



**Who maintains genetic diversity and  
how: Implications for on-farm  
conservation and utilisation**

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# Background

*We know that:*

- **Different levels of diversity exist in most non-commercial production areas**
- **Farmers are conserving and managing diversity**
- **Informal seed system is one of the important management strategies that is creating diversity on-farm**

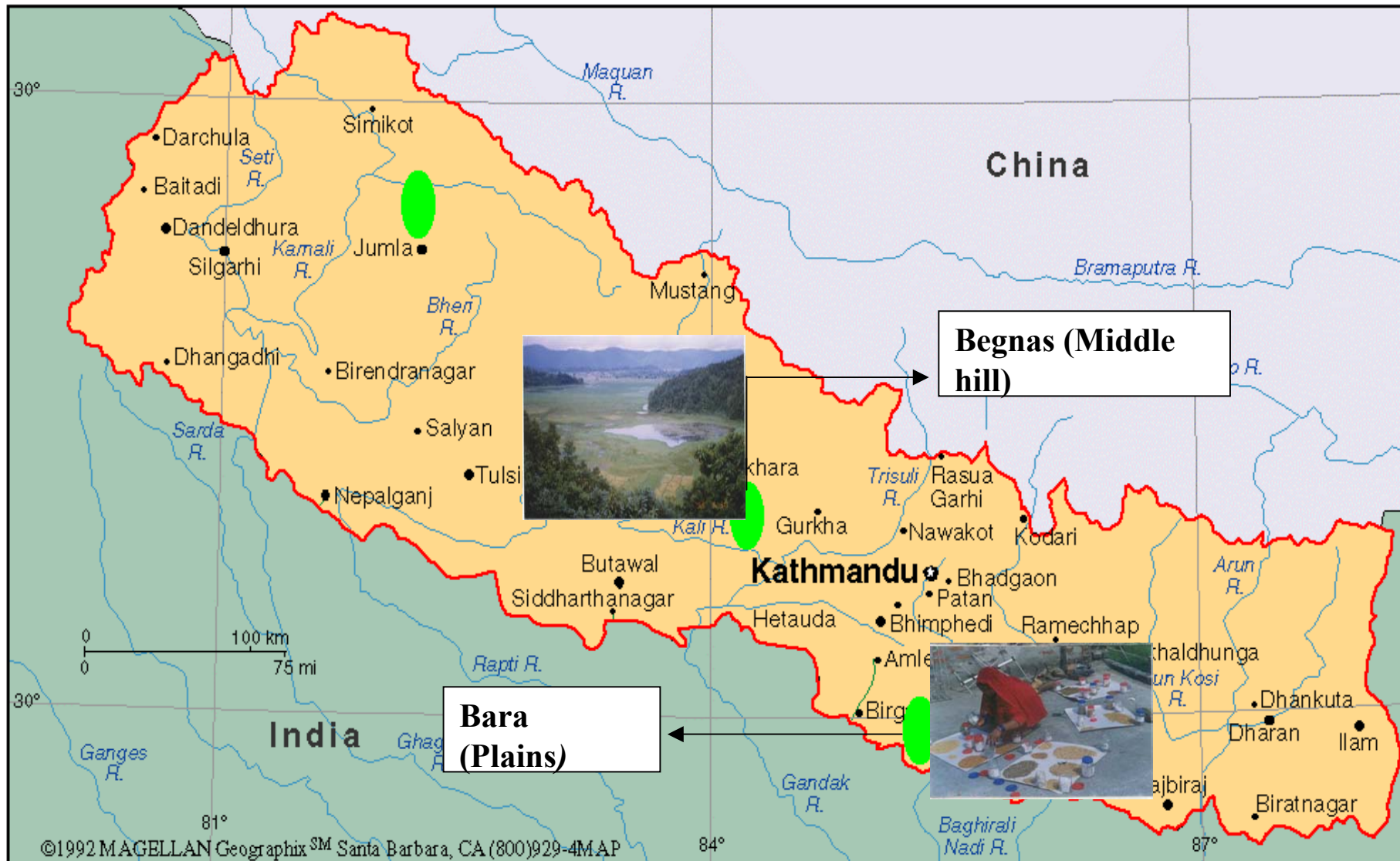
*But, what we still need to know is:*

- **Mechanism of informal flow of genetic materials in a community**
- **How the diversity is maintained on-farm?**
- **Who and what type of community members play significant role in informal seed flow and in maintaining diversity?**

