asia, Heifer has reached over 580,000 farming households as of 2023, with 100,000 achieving a sustainable living income through its programs. Its approach is rooted in partnerships with local communities, governments, and organizations to create lasting, scalable impact.

Passing Gifts Private Limited (PGPL) is an Indian subsidiary of Heifer International, founded in 2021, that provides consulting, advisory, training, and technical services to support social advancement and sustainable development, particularly for smallholder farmers, including women, in India. The company's work focuses on helping farmers form self-help groups to improve livelihoods, access resources, and participate in markets to achieve a sustainable living income, thereby contributing to economic and climate resilience.



ABOUT WASSAN (WATERSHED SUPPORT SERVICES AND ACTIVITIS NETWORK)

WASSAN's 25-year journey has consistently embraced a "landscape thinking" approach, initially through participatory watershed development. Our focus has evolved significantly, moving beyond just soil and water conservation to deeply understand the intricate connections between natural resources, production systems, and livelihoods. A key aspect of this evolution has been our growing appreciation for the profound local knowledge communities possess regarding their landscapes. This natural learning curve has propelled WASSAN towards adopting more comprehensive agroecological approaches. As a non-profit resource organization, we specialize in developing scalable agroecological transformation approaches, drawing directly from grassroots experiences. WASSAN also functions as a vital networking hub, collaborating with over 200 partner organizations nationwide and actively partnering with the government to design and support large-scale programs.



Chapter - 1

Landscapes and Agroecology

1

“A landscape is more than just a piece of land; it's a dynamic interaction between natural elements, human presence, and the way it's perceived and experienced”.

Agroecology is “a holistic and integrated approach that applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems. It seeks to optimize the interactions between plants, animals, humans, and the environment while addressing the need for socially equitable, productive food systems”.

~ (FAO, 2018 - I9037EN/1/04.18)

Public policies (dis)incentives and response of humans to these incentives, cultural beliefs and norms, and several other factors also impact these dynamic interactions within a landscape. Even farming in a plot within a landscape is not an isolated / stand-alone activity; there will be intersections with the ecosystem of the landscape, economic and institutional interaction that shapes the way farming is done.

‘Landscape thinking’ starts with an appreciation of these interactions and mutual dependencies of the elements of the ecosystem & economy within a landscape. It is an important first step in understanding landscapes and agroecosystems; as against the conventional isolated single element initiatives – like introducing improved seeds, for example.

Exercise – 1: Appreciation of interactions of elements of an ecosystem

Participants are asked to choose their own persona (any of the bio-physical or living entities) within a landscape. They are then asked to paste their cards on a sheet and draw the interactions that the 'persona' may have with other elements; they can use different colors to depict positive or negative relationships.

The ensuing picture depicts complex relationships as in *Figure - 1*.

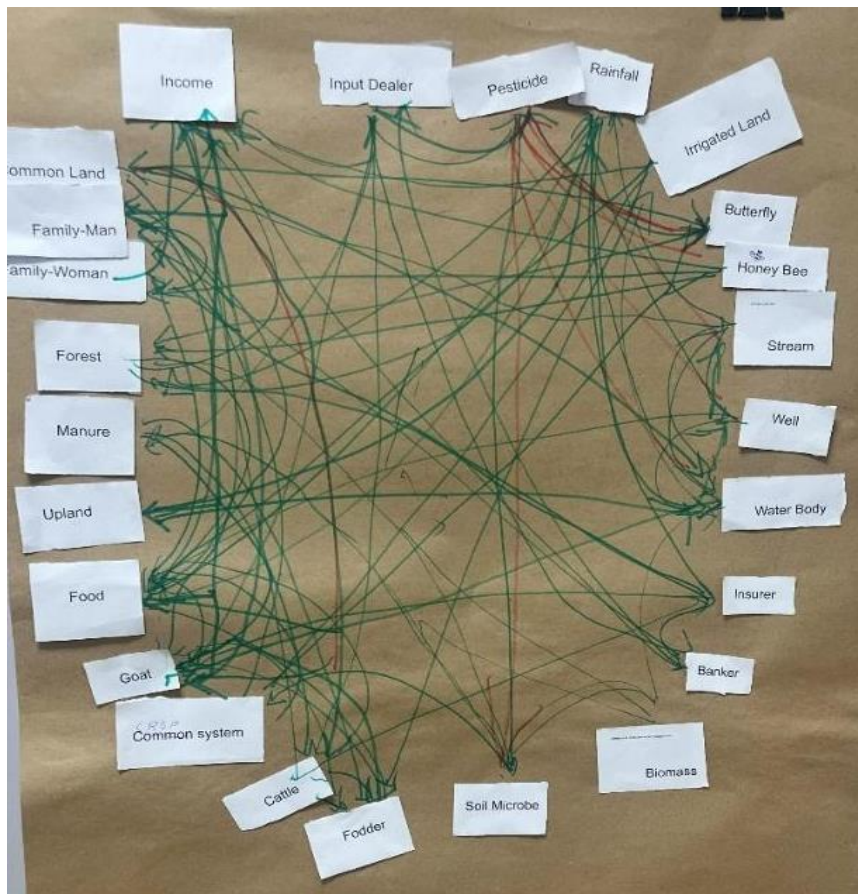


FIGURE - 1: INTERACTIONS OF ELEMENTS OF THE ECOSYSTEM

This figure presents a visual representation of the complex web of interlinkages within an ecosystem. Different elements, such as soil, forest, water bodies, honeybees, livestock, and human actors (e.g., farmers, input dealers, bankers) are interconnected. This system's map helps the participants to appreciate the mutual dependencies and relationships among all components of the ecosystem.

THE GREEN REVOLUTION THINKING (GRT)

The essence of GRT is in its focus on crops and its productivity measured in terms of quantity of grain produced. Driven by developing and introducing new technologies, GRT is focused on:

1. Delinking / limiting the dependency of the crop production system on natural resources; moving towards monocrops is an example.

2. This is achieved through **substitution of chemical and other inputs for natural processes** (for example soil health, predator population management.
3. **Substituting** natural elements of the ecosystem with external inputs has created dependencies on the external inputs and their economy and led to input-economies (input suppliers, credit, and government subsidies to reduce the cost of inputs for the farmers).
4. The **‘circularity’ of nutrient flows was also broken** as ecosystem services ‘no longer matter’
5. **Specialization:** GRT with an emphasis on individual crop’s yields/ productivity encourages ‘specialization’ – this has led to massive monocropping which has become an ecological nightmare! ‘Mechanization’ also led to monocropping as it became easier to develop machines for monocrops. Livestock, once an integral part of mixed farming systems and dependent on common lands, is now often managed separately and the animals are stall-fed. Dairy farming has become a specialized activity, disconnected from agriculture and the commons, undermining the integrated nature of traditional agroecosystems.

The processes induced by GRT have triggered a ‘positive feedback loop’ that has amplified the process of loss of ecosystem services creating more and more dependency on external inputs.

The Agro-Ecological Thinking (AET) or what we have been evolving in India as the movement towards **Natural Farming** is essentially focusing on restoring the circularity and mutual dependency of the elements of landscape ecosystems and ‘internalizing’ the inputs in production processes within the chosen landscape. This process will also have an impact on the economy as more and more inputs are internalized.

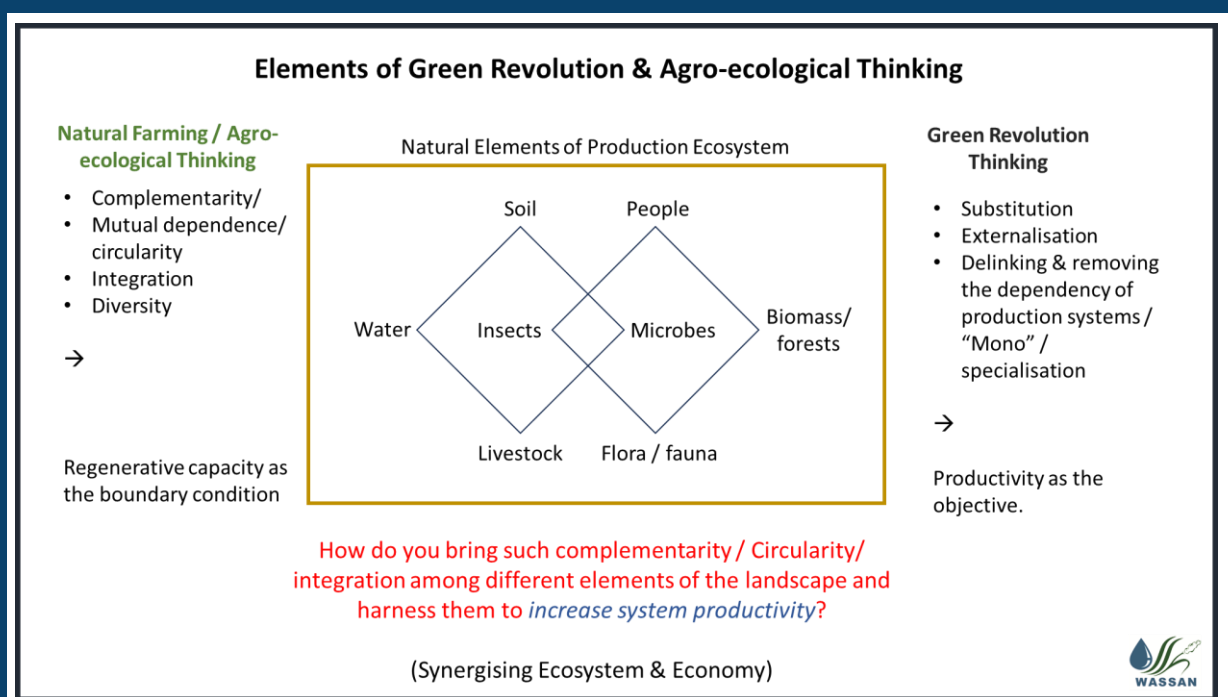
THE AET BUILDS UPON THE FOLLOWING:

1. **Complementarity and mutual dependence:** Building upon the complementary relationship among different production systems- multi crop systems that work on synergies and complementarity of different crops, for example.
2. **Integration of different production systems** (crops and livestock integration/ honey and crops for example)
3. **Diversity** is the hallmark of the AET as it triggers ecosystem services and circularity in nutrition flows.

The AET focuses on ‘system productivity’ that measures the productivity of different elements of the landscape and the level of substitution of external inputs. Several of these processes in GRT and AET can be illustrated by the example of what happens when honeybee population is reduced by pesticides. If honeybees disappear due to pesticide application, pollination declines, leading to reduced crop yields. This, in turn, affects food availability, income, and nutrition, illustrating how a single disruption can ripple through the whole system.