**A Study was, therefore, carried out to:**

- **Understand the informal flow of genetic materials and processes involved in maintaining diversity on-farm**
- **Identify key farmers who maintain diversity on-farm so as to strengthen on-farm conservation and utilisation**
- **Case of Rice crop**

# Study Area



# Methodology

- **Network analysis**
- **Sociometric survey**
- **Snowball sampling**
  - **three stages**

**→ First stage sampling: 24**  
**(stratified random sampling based on**  
**wealth and gender categories)**

**→ Second stage: 30 (identified after 1<sup>st</sup> stage)**

**→ Third stage: 24 (identified after 2nd stage)**

**→ Total sample size: 78 in each study site**  
**n = 203 (Begnas) & 206 (Kachorwa)**

- **Data analysis:**

- **Network mapping - manual**

- **Key (nodal) farmers identified using criteria such as seed source, knowledge source, diversity status and network position**

- **Simple statistical analysis**

# Findings

## 1. Number of cultivars involved in the flow

<u>Site</u>	<u>Landrace</u>	<u>MVs</u>	<u>Total</u>
<b>Begnas</b>	<b>32 (76%)</b>	<b>10 (24%)</b>	<b>42 (100%)</b>
<b>Kachorwa</b>	<b>10 (29%)</b>	<b>25 (71%)</b>	<b>35 (100%)</b>

## 2a. Means of seed flow

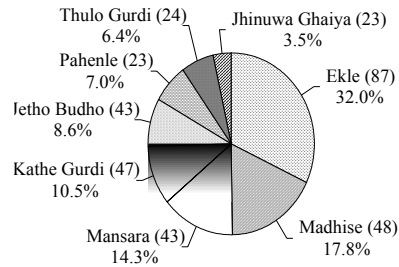
<b>Mechanisms</b>	<b>% Flow of genetic materials</b>	
	<b>Begnas</b>	<b>Kachorwa</b>
<b>Exchange*</b>	<b>53</b>	<b>64</b>
<b>Gift</b>	<b>31</b>	<b>17</b>
<b>Purchase</b>	<b>16</b>	<b>9</b>
<b>Others</b>	<b>-</b>	<b>10</b>

**\* Exchange involved bartering with grain for seed  
Or seed for seed**

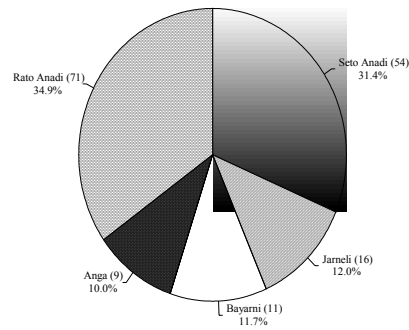
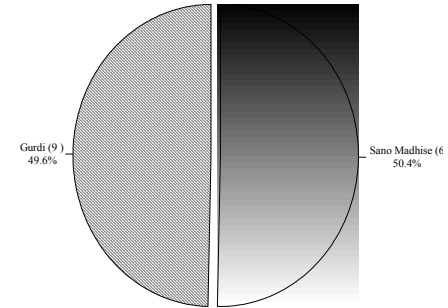
## 2b. Number of flows of landrace and MVs in rice crop through farmers' networks

Mechanisms	% Flow			
	Begnas		Kachorwa	
	Landrace	MV	Landrace	MV
<b>Exchange</b>	<b>67</b>	<b>33</b>	<b>6</b>	<b>94</b>
<b>Gift</b>	<b>79</b>	<b>21</b>	<b>3</b>	<b>97</b>
<b>Purchase</b>	<b>84</b>	<b>16</b>	<b>14</b>	<b>86</b>
<b>Others</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>
<b>Overall</b>	<b>74</b>	<b>26</b>	<b>6</b>	<b>94</b>

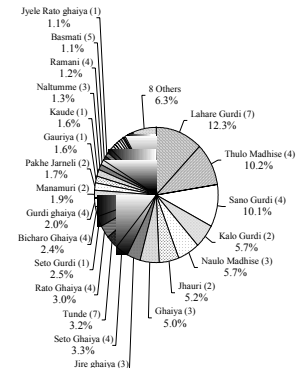
Rice landraces grown in large area by many households



Rice landraces grown in large area by few households



Rice landraces grown in small area by many households



Rice landraces grown in small area by few households

**Figure 1. Categorization of rice landraces of Begnas Kaski based on area coverage and number of farmers growing them. (figures in the parenthesis represent number of households)**

# Percentage distribution of seed flow of cultivars by area coverage and households (n=203 in Begnas & 223 in Kachorwa)

Area HH	Cultivar Type	Large Area		Small Area	
		Begnas %	Kachorwa %	Begnas %	Kachorwa %
Many HH	Landrace	43	3	11	1
	MV	0	65	0	0
Few HH	Landrace	6	0	14	2
	MV	18	1	8	28

### **3. Reasons for seed exchange**

- **Poor quality in own's retention seed**
- **Shortage of seed**
- **Observed better cultivar elsewhere so keen to test**
- **To overcome problem in existing cultivar**
- **Wanted to grow additional cultivar**

## **4. Farmers' networks**

- **A few larger networks involving several individuals**
- **Many smaller networks**
- **Mixed men and women farmers in the same network**
- **Mixed wealth category members in the same network**