Regenerative Capacity of the ecosystem within a landscape sets the boundaries of what is possible. The extent to which the landscape ecosystem provides *ecosystem services* dynamically changes with the interventions. It also defines the system's ability to recover and maintain functionality after any disturbance i.e. resilience. Traditional *shifting cultivation* (Jhum cultivation) is a good illustrative example. In the Jhum cultivation land is cultivated for 2–3 years and then left fallow for about 7 years to allow natural regeneration of soil fertility and ecosystem balance. If this fallow period is shortened or skipped due to external pressures, the system crosses its regenerative threshold (extent of fallow-period), leading to soil degradation, reduced productivity, and long-term ecological imbalance.

Action in AET is to strengthen one component that creates a multiplier effect, often influencing several other relationships within the system, i.e., creating synergistic relationships (e.g., bees pollinating plants to increase fruiting) as against the GRT where the linkages are disregarded. The slide below summarizes the discussion.



To summarize, landscape-based agroecological transformation represents a profound shift in how we understand and engage with agricultural systems. Moving beyond individual farms and isolated interventions, this approach emphasizes the interconnectedness of all elements within a landscape - soils, water bodies, forests, biodiversity, human communities, and the broader environment. It recognizes that sustainable farming is not merely about reducing chemical inputs or increasing yields, but about restoring the ecological balance, social equity, and cultural knowledge that sustain life across generations.

This chapter has explored key principles that underpin this transformation: mutual interdependence, where each component of the ecosystem interacts with and relies on others; substitution, where external interventions can displace natural processes; externalization, which shows how over-reliance on external inputs weakens local ecological cycles; and specialization, where breaking apart traditionally integrated systems reduces resilience. These patterns highlight how modern agricultural practices, despite short-term gains, often erode the ecological and social foundations that long sustained communities and landscapes.

Central to agroecological thinking is the idea of regenerative capacity—the landscape's ability to recover, renew, and maintain its ecological functions. Traditional systems like jhum cultivation demonstrated a deep respect for these ecological limits, allowing landscapes to rest, regenerate, and continue to support life. But today, pressures such as market demands, population growth, and policy biases toward intensification threaten to push systems beyond these thresholds, risking long-term degradation.

A landscape-based perspective calls for a systems approach, where farming is seen not as an isolated activity, but as part of a living, dynamic web. It values diversity over uniformity, local knowledge over one-size-fits-all solutions, and collective stewardship over individual extraction. It invites a rethinking of agriculture—not just as a means of food production, but as a pathway to ecological restoration, social justice, and climate resilience.

RECONFIGURING THE SUPPORT SYSTEMS

Agriculture Support Systems in India evolved with, and for the spread of Green Revolution (GR). As explained earlier, these are meant for large scale adoption of GR technologies; premised on high productivity, external inputs, public investments and subsidies. *Figure - 2* illustrates this support systems carved out for GR and *de facto* became *sine qua non* for the agriculture support systems in India.

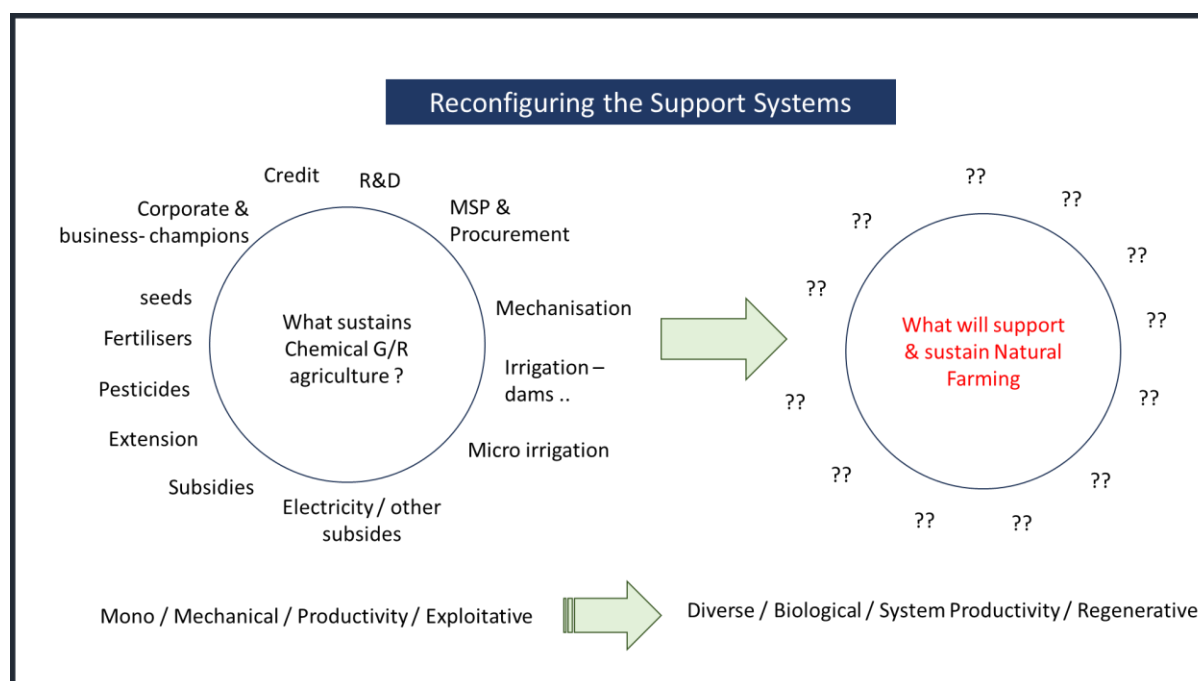


Figure - 2: Re-configuring the Support Systems

As the GRT is premised on monocultures/ mechanization/ grain productivity / and exploitation of resources, its support systems are built around delivering these as indicated in *Figure - 2*. The AET operates on the principles of diversity/ synergies in biological systems/ system productivity/ regeneration/ internalization of inputs etc.; these are an *antithesis* of GRT. For AET to spread, we need to reconfigure these support systems to align with the principles governing AET. This is one of the major challenges of agro-ecological transformation.

To realize the vision of AET, change is needed at multiple levels: in how knowledge is generated and shared, in how policies are designed and implemented, in how communities organize themselves, and in how natural resources are valued and managed and so on. Landscape-based agroecological transformation, therefore, is not just a technical process, it is a social, ecological, economic and political journey towards a more sustainable and equitable future for food, farming, and the planet.

The **two challenges** in moving towards AET are, therefore:

1. How to shift towards production systems that are – complementary, enable circularity in nutrient flows, integrated & Regenerative and,
2. Establishing enabling Support Systems that makes it easy for a farmer/ community to shift.



Chapter - 2

Tools for Exploring Agroecological Approaches

Understanding the landscape, its elements and their interaction is the first step in moving towards Agroecological Transformation. Such an understanding is naturally entrenched in the local communities.

Their current livelihood systems are rooted in navigating this complex system. How do we understand this complex system whose knowledge is with the local community?

WASSAN has evolved several tools to understand landscape agroecology and to explore options for development. This chapter provides an outline of these participatory analytical tools. Three of the tools used in the learning exercises with Heifer-India are detailed in this chapter.

- **ePRA:** It is a Participatory Method using Google Earth image/map of the landscape to explore the landscape features with the community. As a participatory spatial analysis tool, it combines GIS and Data generation methods. This is used to understand the landscape – the land, water, forests their typologies and trends.
- **Fasal Chakra:** a powerful tool used along with the ePRA to understand and analyse the crop systems and their relationship with the land types, soils, location etc., prevalent in the landscape. It enables exploration of multiple dimensions of the landscape agroecology – the trends in crop systems, climate vulnerabilities, input usage, fallow periods, local food systems etc.
- **Quick Assessment of Local Economy:** These participatory exercises help in understanding the local economy, consumption patterns and enable them to explore options for strengthening local circular economy.

ePRA- A Method for Participatory Mapping and Spatial Exploration of the Landscape

Understanding spatial patterns is an important part of landscape planning. The land-based production systems, their productivity, vulnerabilities to climate; land tenures and resource flows depend on the spatial patterns – slope, types of land, soil, water resources, forests, physical access etc.

Resource Mapping is a familiar tool in PRA to understand the spatial patterns. This is usually done on ground, facilitating the knowledgeable local participants to draw the resource map of the landscape on ground. The maps provide a picture at the end along with rich notes.

ePRA introduces a large format physical print of the landscape from Google Earth (GE); an opensource repository of remotely sensed maps available online. Participants are introduced to the map and facilitated to identify various resources on the map. The mapping will be done by the community on the physical map. As the map is to scale, the details can be digitized to develop data layers using open source QGIS. All the spatial data thus will be converted into digital maps and data that can be overlaid. The discussion is captured by the note keeper.

The ePRA exercise helps in mapping of various spatial variables on the map by the communities which when digitized gives a real time database.

■ WHY USE ePRA METHOD

ePRA method is meant for spatial exploration along with the community building upon their heuristic knowledge about the 'place' / landscape. It has the following advantages:

1. It is based on the Google Earth map that shows various landscape resources; the participatory maps are no longer arbitrary.
2. Visibility of data on the map – helps participants to have a bird's view of their landscape with various bio-physical features such as forests, streams, waterbodies, houses, roads, different types of lands etc. of the landscape.
3. Generates a lot of interest with the villagers as they probably will be seeing their landscape as a bird's view.

4. Since there is a bird's view of the landscape – interaction with various spatial based elements can be discussed. For e.g., access to water, location of land and its quality, where are the lands of the poor? Etc.
5. Mapping will be precise as the GE map is to scale, and features/ boundaries are visible clearly.
6. Above all, the data can be generated after participatory mapping using QGIS to digitise it and develop attribute layers that can be overlaid. The combination of GIS with participatory mapping liberates one from having access to much of the secondary data.
7. Familiarity with GE software helps with much deeper analysis as contours and other spatial analysis tools are available.
8. Can overlay other remote sensing maps also.
9. ePRA exercise provides very detailed Baseline Information for any project.

■ WHERE IS IT DIFFICULT TO USE ePRA METHOD?

1. ePRA depends on the GE map. Where there is high density/ canopy cover of vegetation the details are obscure and make it difficult to identify the features.
2. Also, where the GE maps are not updated/ coarse the feature visibility will be low.
3. GE maps are downloaded and the ePRA work will be physically printed out; therefore, there is no need for electricity/ network connectivity/ gadgets. But to download the GE map one needs to have good connectivity and facility for taking a printout on a flexi.

In the numerous exercises that WASSAN has carried out, it was observed that the rural communities can easily understand the maps after initial orientation; education is not a bottleneck for the exercise.

■ WHAT PURPOSES THE ePRA CAN BE USED FOR?

As mentioned earlier, ePRA is used for spatial mapping and pattern analysis. While the applications can be numerous depending on one's purpose, the following are illustrative purposes the method can be used for.

1. **Water bodies:** mapping of streams, water bodies of different types, their seasonality etc.

2. **Land Use:** Land use maps can be generated easily with people's knowledge and using their own indigenous classification of land. Different land types, their ownership/ tenure, quality, crops cultivated, their climate vulnerability etc. can be elicited drawing their interrelationships.
3. **Irrigation / Water Access:** mapping irrigated and rainfed lands
4. **Commons and Forests:** mapping of common lands, their types and status, product (NTFP) profiles, their use and access, encroachments etc., can be mapped.
5. **Grazing tracts of livestock** and availability of water in the grazing tracts.
6. **Tree Cover** and an assessment of diversity.
7. WASSAN uses it for various planning exercises, design of programs such as water collectives, generating baselines, and tracking progress in implementation - M&E – together with mobile based open-source tools.