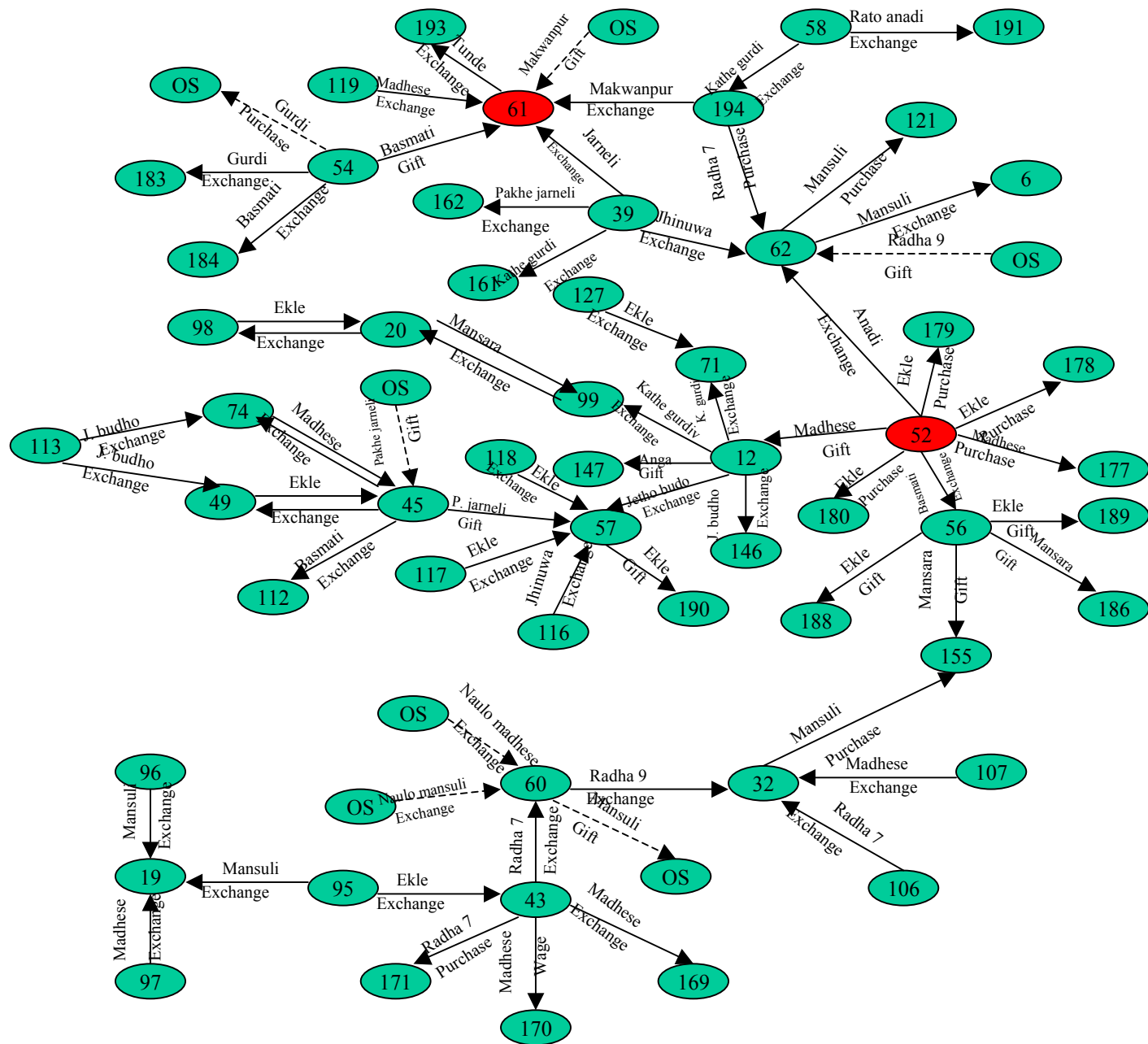
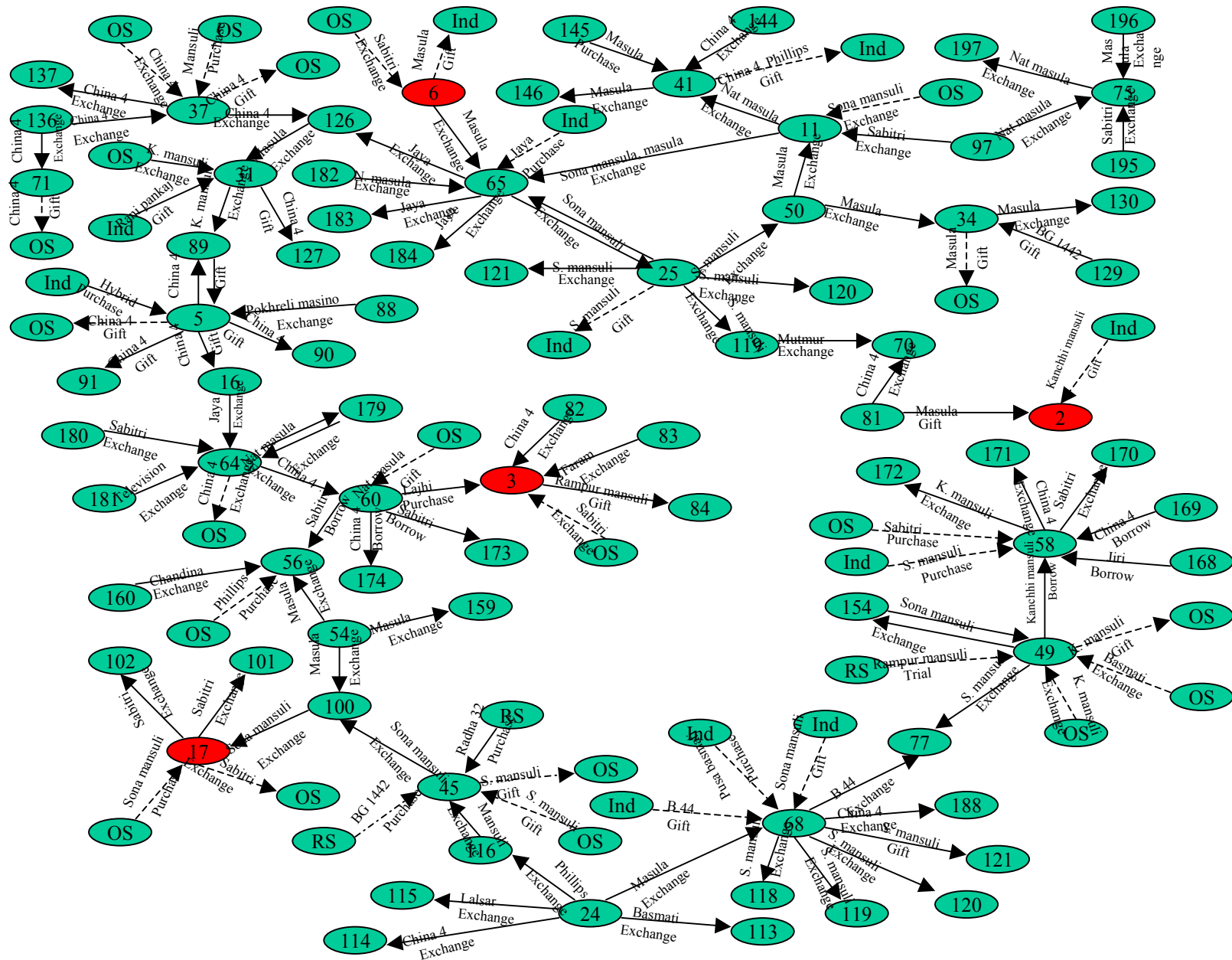