In essence, ePRA can be used based on the user requirements.

It's main advantage lies in exploring spatial patterns along with the community blending people's knowledge of the place with modern tools.

THE PROCESS OF CONDUCTING EPRA – A STEP-BY-STEP GUIDE:

*There are **THREE STAGES** in conducting an ePRA exercise.*

1. Preparatory work,
2. Conducting the exercise on-field and
3. Post-exercise processing work

1. PREPARING FOR THE EPRA EXERCISE:

- a. *A large print of GE map* is necessary for ePRA. The approximate boundary of the landscape we want to explore is to be marked on the GE map for taking a printout. Preparing this map is the starting point of the exercise.
 - Take a small colour A3 size printout of the area of interest using Google Earth or open the Google Earth Pro application directly on a laptop. Along with a few local knowledgeable people familiar with the area demarcate key landmarks on the map that forms the

approximate border of the landscape/ village(s). Ensure the larger print covers some additional area on all four sides, as the boundaries will likely to be refined further during the field exercise.

- **Large Print of the area:** Make the area of interest zoomed in on the GE map and save a high-resolution image of the area (ensure – scale and ‘North’ direction marked on the image). Take a printout of the area set to A0 size or even larger (6 ft x 3 ft) as per the requirement’ ensure that the image does not get pixelated. A vinyl / flexi print at 300 dpi resolution is preferable. This allows key features such as roads, landmarks, and land use patterns to be clearly visible and easily interpreted by all participants.
 - If the landscape is larger covering many villages, make the entire landscape into sub-parts and organise the maps into different parts -each one helping the ePRA exercise in that sub-part.
2. **Keep all the material** such as colour pens, different colour threads, smaller bindis, cello tape, permanent markers (light colour), sticky notes, glue, whitener, charts, cards and scissors to be used to mark various features while doing the exercise.
 3. **Where we conduct participatory exercises** is very important. Identify key resource persons from the village who have extensive knowledge of the area. Inform all the villagers in advance about the day and time when the field exercise will be conducted. The place selected for the field exercise must have a shed ensuring a comfortable place for discussion, with good lighting and focused interaction with the community. Mind the locations where access is free to all and not restricted.
 4. **Who Participates in the Exercise?**
 - Decide on the participants based on the issues/ themes to be explored. It is important to have people with knowledge of the landscape to be involved.
 - Different age groups; women and men; people residing in different habitations within the landscape - give a multi-dimensional perspective on the landscape. The process needs to be inclusive and inviting.
 - People involved in the thematic area being explored is important.
 - While there will be some floating participants, it is important to retain key informants throughout the exercise.
 5. **Selection of Themes for exploration & data structure:**
 - ePRA exercise generates very interesting details of the landscape. There is a tendency of getting lost in the details as it unfolds. It is important to pre-select the themes/ issues to be explored in the exercise.
 - The purpose of the exercise needs to be precisely worked out. This leads to identifying the features to be mapped, the patterns to be explored (variables for data generation and their relationships) and the data to be generated.

- It is important to identify the data structures that will be generated through the exercise. For example, understanding land types – requires the following questions:

1. The local classification of land and the physical features of those land types.
2. Crops cultivated specific to those land types and the reasons for the same
3. Trends in crop cultivation in those land types
4. Climate vulnerabilities of crop cultivation in those land types.

The above questions lend themselves to generating data on different parameters. While the land types are elicited as a matrix exercise with cards, generating Tabular data, the occurrence of these land types can be marked on the map. This gives us total understanding of different land types and their spatial locations. This provides a rich data set built upon the local knowledge.

DEFINING ROLES:

Like in Participatory Resource Mapping exercises, it is important to define the roles of the facilitators before the exercise. The key roles include:

- i) **Facilitators:** These are the persons who will facilitate the exercise – asking questions; better to have two facilitators. Avoid multiple people asking questions or facilitating the discussion; if there are any questions – they need to be conveyed to the facilitators.
- ii) **Note Takers:** A good deal of information will flow while mapping which is important for understanding the patterns. One or two persons be assigned to take notes and organise the data and also, to prompt the facilitator on relevant questions.
- iii) **Motivator:** The person who keeps the community engaged in the exercise and avoids unnecessary distractions.
- iv) **Photographer:** there is a normal tendency for everyone to take photographs. Assign this role to one person or to the enablers.
- v) **Stationary management:** the features to be mapped on the map need to use different stationary. There will be:
 - a. point data (like a school building) – use Bindis or small colored stickers that can be pasted on the map
 - b. lines (like streams) – use threads (of different colors for different themes) to be pasted on the map with tape.
 - c. and polygons like boundary of a water body – draw it on the map with marker pens/ whitener etc.
- vi) **Gate keepers:** managing participants and keeping their interest alive and encouraging them to participate; also managing the floating people.

- b. **Plan the exercise** for a period of a maximum of 3 hours after which the participants may lose their focus. If there are details to be mapped, do it with few key informants for a longer period or multiple time slots.

■ CONDUCTING THE ePRA EXERCISE

1. The setting: Important to find a place where there is no disturbance, adequate light and air and comfortable. There must be space for spreading the GE map and people to stand around. Choose a time when required people can give time. Make people sit comfortably around the map.
2. Once the participants settle down, give a brief background on why this planning exercise is being conducted and ask for the time that they can spare/ to close the exercise.
3. Getting familiar with the GE map: Give some initial time for the community to understand and get acquainted with the map. Generally, the community rotates the map in the right direction as per their understanding of the village location and directions. The discussion also starts with identifying the major roads and habitations and other landmarks so that the participants get familiar with a bird's eye view of their village/ landscape.
4. Once the participants are familiar with the map, explore the boundary of the village/ landscape and draw an approximate outline of the village.
5. *'Hand over the stick'*: By this time some of the participants will be forthcoming to map the features; the facilitators slowly give control to these participants to mark features on the map and limit their role to asking questions. The participants will take over the mapping exercise. It is important to involve women and elderly people in taking over the exercise; the more they involve, the more knowledge we get.
6. Getting on with the exercise as per the design:
 - a. Plan the features to be explored and sequence them. Be patient till the feature is completely done.
 - b. In preparation of the exercise – write down:
 - each feature to be explored.
 - the stationary to be used to indicate the feature,
 - the questions to be asked and
 - the data to be noted

It is important to go sequentially on each feature and facilitate the discussion.

7. Keep the legend: For each feature the typologies (variants) can be depicted by different colours or give code numbers. On a chart by the side of the map – build the legend i.e. what the colour/ the Code indicates.
8. Summarise the map and the points noted on the feature to the participants once a feature is complete; and ask if anything is missing.
9. Take a photograph of the map from a height so that all the maps are clearly visible along with the legend. This will be useful for digitisation of the map.
10. It is good practice to leave the map within the village. As people get familiar with the GE map, it will be very useful for them in future discussions/ plans. The photographs are sufficient for our purpose for further work.

■ POST-EXERCISE PROCESSING WORK

The GE website can be used for digitisation or QGIS. It requires basic training in digitisation in either GE or QGIS; both are open source. Upon digitisation, the point data i.e. location of a specific feature, the lines (streams/ roads) and polygons (land parcels, water bodies) will be converted to vector data. Open the attribute Table and add the notes to the specific features that were documented during the exercise. The entire spatial database will be ready for further analysis.

■ HOW TO USE ePRA FOR PLANNING PROGRAMS?

Once the features are captured on the map, the map can be used for planning activities. For e.g., as the livestock grazing tracts and water bodies are mapped, the grazing tracts where water bodies / drinking water for livestock is not available can be easily identified. Raising this question prompts participants to identify such locations where a new water body can be created for livestock drinking water.

Another example is assessment of water bodies. While mapping the water bodies, embed the question- if there are any repairs to the water body are needed? Note the conversation. Yet another example is climate vulnerability. Ask the question – which land types (and crop systems there in) are vulnerable to climate variability. One can give a scale of 1 to 5 and ask participants to indicate this scale while delineating the land types.

All those ‘planning questions’ can be embedded in the facilitation, if the purpose is planned. The detailed action plans can be compiled post-exercise and in another session with the Gram Sabha – these plans can be presented in a consolidated form along with the map to get people’s ratification. Those plans can then be budgeted.

■ MAPPING LAND TENURE

If one intends to go in depth, the land parcels (plots) can be delineated and ask the question who owns/ cultivates the plot? Have an a priori list of all the farmers in the village and give them serial numbers. Farmer’s serial number can be written on the plot. Converting this data into vector in QGIS gives the attribute Table to enter the plot ownership. This enables the planners to identify the owners/ operators of the plots. From the database one can get who all needs to be involved while discussing a particular problem.

During the Bihar field visit to Rampur Bharamdas village in Jaffarpatti Panchayat, Vaishali District, the challenges faced by the community across different production systems and natural resources was explored. Heifer-India is working in this area. The map below highlights various land types, water resource locations,



sample irrigated areas used by farmers, and areas where irrigation water is sold to neighboring farmers. It also marks different horticultural plots in the village. As part of the exercise, each production system—such as crops, goat-rearing, poultry, large ruminants, kitchen garden etc.—was discussed in detail. We also examined the status of different natural resources, their characteristics, the community’s dependence on them, and the key issues associated with their use. Broader strategic areas for action emerged from these discussions, informed by both technical observations and farmers lived experiences. The use of Google Maps provided spatial clarity—helping to visualize not only the location and extent



FEW POINTS TO REMEMBER

- The community usually does not spend more than 2–3 hours at a stretch; therefore, questions should be crisp and easy to understand.
- The entire exercise may take 2–3 days, depending on the purpose and the depth of information required.
- Once the broader strategic areas emerge, smaller groups within the community—those impacted by the identified strategic areas—can be engaged for more detailed discussions.

CONCLUSION

ePRA is more than just a data collection method—it is a participatory approach that bridges the gap between planners and the community. By actively involving villagers in mapping and discussions, it captures authentic, real-time insights into their lives, resources, and challenges. This grounded understanding enables more inclusive, responsive, and sustainable planning.

Digitizing ePRA maps using tools like Google Earth Pro helps preserve local knowledge and integrate it into broader planning and decision-making processes.



Chapter - 3

FASAL CHAKRA

A Participatory Method to Explore Patterns of Time & Space and their interactions

WHAT IS FASAL CHAKRA?

Fasal Chakra (meaning Crop Cycles) is a participatory method used to understand crop systems in different land types and their vulnerabilities at the landscape level building upon the community knowledge. It helps explore the interconnections between crops, land/soil types, and local climate systems. The Fasal Chakra exercise provides a method to understand climatic vulnerabilities across different land types and cropping systems; and the food systems.