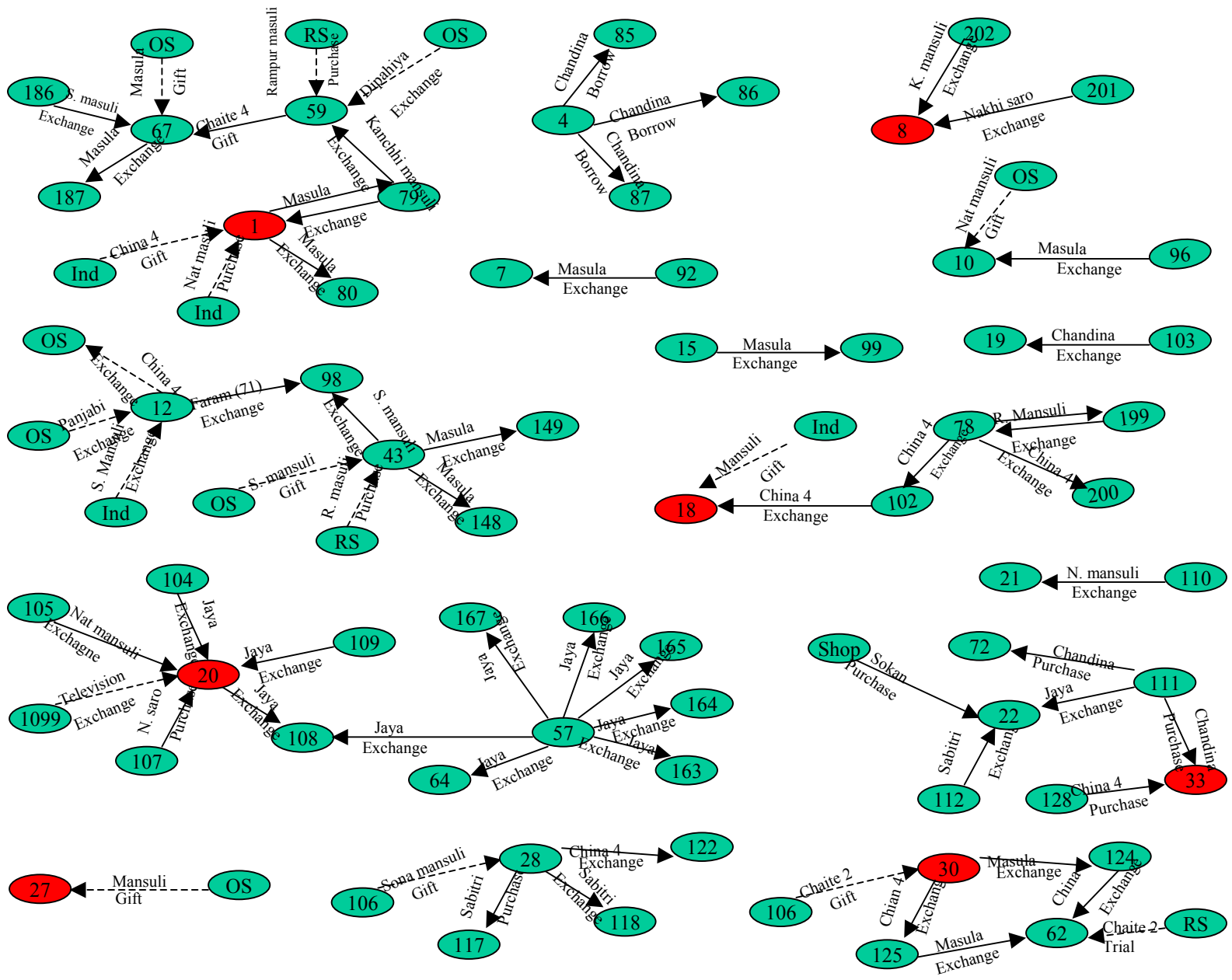


Fig 2a. Farmers' network on rice seed flow in Begnas eco-site (Network I)





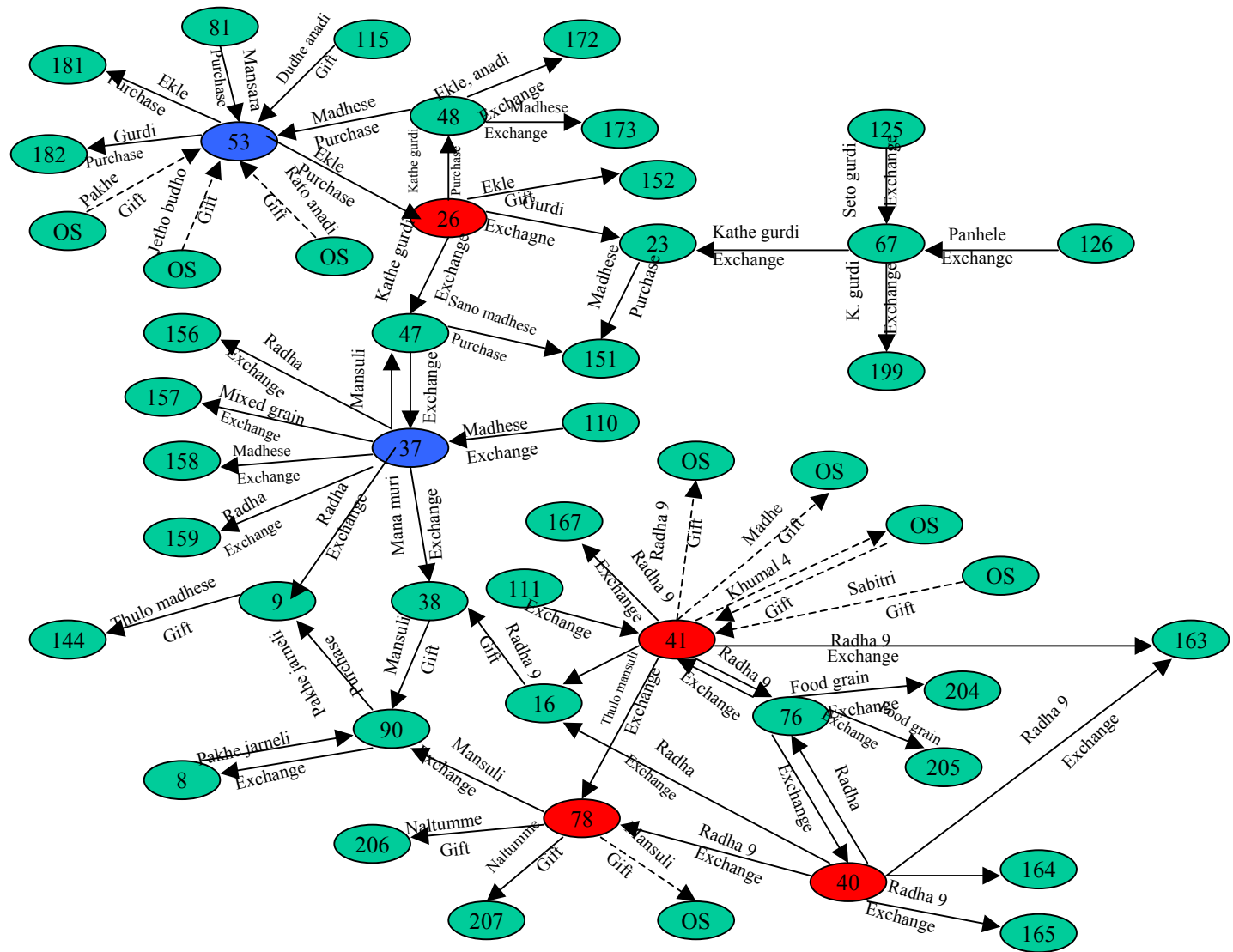
**Fig 3a. Farmers' network on rice seed flow in Kachorwa eco-site (Network I)**