Developed in the process of WASSAN's field experiences in planning for natural farming, Fasal Chakra brings forward indigenous insights into agro-ecosystem dynamics, supporting more grounded and context-specific planning.

WHY FASAL CHAKRA (FC)?

The primary purpose of the Fasal Chakra 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. It helps in making informed decisions on crop-systems diversification, planning agricultural interventions, and improving overall agricultural system productivity in the region.

- **Fasal Chakra and System Productivity:** In place of conventional ‘yield gap’ analysis that looks at a particular crop, FC provides a method to locate yields in a plot in the ecosystem context resulting from an intersection of multiple variables- the land type, soils, moisture regime, elevation etc.
- **Fasal Chakra & Climate Risks:** FC exercise also allows understanding of the climatic risk each cropping system is experiencing in different land types. This includes details such as the type of climatic risk, its month of impact, type of impact. The discussion also helps to understand current coping mechanisms, best practices, if any, and also facilitates discussion to co-create solutions along with the community.
- **Fasal Chakra & Crop Diversification:** Combined with a Trend analysis of crop systems in each land types, FC provides an insightful tool to explore the crop systems and to facilitate a discussion in crop diversification or on increasing cropping intensity to ensure soil is covered for 365 days with live crops.

FC exercise can be adapted for multiple purposes in a landscape analysis in addition to the above – say for exploring farm mechanization options, food systems analysis, input usage and replacement etc. In combination with ePRA, using FC one can make a quick assessment of the products and productivity of the landscape that can be used for planning for markets. FC is a flexible tool; its core use lies in analyzing intersections of landscape, climate and crop systems into a systems analysis.

CROP SYSTEMS PLANNING IN A LANDSCAPE - AGROECOLOGICAL SETTING

Crop systems planning in agroecological transformation / natural farming will have the following purposes:

1. Crop diversification and introducing multi-crop systems. While the main crop continues to focus on income, understanding opportunities for crop diversification to provide for:
 - Nutritious food for farm households
 - Fodder for livestock
 - Biomass for soil

- Income from supplementary produce that will meet the operational expenses so as to reduce the risks in loss of maincrop.
 - Reduce Climatic Risks
2. Ensuring covering of the soil with live roots for 365 days or as long as it is possible.
 3. Enabling the turn-over of 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, understanding the trends over time and the risks involved in the current practices.

FASAL CHAKRA EXERCISE

Fasal Chakra exercise generally takes about 3 hours' time and is best done in an area where there will be not much interference from onlookers.

1. SETTING UP FOR THE EXERCISE

- A. **Participants:** The *Fasal Chakra* exercise is taken up with key persons in the village – women and men; old and young, who have knowledge of the landscape and cropping cycles. Involving elderly 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, mid-land, lowland etc., in different parts of the landscape. A mix of people – old and young, women and men, small and marginal, and large farmers, etc., adds value to the exercise.
- B. **Choosing the 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 organized 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.
- C. **Material Required:** *Fasal Chakra* exercise is best taken up on the floor as it helps in community, women in particular, to have a major role; and it makes the exercise highly flexible. In the absence of a clear floor area, it can be taken up on large brown sheets; as the area required is large, stick four large brown sheets together.



For SMALL group (brown sheets)	For LARGE group (brown sheets)
• Brown Sheet • Sticky tape • Thread • Bold Marker • Sketch pens • Glue stick • Colour Sheets • Small stones • Flash cards • Scissors/paper cutter	• Rangoli • Chalk stick • Thread / Rope • Bold marker pens • Sketch pens • Glue Stick • Colour Sheets • Small stones • Flash cards • Scissor/ paper cutter

2. FACILITATION REQUIREMENTS

Fasal Chakra is an intense exercise. It requires familiarity of the facilitator with the subject. Conducting this exercise requires three roles:

- An **informed** facilitator
- A person who is **documenting**; documentation is the key, as so much location-specific information and knowledge flows from the participants
- A person **to engage** with the participants, encouraging them to interact and share, supporting the facilitator.
- A **boundary manager**, who deals with unwanted external persons interfering with the exercise.

3. DEFINING THE PURPOSE & KEY QUESTIONS:

Since the participants' time is precious and limited, it is important to define the scope of the exercise and its purpose. As the exercise can potentially unfurl a great deal of knowledge with the community – it is important to set limits to the exploration; within what can be concluded in about 3 hours' time. Setting up the exercise requires at least half an hour to 3/4th hour time.

List the key elements of exploration; and in each element, list the key questions that need to be explored. Write down these questions on flash cards.

It is important to complete the ePRA exercise before the FC exercise. ePRA exercise will give the land types, their characteristics and the related crop systems etc. Since we are exploring the intersection of Land Types, Climate and Crop systems – an understanding of the Land Types (including irrigated and rainfed) and their extent is crucial.

4. 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 a listing of various land uses in the village. Note these on flash cards – one land use on one 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.

In the following the exercise is limited to agriculture land (including fallows).

The exercise starts with the following question:

- *What are the different types of agricultural land occurring in the landscape?* This question in the plenary generates discussion on the listing of various Land Types as they occur in the village. Relating to the land use in facilitating the discussion will be useful. (start with this if ePRA exercise is not done before).
- List the Land Types – one each on a card.

Exploring Land Types with Participant Groups: *Form small groups of participants and give one (or more) land-type cards to each group for discussion; the group tasks are two:*

- a. **Detailing the characteristics of the Land Types** – this explains the differences between each of the land types- includes the soil type, 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’?

- b. **Detail the crops and varieties** (including local ones) cultivated in each of the land types. Capture the crops and varieties, and their 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 types:*

- 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?

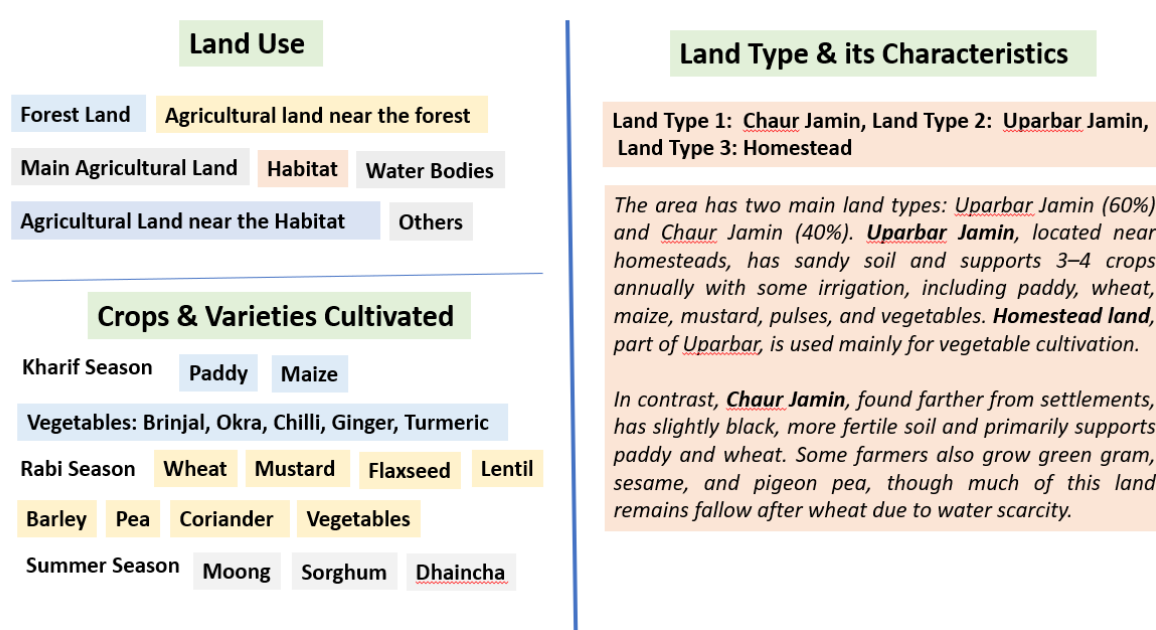


Figure - 3: Understanding Local Land Use and Land Types: Insights from the Fasal Chakra Exercise during Bihar Field Visit of HI

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 know:

- Land uses
- Different land types and
- Crops and varieties are cultivated in different seasons in each of the land type.
- Changes in the crop systems in each land type over time.

5. CREATING FASAL CHAKRA

Information in the *Fasal Chakra* evolves in concentric circles as a visual for facilitation. The concentric circles are split into 12 months radially to depict the months in a year. If the community has any other classification of time – use such classification (such as *Karte in Telugu calendar*) as community can better relate to it. Label each month by its name.

a. Prepare the Base:

- Mark the center of the concentric circles. Use a thread or a rope to mark the circles from the center point for the concentric circles.
- Draw the innermost circle and the outermost one. The innermost circle is used to map the rainfall pattern. The gap between these circles depicts the agriculture area in the landscape.

b. Draw 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 of the number of land types listed. i.e., for three land types, draw four concentric circles.
- The inner smaller circle is to get information on the rainfall.

e. Local perception on rainfall pattern

- Ask the participants to depict the local month-wise rainfall in the calendar in the innermost circle. Use the following categories of rainfall to depict the intensity and duration of the rainfall.
- **Rainfall categorization:** (i) 0 – no rainfall, (ii) I – very low rainfall, (iii) II – low rainfall, (iv) III – medium rainfall, (v) IV – heavy rainfall, (vi) V – 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 conditions in winter, like dew.

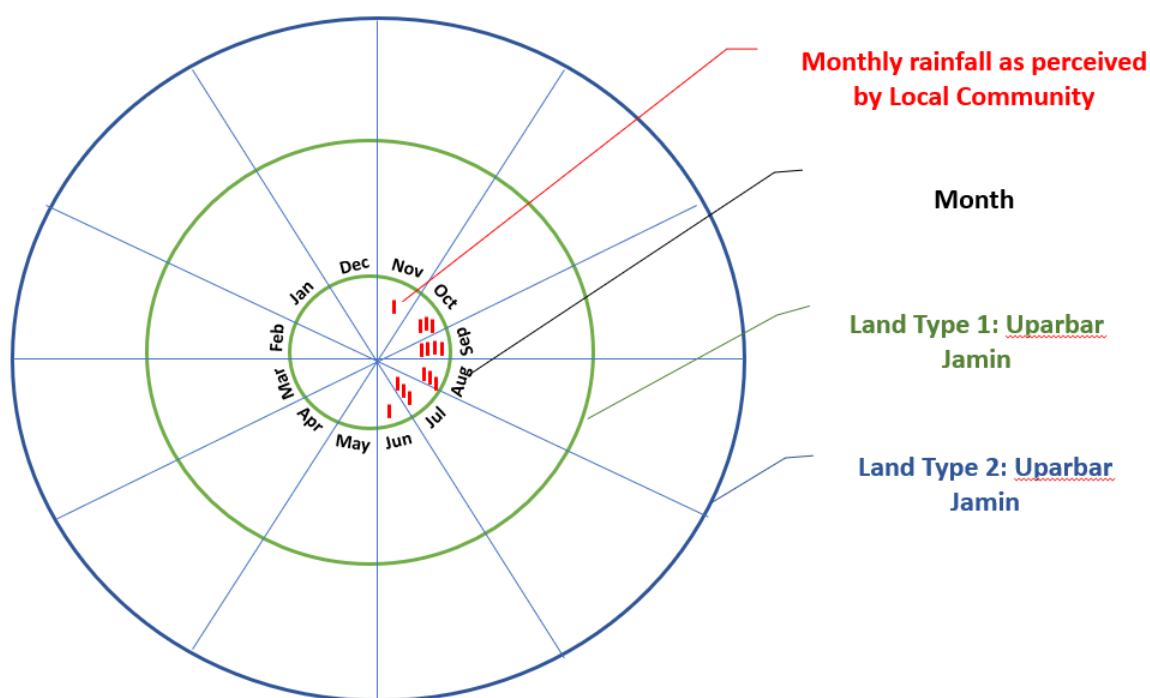


Figure - 4: Monthly rainfall as depicted by the participants in Bihar field exercise