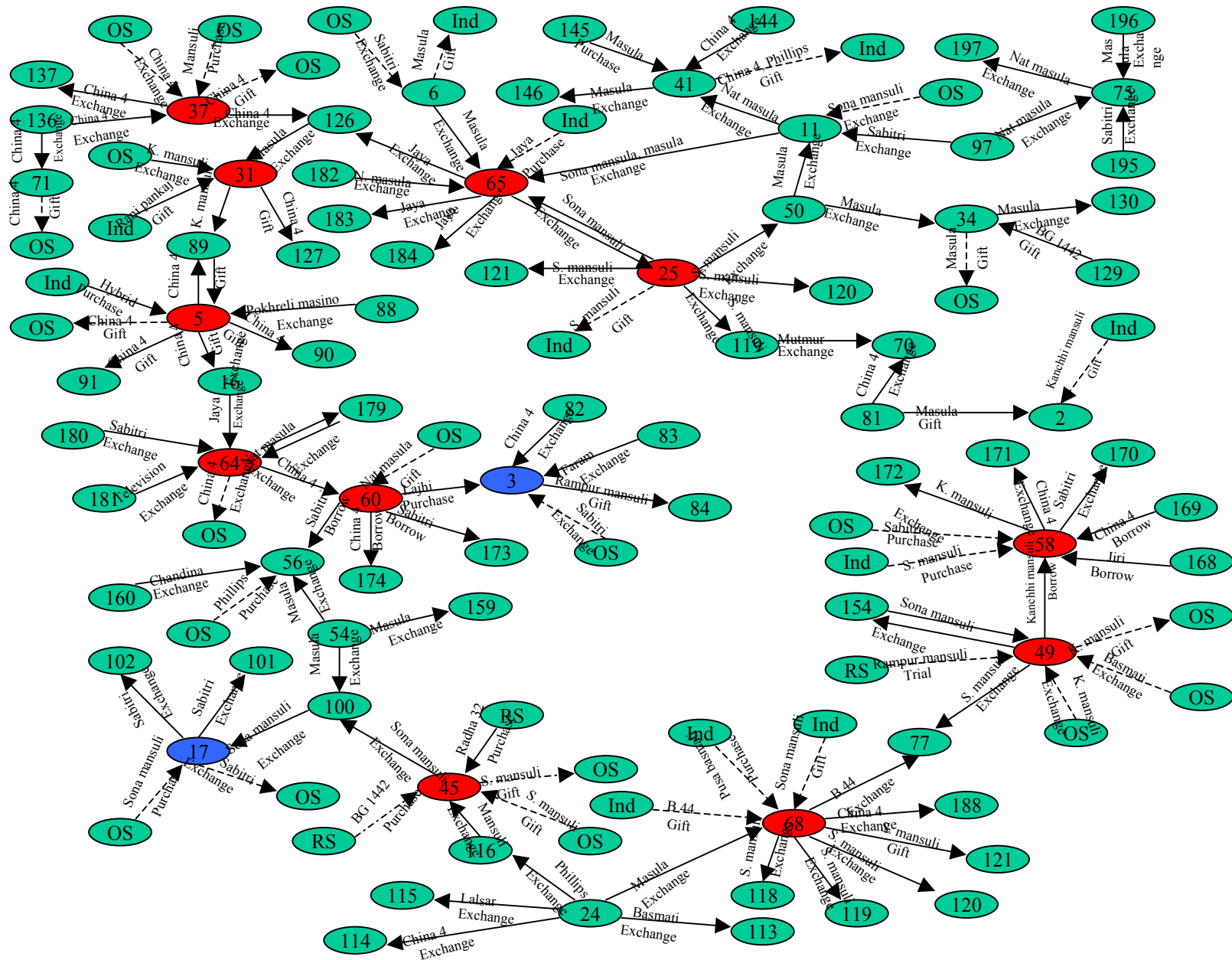
**Fig 3b. Farmers' network on rice seed flow in Kachorwa eco-site (Network II)**