6. DETAILED CROP SYSTEMS INFORMATION

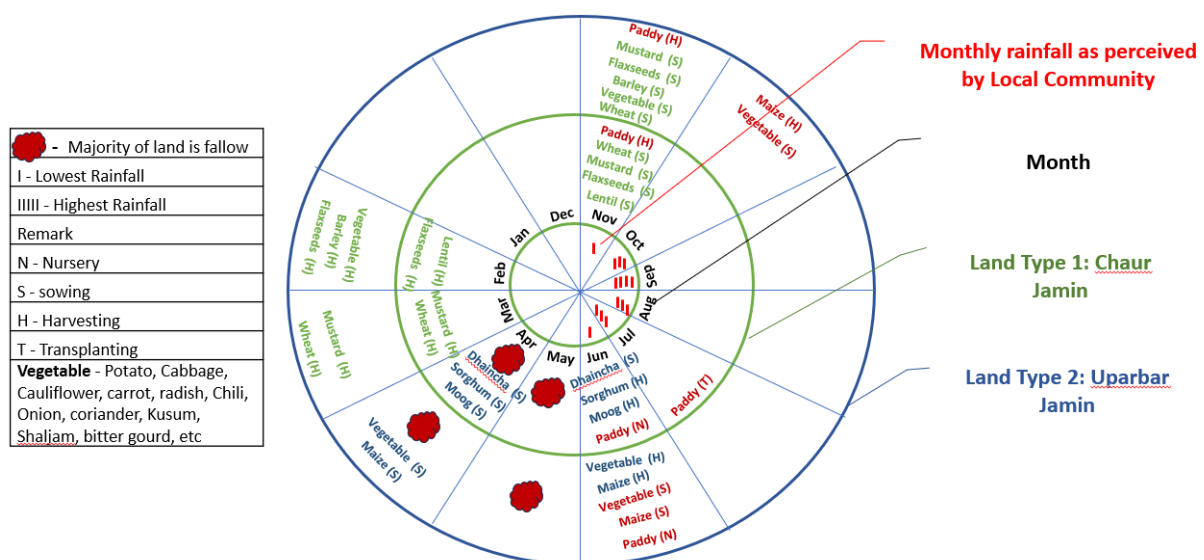
Divide the gap between the innermost circle used to depict rainfall and the outermost one into as many concentric circles as the number of Land Types identified. The space in between the circle lines depict one land type where information on crop systems in each of the land type can be filled in.

- a. **In each Land Type Circle** – mark the crop cycle (crop/ crops (if intercrops are there) with the information as follows on smaller cards:
 - *Crop name* – with duration in days, and approximate yield.
 - *Sowing time, weeding time, inter-cultivation, and harvesting* – 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 the Rabi crop is also taken up, have cards for the Rabi crop and capture the seasonality of operations, sowing, and harvesting windows. Mark the 'windows' of time when the weeding/ harvesting expands over time period.

- 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 in these months showing the 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 flash cards of different colour for each crop system within the Land Type.
 - Ensure consistency in using symbols for harvesting across all land types and seasons.
 - Continue this exercise to get information from all the groups i.e., all the land types.
- b. Ask what percentage each land type constitutes within the total landscape being studied. This gives a picture of the relative prominence of the particular land type. The facilitator may also ask – approximately, how much area will be there in each landscape?

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

- Monthly rainfall includes frequency of off-monsoon rains.
- Information on crops in 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.



7. EXPLORING ACTION AREAS RELATED TO CLIMATE VULNERABILITY

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.



GIVE A TEA BREAK

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

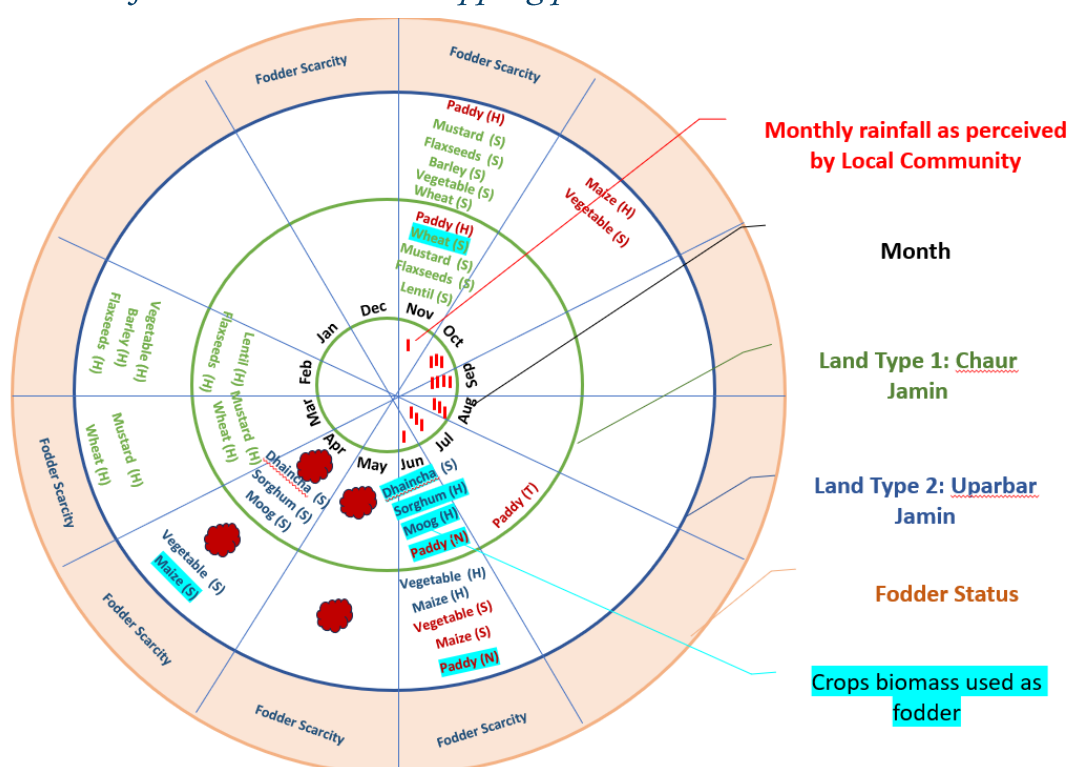
1. **Risk Analysis** - Given the constraints of the land type and the current crop systems and rainfall map ped, ask:
 - Where are all the risks along the crop cycles across the 12 months in each of the land types? Mark the risks identified on cards and place in the respective time period. After indicating the risks, ask for the relative ranking of the risks, highest to lowest (mark with some colour).
 - 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.
2. **Regenerating fallows / 365 days crop cover** - The stones in the months in each land type depicting the fallow months provide a visual picture of how much of the landscape will be fallow and soil exposed to 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, and others in the fallow periods?

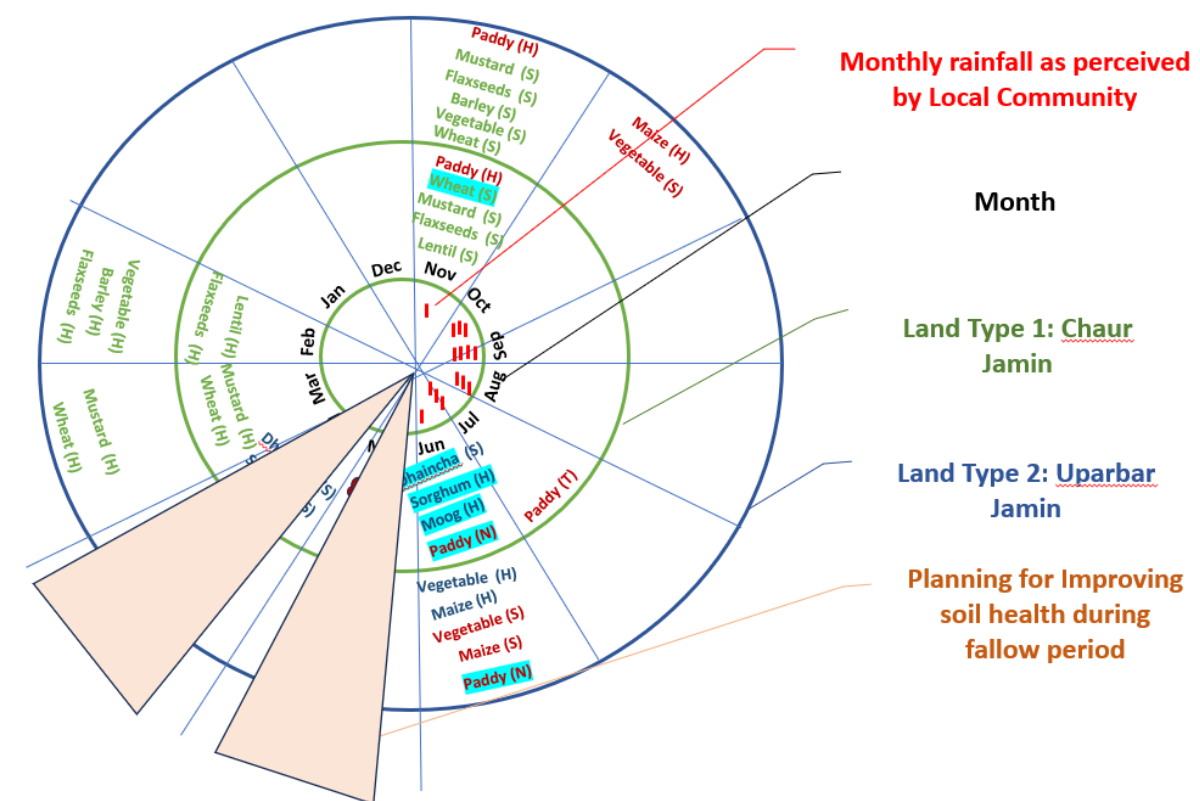
The ensuing discussion may suggest action areas for exploring crop systems changes that ensure multiple crops are cultivated covering soil as many months as possible across the year.

3. **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 farmland 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 crop systems changes 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 crop systems changes. A detailed exploration of all such action areas may be developed further into specific programmatic action.

A detailed plan based on this approach is shared in the Bihar Field Visit Report. Similarly, the Fasal Chakra can be used as a base layer to develop other integrated plans—such as household nutrition plans, climate risk mapping, agricultural machinery needs, and soil health improvement strategies—by overlaying relevant information onto the cropping pattern.





- Getting required organic matter to turn into soil is a major constraint in improving soil health. During the months of April, May, and June, majority of the land remains fallow. However, pre-monsoon showers during this period present an opportunity to improve soil health. Broadcasting seed pellets of locally available pulses, vegetables, fodder crops, green manure crops, and millets, and incorporating the resulting biomass into the soil after 30–40 days—prior to Kharif sowing—significantly enhances soil fertility and microbial activity; this method is called PMDS (Pre-monsoon Dry sowing). FC exercise helps in identifying the scope of PMDS in different land types.
- Improving crop management practices through the application of locally prepared bio-inputs made from readily available materials can reduce dependency on chemical fertilizers and pesticides. These bio-inputs offer a sustainable alternative for nutrient and pest management. FC provides a basis for identifying where and how the current chemical inputs can be replaced by bio-inputs.
- Crop diversification, particularly in combinations of cereals, pulses, fodder crops, millets, and green manure crops, promotes the growth of diverse soil microbes, contributing to healthier and more resilient agroecosystems.

All these discussions can be effectively triggered through the Fasal Chakra exercise, which offers a base to explore. It helps communities discuss and prioritize actions such as crop system changes, risk mitigation, soil health improvement, and integration of nutrition-sensitive crops, others leading to practical, locally relevant planning.

SUMMARY

Fasal Chakra is an exercise to explore and understand the intersections of land types, climate, and crop systems. Piloted and evolved in various programs of WASSAN, the Participatory Method is now integrated into several natural farming/ agroecology programs such the JIVA- Agroecology program of NABARD.

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 *Fasal Chakra* – participatory method.



Chapter - 4

Exploring Circular Economy

WHAT IS THE CIRCULAR ECONOMY?

In rural landscapes, a circular economy means keeping nutrients, energy, and value circulating within the village or local area. According to FAO (2022), “circular economy in agri-food systems promotes resource-use efficiency, reuse of biomass, nutrients, and water, while enhancing ecosystem services.” This approach helps reduce the need to bring in materials or products from outside, cuts down on pollution, and supports small village-based businesses.

Insights from ePRA & Fasal Chakra Exercises:

The ePRA and FC exercises provide a deeper understanding of the landscape, its production systems and products. During a field exercise in Rampur Brahmdas village of Bihar, the Fasal Chakra revealed that the majority of households primarily cultivate paddy, followed by wheat. Some households also grow vegetables on their homestead land. This monocropping of paddy and wheat has led to a heavy reliance on external markets for basic consumption goods, many of which can be potentially cultivated locally. ePRA exercise highlighted limitations of water availability and poor soil health resulting in high chemical consumption.

The exercise on Village Circular Economy further helped in assessing the level of external dependency while identifying opportunities for internalizing inputs to retain value, nutrients, energy, and resources within the local landscape.

The core aim of this exercise is to explore opportunities to enhance circularity in the rural economy by minimizing leakages such as nutrient loss, energy waste, and the outflow of economic value, and instead internalizing both economic and ecological flows within the village.

The Participatory exercise on exploring Village Circular Economy is structured around two main components viz.,

1. **Understanding consumption expenditure**, which captures data on goods and services regularly purchased by village households, such as vegetables, fruits, meat, pulses, etc.
2. **Understanding agricultural input expenditure**, which documents spending on farming inputs like seeds, fertilizers, pesticides, machinery, and labor.

Together, these datasets help visualize the scale of economic outflow and uncover areas where local alternatives and enterprises could replace external dependencies. This forms the basis for community-led discussions and action on strengthening local economies, retaining value within the village, and promoting a more circular and regenerative rural landscape.

LOCAL CIRCULAR ECONOMY ANALYSIS – PARTICIPATORY EXERCISE

- **The Method:** The exercise is to approximate the average consumption expenditure of households in a group and its structure; mainly focusing on food related items. The average consumption expenditure is then projected to the village to get an approximate structure of consumption expenditure – both on food items and inputs into agriculture.

Participants are then grouped around each commodity cluster tasked to discuss a) what are the ways the consumption expenditure can be localized and b) what actions are needed to achieve this.

The method is a crude approximation used to trigger visualization of the local economy and exploring various options for local enterprise development.

- **The Process:** This exercise is typically conducted in a workshop mode with participants from diverse groups of people in the landscape; more diverse the group, better approximation of the average consumption expenditure. About 30-50 participants would be ideal.

1. **Arriving at frequency:** The opening question "How frequently do you purchase your household commodities from the market?" and the ensuing discussion leads to arriving at the time period for which we need to get data on consumption expenditure. It can be weekly or monthly as per the group's decision; monthly data is easy to visualize.

2. **List of the Commodities:** Encourage open sharing of all items such as rice, oil, vegetables, fish, meat, etc., that the participant group will buy from markets. Here ensure that the participants respond to their own household situation. Create a consolidated list of frequently purchased commodities based on participants' responses. Group the commodities – as rice, millets, oil, vegetables. etc., so that the list is not unwieldy; group the commodities as much as possible. The category of items that cannot be produced locally (sugar for e.g.) or substituted with locally produced products (snacks/ chocolates for e.g.,) may be placed in the category – “others” to simplify the process.
3. **Develop the Matrix:** Use different color flashcards, assigning a distinct color to each type of commodity (e.g., green for vegetables, yellow for oil, etc.). Lay out the flashcards on the ground in a horizontal line, so each color-coded card represents a category.
4. **Get information from participants:** Distribute small size (1/4 of the size) color flashcards to participants along with markers or pens. If seven categories are created based on the above discussion, then each participant should receive seven cards—one for each category. Ask the participants to write down the monthly expenditure in their household on each of the commodity groups on the specific color flashcard. Ask them to write a) approximate quantity consumed b) monthly expenditure on the commodity. Maintain a standard orientation of the flash card (portrait or landscape) – to enable easy compilation of the matrix Table.

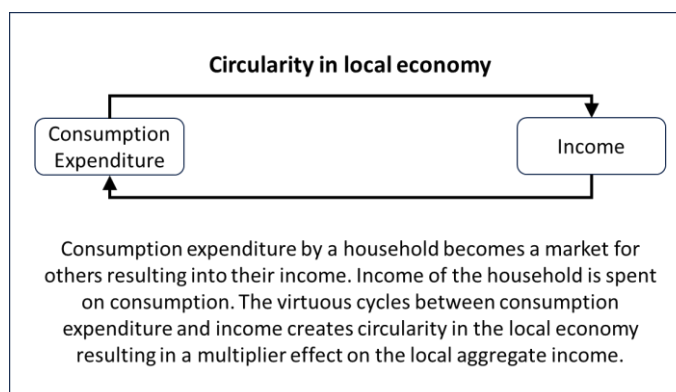


5. **Compiling the Data from Participants:** Instruct participants to place their filled flash cards vertically below the matching flashcard (commodity). This forms a table with columns indicating the categories and rows giving HH details of the quantity of the commodity and its cost.



6. **Analyse the data:**
 - a. Calculate the average consumption expenditure per household (HH) on each commodity based on the data compiled. This will involve summing up the expenditure for each commodity across all households (sum of the vertical column) and dividing by the total number of households from which data was received. One may also sum the total expenditure per household (sum of rows) to arrive at total expenditure per household on all the commodity groups.
 - b. Extrapolate the expenses commodity-wise to the village level by multiplying the calculated average expenditure on each commodity by the total number of households in the village. This calculation will give the total amount a village spends on each commodity – the figure that will provide a crude approximation on what is going out of the village.

7. **Explain the concept of ‘Circularity’ in the economy:** It can be illustrated with the example of vegetables – if 100 households in a village are purchasing vegetables from a market supplied by outsiders spending Rs.200 each week, the total consumption expenditure of Rs.20000 will go out of the village. If vegetables are produced within the village and purchased by these 100 households, the Rs.20000 (Rs.10.40 lakhs per year) becomes a market / income for the vegetable producer in the village. The vegetable farmer spending that income on other goods produced within the village – creates demand/ market for such goods and income for that producer. Thus, the aggregate income will have a multiplier effect.



8. **Plenary Discussion and Reflection:** In the plenary, facilitate reflection on the average consumption figures arrived at with the following guiding questions:
- The quantum of consumption expenditure that is going out which can create potential multiplier effect.
 - Scope for local production or substitution of the externalized consumption expenditure
 - Ideas for the circular economy or local value addition

EXAMPLE OF BIHAR FIELD VISIT

The table indicates weekly expenditure made by farmers in the purchase of vegetables, pulses, oil, cereals, fruits, and non-veg.

Sr. No	Name	Member	Vegetable	Pulses	Oil	Cereals	Fruits	Nonveg	Others
1	Lakkhi Devi	7	175	280	130		190		430
2	Ranju Devi	6	295				500		
3	Indu Devi	7	185	120			100		350
4	Ninta Devi	6	300	120	135		360	400	560
5	Harindar Singh	12	400	270	150	1500	1000		
6	Ram Bihari		170	150	100		810	520	300
7	Lakhan Singh		170	120	160		810		250
8	Gayatri Devi	5	90	130	120		165		100
9	Changla Devi	11	310	80					
10	Lakhiya Devi	6	185		130				
11	Sharmila Devi	7	100						
12	Devnati Devi	5	95						
13	Indu Devi	6	135				390		

Sr. No	Name	Member	Vegetable	Pulses	Oil	Cereals	Fruits	Nonveg	Others
14	Sharmila Kumari		310						
15	Ranju Devi	5	80						
16	Asha Devi	5	275						
17	Anuradha Devi	4	260						
18	Tetri Devi	18	220	200			305		
19	Dulariya Devi	4	150						
20	Shraddha Devi	4	100						
21	Kanti Devi	9	30						
22	Sheela Devi	15	220						
23	Asha Devi	3	200	100					
Average Members in HH		7.25	194	157	132	1500	463	460	332
Annual Expenditure of 130 HHs			1309383	1061320	893286	10140000	3129880*	3109600*	2242067

Note: When this exercise was conducted, the village was observing the Chaitra Chhath Puja festival. As a result, the expenditure on non-vegetarian items was lower, while the expenditure on fruits was relatively higher than usual.

From the Fasal Chakra exercise, details of crops cultivated season-wise in the village emerged, and during the ePRA exercise, the areal extent of major crops was also captured. Based on this understanding, it was found that paddy and wheat are the two dominant crops cultivated. A smaller proportion of green gram, mustard, and flaxseeds are also grown. Additionally, vegetables are mainly cultivated on the Uparbar jamin.

When extrapolated to **130 households over a period of 52 weeks**, the expenditure data indicates that the village collectively spends approximately ₹13 lakhs **annually** on vegetables, ₹10 lakhs on pulses, and ₹9 lakhs on edible oil.