## **5. Nodal farmers in the networks**

- **Certain individuals occupying key positions in the network - “Nodal Farmers”**
- **Mainly from rich wealth category**
- **Some of them are women farmers**
- **They are spatially distributed within the community**
- **Mainly High Diversity Maintaining group**
  - **“Diversity-Minded”**



**Fig 4a. Nodal farmers in Begnas eco-site**



**Fig 4b. Nodal farmers in Kachorwa eco-site**

- **Nodal farmers are also perceived as the most knowledgeable persons in the community in terms of:**

- **Seed related matters**
- **Selection of planting materials**
- **Production environments for different cultivars in the area**
- **Research mindedness**

- **They are playing important role in the flow of genetic materials**
  - **Bringing in materials from within and outside the community**
  - **Giving out materials to others in the community**
- **Constantly looking for new cultivars for their variable farm environments**

## **6. What do we understand from these results?**

- Farmers' seed flow systems occurring through social networks play important role in maintaining the dynamic process of crop diversity on-farm**
- Along with the genetic materials, knowledge-based non-material information also flows in the community. This helps in conserving the associated knowledge of the cultivars**

- **Certain members of the community act as nodal farmers in the maintenance of crop diversity on-farm and managing the processes involved in it**
- **They also influence other network members on the decision making processes for crop diversity maintenance**

- **Nodal farmers tend to address diversity  
Needs of the community members**
- **Network analysis as an effective  
approach to trace the flow of genetic  
materials and associated knowledge along  
with the identification of nodal farmers**

# **7. Implications for on-farm conservation and utilization strategy**

## **A. Diversity deployment**

- Expertise of the nodal farmers in selection and maintenance of genetic materials can be effectively used in diversity deployment/PPB while enhancing natural farmer-to-farmer dissemination of PPB materials**

## **B. Strengthening on-farm conservation of crop diversity**

- A network of nodal farmers can be conservation farmers and act as “Community Gene Bank”, effectively involve in CBR, and involve in public awareness**

## **C. Strengthening seed supply system**

- Nodal farmers can be involved in strengthening informal seed systems including seed production and distribution**

## **D. Training and development**

- **Nodal farmers can be effectively involved as resource persons for farmer - to - farmer training and source of information on local crop diversity**
- **They can be used in the development of training and extension materials on local cultivars and their associated knowledge**

# **And Finally**

**The informal seed systems of crop diversity are based on barter economy. As the cash-based economy develops, such systems may decline.**

**Hence, ways to strengthen the local informal system (such as CBR, diversity fair) through farmers networks and nodal farmers should be found out**

A large crowd of people, including children and adults, gathered outdoors in front of buildings and trees. The text "Thank you" is overlaid in red.

**Thank you**