- This raises several planning questions that can be discussed with the community:
- Can the village become self-sufficient in vegetable cultivation? If yes, how can this be achieved?
- Since paddy is a monocrop, is there scope to diversify bunds with pulse crops?
- Can local dal processing be initiated within the village?
- Households that cultivate mustard tend to consume oil extracted from it. Can an estimate be made to assess whether 60–70% of the village's oil requirement can be met by diversifying wheat with oilseed crops such as mustard and flaxseed?

Similar discussions can also be triggered around the expenditure on fruits and meat, exploring how local production could reduce dependency on external markets.

9. Arriving at Action Plans:

The next step is to arrive at action plans. From commodity wise groups and task, them with arriving at:

- a) What is the scope of internalising the consumption expenditure within the village?
- b) Why is there no such internal production? Or dependency on external markets?
- c) What all needs to be done to internalise the consumption expenditure on that commodity?

The group discussion will lead to identification of production, processing, markets and related interventions. Let the imagination fly without looking at feasibility or viability, which can be looked into at a later date. The discussion may also be on what items can be substituted by locally produced goods. For e.g., the expenditure on *Kurkure* / *biscuits* – can that expenditure be substituted by locally produced snacks?

The Local Circular Economy exercise thus provides us an economic understanding of landscape production and triggers the imagination of the participants on strengthening the local economy and circularity; this is besides, having a first approximation on what enterprises to be promoted in the area.

CIRCULAR ECONOMY EXERCISE TO UNDERSTAND THE AGRICULTURAL INPUT EXPENDITURE

After gaining an in-depth understanding of the cropping pattern by land type through the Fasal Chakra exercise, a detailed analysis of the cost of cultivation for major crops is to be conducted to assess the expenses involved at each stage of the cultivation process. This exercise involves focused group discussions with farmers to document the costs incurred, from land preparation to threshing.

During these discussions, farmers provide valuable inputs on expenses related to land preparation, seed procurement, sowing, intercultural operations, irrigation, fertilizer application, pest and disease management, harvesting, and post-harvest handling.

The process also reveals region-specific challenges. For instance, during the field visit to Bihar, the cost of irrigation per crop cycle was found to be particularly high. Moreover, the discussions helped clarify the relationship between input costs, crop productivity, and market prices. It is important that one designated person is responsible for detailed note-taking during these discussions, while another facilitates and moderates the conversation with the farmer groups.

This analysis plays a crucial role in identifying opportunities to reduce input costs—such as those for labour, seeds, pesticides, fertilizers, and irrigation—through better planning. It also highlights the need to reduce drudgery by introducing small-scale equipment tailored to small landholdings. Promoting local, low-cost solutions—such as the preparation and use of bio-inputs made from locally available materials—can significantly lower expenses related to fertilizers and pest and disease management. Such discussion will trigger the idea of moving towards agroecological approaches/ natural farming.

Table: Cost of Cultivation of Paddy Crop – Data from Bihar Field Visit

Particular	Unit	Cost	Conversion	Total Cost / Acre	% of the total	Internalize
Land Preparation - Main plot	Kattha	300	22.5	6750	12%	
Seed	Kg	400	6	2400	4%	
Transplantation		200	22.5	4500	8%	
DAP (Diammonium Phosphate)	kg/katha	300	22.5	6750	12%	
Potash	kg/katha	30	22.5	675	1%	
Thymus??	kg/katha	50	22.5	1125	2%	
Nitrogen	kg/katha	10	22.5	225	0.4%	
Calcium	kg/katha	50	22.5	1125	2%	
Zinc	kg/katha	70	22.5	1575	3%	
Weeding	Rs/Katha	200	22.5	4500	8%	
Harvesting	Rs/Katha	300	22.5	6750	12%	
Irrigation	4/Entire Crop	600	22.5	13500	25%	
Bagging		20	40	800	1%	
Threshing	Rs/Hr	1000	4	4000	7%	
Total			4500	54675		

Rows highlighted in green indicate cost components that have the potential to be reduced or internalized within the village using locally available resources and solutions. (Refer Bihar visit report for details)

CONCLUSION

The Circular Economy Exercise provides a practical and participatory way to crudely approximate both **consumption and agricultural input expenditures** at the household and village levels. It enabled communities to:

- Recognize economic outflows and dependencies on external markets.
- Visualize opportunities for **local production, value addition, and enterprise development**.
- Plan for **self-reliance** through crop diversification, input reduction, and use of local resources and moving towards agroecological approaches / natural farming.
- Identify areas for **immediate action**.

By overlaying this analysis with the insights from the **Fasal Chakra and ePRA**, the exercise strengthens village-level planning, promotes **resource efficiency**, and supports **agroecological transitions** rooted in community knowledge.

Chapter - 5

Participatory Methods for Livestock Situation Analysis

This section introduces few participatory methods for analysing the situation related to livestock in a landscape. The three methods viz., 1) understanding the purpose of rearing livestock, 2) understanding the challenges in livestock rearing and prioritising action areas and 3) understanding seasonality of livestock diseases and ranking them.

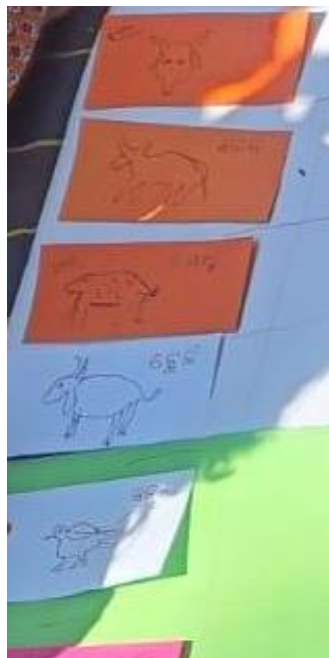
These tools help in preliminary assessment of livestock situation, but more is needed for livestock situation analysis in a landscape transformation context.

Exercise 1: Purpose of Rearing Animals

This participatory exercise is designed to understand the diversity of livestock in the village and the various purposes for which they are reared. It also aims to capture how many households currently rear different types of livestock (structure of livestock holdings) and how this has changed over the past 20–30 years i.e. trends in livestock rearing.

- **Materials:** Rangoli powder or chalk, Symbols or cards representing various livestock species, Symbols or cards representing different uses (e.g., milk, meat, draught power, manure, income), Small stones, sticks, or stars for ranking
- **Method: Developing livestock purpose Matrix:** Begin by asking participants to name all the livestock species currently reared in the village (e.g., cows, buffaloes, goats, sheep, poultry, pigs, bullocks, etc.). Place symbols or cards representing each animal vertically on the ground (or chart paper), one below the other forming rows. Ask participants to name the different purposes for which animals are reared (e.g., milk, income, manure, draught, meat, etc.). Place these horizontally across the top of the Table (columns). This gives a two-way Table for eliciting further information.

-



- **Community Ranking:** For each livestock in the row, ask the group to discuss and indicate the importance of each use. Use stones or draw stars under each use to indicate importance – from 1 to 5 stones: 5 being the most important and 1 being the least important. Repeat the process for each type of livestock to complete the Table.
- **Trend Analysis of Livestock composition:** Facilitate discussion about how livestock ownership and use have changed over the last 20–30 years. Ask which animals were reared in the past that are no longer common? What new animals have been introduced? Why?
 - The ensuing discussion and the reasons for structural changes in livestock composition and numbers, will provide useful information related to the landscape and livestock interactions over time. Several issues get flagged. Taking notes on the discussion is important.
 - It is important to explore and understand if there are specialised communities rearing livestock such as goat rearers or sheep rearers/ herders in the village. Explore their numbers and changes over time in their holdings.
- **Explore Contextual Issues:** Explore in the focused group discussions with livestock rearers on grazing patterns, access to forest land, fallows and availability of fodder. Identify any conflicts or challenges associated with livestock rearing and natural resource use.

DISCUSSION POINTS

- What are the primary and secondary purposes for rearing each animal?
- How do different social or economic groups prioritize livestock and their uses?
- What are the observable trends in livestock ownership over the past decades?
- What challenges do farmers face in accessing grazing resources or fodder?
- What is the role of livestock in agriculture and in the economy; and, what is the dependence of specific communities on livestock?
- What is the role of livestock in circulation of nutrients across the agriculture and commons landscape?

This exercise helps uncover the community's reasons for rearing different types of livestock, highlighting their relative importance, cultural significance, and contribution to household livelihoods. It also provides insights into changing trends over time and the resource dependencies associated with livestock rearing.

The illustration reflects the community's prioritization of the various purposes for which livestock are reared.

Exercise 2: Prioritizing Challenges in Livestock Rearing

Once the purpose of livestock rearing and the prioritization of different livestock species are completed by the community, the next step is to identify and prioritize the key challenges associated with the **highly prioritized livestock** from the above exercise.

For example, if cows and goats are ranked as the most important livestock in the first exercise during the initial exercise, a focused discussion should be held to understand the specific challenges related to rearing these animals. These may include Fodder scarcity, Animal health issues, Scarcity of drinking water, Lack of access to local treatment facilities, Market-related constraints, Poor housing or shelter for livestock etc.



PRIORITIZING CHALLENGES

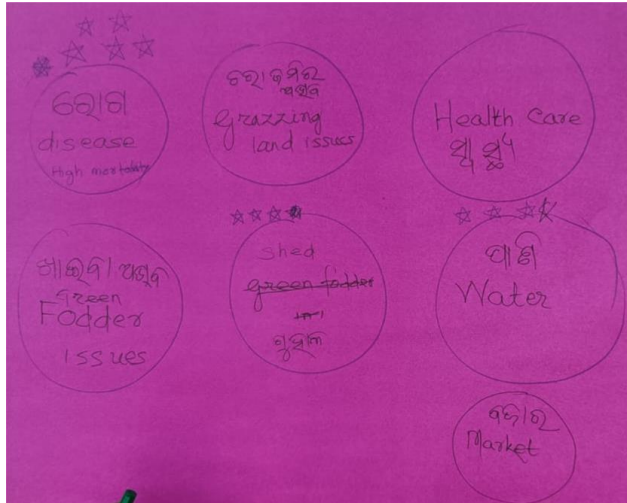


Figure Prioritising challenges in livestock rearing, Koraput, Odisha

Once a list of challenges is generated through focused group discussion with community members, the next step is to prioritize these challenges. This helps to focus the discussion and action planning on the most critical issues.

If **animal healthcare services** emerge as a major challenge, the **Venn Diagram** tool can be used to explore and analyze the availability, accessibility, and effectiveness of animal health service providers in the village. In a village exercise where H-I is working in Koraput district of Odisha, community prioritised diseases, livestock shelter and livestock drinking water as the most important challenges.

Exercise 3: Analysing Animal Health Care Services using Venn Diagram

The **Venn Diagram** is a participatory tool used to identify existing institutions or service providers in the village, understand their roles and relevance to livestock rearing and assess their importance and accessibility from the community's perspective.

Institutions may include:

- Government agencies (e.g., Veterinary Hospital, Animal Husbandry Department)
- Local institutions (e.g., RBKs, Panchayats)
- Private sector players (e.g., veterinary pharmacies, agri-input shops)
- Community service providers (e.g., trained animal health workers, traditional healers)

NGOs working in livestock or animal health.

FACILITATION STEPS TO CREATE A VENN DIAGRAM

1. **List the Institutions & assess their importance:** Ask participants to list all the institutions and individuals involved in providing animal healthcare or related services in the village. Write their names on a card (circular card of different sizes is preferable) or any other card or just indicate on a chart paper and draw a circle around it. The size of the circle represents the ‘perceived importance’ of the community, i.e. larger the circle, higher the importance.
2. **Assessing ‘Access’:** Keep the village/ community circle card (or draw) in the middle. Ask the participants to place the cards with service providers’ names around the central card. The **distance** of each circle from the community circle reflects **accessibility and usefulness**. Institutions placed closer to the community are seen as more accessible.
3. **Place and Discuss:** Work with participants to place each institution around the community circle according to its size (importance) and distance (accessibility). Discuss and agree upon these placements as a group. More important is to elicit the reasons why they have chosen the particular size of the circle or placed at such distance. This gives us an institutional analysis of the livestock health care services.
4. **Review and Validate:** After all institutions are placed:
 - Revisit the placements with the group
 - Make any changes needed based on feedback
 - Discuss each institution’s strengths, limitations, and potential improvements
5. **Document the Outcome:** Draw the final Venn diagram neatly on paper or a chart with all placements as agreed by the community. Record key discussion points, including Services available, Gaps identified, Suggestions for improving access or quality, Roles of institutions in addressing livestock challenges.

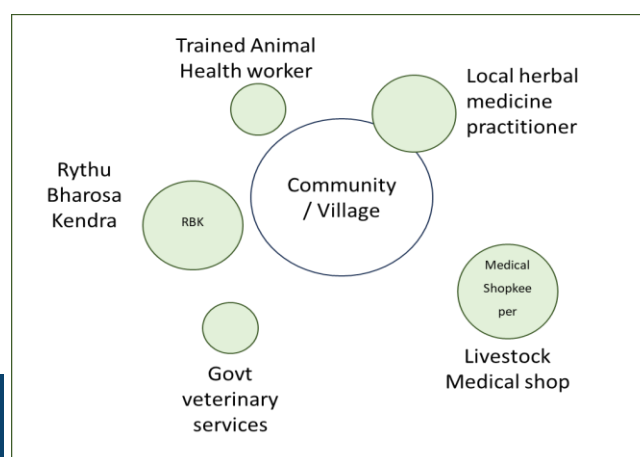


Figure - 5: Venn Diagram on livestock health care services, Koraput, Odisha

In an exercise in Koraput, Odisha community has observed that the local herbal medicine practitioner is the most important and highly accessible; whereas the government veterinary services are least accessible and least important in their current perception!

CONCLUSION

This process helps communities reflect on the **institutional landscape** around animal health and identify opportunities to **strengthen service delivery**. It also helps to understand local gaps and leverage existing systems for better livestock management.

Exercise 4: Disease Seasonality Mapping and Ranking

- **Purpose:** This participatory tool helps communities map the seasonal occurrence of diseases affecting livestock and poultry, and to prioritize them based on frequency, mortality and economic loss. It supports targeted interventions for livestock health management and informs monitoring over time.
- **Methodology:** *This exercise should be conducted separately for each species, such as cattle, buffalo, goat, sheep, poultry, pig, duck, etc.*

Step 1: Listing Diseases

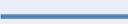
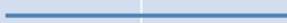
- Form species-specific community groups (e.g., goat rearers, poultry keepers).
- Ask participants to list all the **common diseases/symptoms** affecting that species.
- For each disease mentioned, create a **flashcard** or draw a **symbol**.
- Arrange the disease cards **vertically** in a single column on the ground.

Step 2: Defining Periods

- Create flashcards or symbols for **months or seasons** as understood by the local community (e.g., Summer, Monsoon, Winter).
- Place these **horizontally** across the top of the matrix in columns.
- Use rangoli/ chalk to draw a grid connecting diseases and time periods.

Step 3: Mapping Disease Seasonality

- Ask participants to indicate when each disease typically occurs:
 - a. Draw a **horizontal line** or place markers (stones, sticks, etc.) for the **duration** of the disease, **from onset to end**, across the months/seasons.
 - b. Repeat this for each disease

Disease name	Rainy	Winter	Summer
Diarrhoea			
Foot rot			
Bloat			
Colic			
Snake bite			
HS			
BQ			
FMD			

Step 4: Disease Ranking

After the seasonality mapping, initiate a **ranking exercise** to identify which diseases require urgent attention. This should be done **separately** for the following three parameters:

- Diseases according to the **frequency of occurrence**
- Diseases according to the **extent of mortality**.
- Diseases according to the **extent of economic loss**.

Ranking Process:

- Draw **three vertical columns** next to the disease cards—one for each ranking category.
- Use **stones, sticks, or stars** to represent ranking:
 - **Fewer markers** indicate less concern.
 - **More markers** indicate higher concern (more frequent, more deadly, greater economic loss).

Disease name	Rainy	Winter	Summer	Frequently occurs (ranking)	High mortality (ranking among diseases)	Herbal medicine available (among diseases)
Diarrhoea	————→			*****	*	*****
Foot rot	————→			*****		*****
Bloat			————→	****	**	***
Colic			————→	***	*	**
Snake bite		————→	————→	*	****	*
HS			————→	*	*****	*
BQ			————→	*	*****	*
FMD	————→			*	*	**

Special Considerations

- Conduct this exercise **separately for each livestock species** to capture species-specific disease dynamics.
- Ensure **inclusive participation**, especially involving livestock keepers, to capture a wider perspective on vulnerability and coping mechanisms.

Use of Results

- Create a **Disease Calendar** based on community input, clearly indicating high-risk periods for each disease.
- The ranking exercise helps:
 - Prioritize **interventions** (e.g., vaccination drives, awareness sessions).
 - Identify **gaps** in veterinary services and preventive care.
 - Monitor **changes over time** in disease patterns and perceptions.
 - Evaluate the **impact** of health programs and prepare for **emerging threats**.

Conclusion

These participatory tools enable communities to systematically reflect on the purpose of livestock rearing, identify key challenges, assess available services, and understand seasonal disease patterns. The insights generated support better planning, informed decision-making, and the development of locally appropriate interventions to strengthen livestock-based livelihoods.

Chapter - 6

SUMMARY AND CONCLUSION

This document complements the learning exercises that WASSAN has facilitated for the Passing Gifts PL and Heifer teams. The participatory methods were practiced on site along with the PGPL and HI teams in Koraput district of Odisha and in Bihar. This was followed by a two-day consolidation workshop on agroecological transformation in Hyderabad. The document is a practitioners guide to use participatory methods in understanding landscapes and their agroecology.

Some of these participatory methods have evolved over time in WASSAN's work on landscapes & agroecology/ natural farming. The methods in particular, are built upon the Participatory Methods (PRA) to include usage of spatial analysis using Google Earth, QGIS and other information technology tools now available open source. The methods also are amenable to develop robust databases from participatory exercises that can also serve as baseline data.

An important consideration in developing these tools is to elicit and build upon the local knowledge of the community on their landscapes. The knowledge system also includes using communities' own classification of their land types and other resources. The methods provide a visual that the community feels comfortable for communication.

The attempt is to decipher the complex local understanding of the landscape, the interactions among its various elements and the interface of people with their ecosystem in carving out specific production systems for their livelihoods.

This document presents a set of participatory tools—**ePRA, Fasal Chakra, Understanding Local Circular Economy, Participatory Livestock Analysis**—developed and tested by WASSAN to support **landscape-based agroecological planning**. These tools are designed to community knowledge at the centre and build shared understanding of local ecosystems, farming systems, and resource flows.

PARTICIPATORY METHODS IN A NUTSHELL

[a] Outcomes from E-PRA

- Provides an accurate **visual representation of key landscape features** (such as settlements, water bodies, land use/ land types, forest areas, etc.)
- **Enables understanding of the spatial extent** (e.g., areas under horticulture, paddy crop areas water body areas etc.).
- **Facilitates the visualization of multiple layers of information simultaneously**, (*visualization of interactions between production systems and natural resources in the given landscape*)
- Information collected during the exercise can be **digitally stored** (e.g., in KML files) and remain accessible anytime, supporting long-term planning, tracking, and learning.

[b] Outcomes from Fasal Chakra Exercise

- Season-wise mapping of crops helps to **visualize cropping patterns across land types** (e.g., Uparbar and Chaur Jamin).
- Facilitates **understanding of land use intensity**, including fallow periods, monocropping, and multi-cropping practices.
- Identifies **dominant crops, neglected crops, and opportunities for crop diversification** (e.g., integrating millets, pulses, fodder, and green manure crops).
- Serves as a foundation for further planning exercises, such as **fodder sufficiency plans, soil health improvement, nutritional planning, input reduction strategies, climatic risk and its planning etc.**
- Creates a shared platform for planning location-specific, agroecological interventions grounded in community knowledge.

[c] Outcomes of the Circular Economy Exercise

Analysis of household level Consumption expenditure and input expenditure in Agriculture:

- Enabled a clear understanding of household dependency on external markets for various food groups - vegetables, pulses, oils, cereals, fruits, and non-vegetarian items etc.
- Help with identification of commodities that could be locally produced or processed; or options for substitution with locally produced goods.

- **Agricultural Input Expenditure Analysis:** Mapped out detailed costs of cultivation from land preparation to threshing for major crops, enabling identification of cost-intensive stages. The exercise also opens up discussions on reducing external input dependency by replacing them with local, low-cost alternatives, thereby internalizing costs and enabling circular flow of nutrients within the village landscape and having a multiplier effect on the economy.

PARTICIPATORY LIVESTOCK SITUATION ANALYSIS

These exercises enable communities to:

- Identify the **types and purposes** of livestock reared and how ownership patterns have evolved over time.
- **Prioritize key challenges** such as fodder scarcity, animal health issues, and limited veterinary health care access.
- Map and assess the **effectiveness of local animal health service providers** through Venn diagrams.
- Create a **seasonal disease calendar** and rank livestock diseases based on frequency, mortality, and economic impact.

Together, these tools help in generating a shared understanding of livestock's role in livelihoods, highlighted gaps in support systems, and lay out the foundation for **community-led planning** for improved animal health and sustainable livestock management.

The ePRA, Fasal Chakra, Livestock, and Circular Economy exercises together offer an integrated approach to agroecological and landscape-based planning, although many more tools are required for a complete understanding. These participatory tools help communities better understand their natural resources and production systems, enabling them to identify challenges and opportunities. Together, they support informed decision-making and contribute to building more self-reliant and resilient villages.

Landscapes and Agroecology: **Participatory Planning Methods**



Technical Support by



July 2025