Understanding knowledge co-creation in agroecological learning: a case study of farmer field schools in Senegal

Rokhaya F. Gueye[1], Katja Kehlenbeck[2], Silke Stöber[2], Annie H. Ong'ayo[3], Ahmadou Diallo[4], Fatou Diouf[5], Fatimata Diop[6]
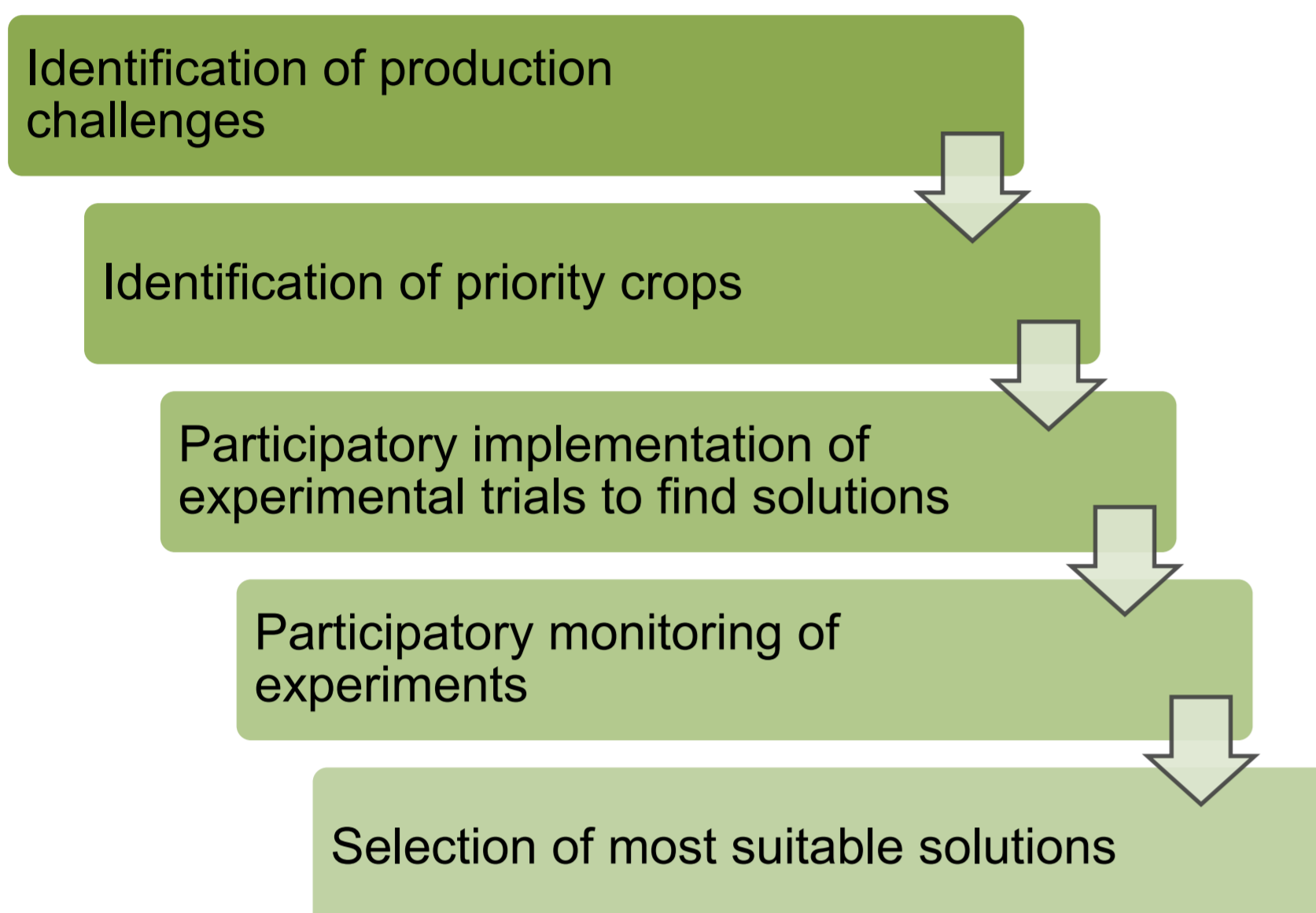
[1]Université du Sine Saloum Elhadj Ibrahima Niass, Sénégal; [2]Humboldt-Universität zu Berlin, Center for Rural Development (SLE), Berlin, Germany; [3]Pwani University, Department of Community Development, Kilifi, Kenya; [4]Gaston Berger University, Saint-Louis, Senegal; [5]Eclosio - NGO of Liége University, Thiés, Senegal, [6]APAF, Mbour, Senegal.

BACKGROUND

Farmer Field Schools (FFS) provide a platform for group learning, enabling farmers to develop their skills in critical analysis and co-creation of knowledge. The AfriNutriForest project, which focuses on intensifying fruit-vegetable agroforestry systems in an agroecological and participatory way, is applying the FFS approach. However, there is a lack of scientific data for better understanding the specific processes of co-creating knowledge among farmers within FFS groups.

Objective: Understand the processes of knowledge co-creation of farmers within the FFS groups of the AfriNutriForest project.

Process of farmer-led research in Farmer Field Schools

Identification of production challenges

Identification of priority crops

Participatory implementation of experimental trials to find solutions

Participatory monitoring of experiments

Selection of most suitable solutions

Discussions of the first author with the FFS group members in Mboudaye.

CONCLUSIONS

1. None of the groups are fully leveraging their potential for co-creating knowledge and they are rather disconnected.
2. The Pambal group is the most advanced in the transition to agroecological production. A cross-visit could encourage that transition in all three groups.
3. Technical exchange alone is insufficient for sustainable knowledge co-creation, thus rethinking leadership, generational expansion, agroecological business models and communication within the groups on a regular basis is crucial.

METHODS

Study area: AfriNutriForest project sites in NE Senegal: Ndiamb Fall, Pambal and Mboudaye, total of 84 FFS participants: 46, 19 and 18, respectively.

Qualitative mixed methods approach:
➤ Observations of processes and behaviors, document analysis.
➤ Semi-structured interviews (59): Ndiamb Fall 27, Pambal 19, Mboudaye 18.
➤ Focus group discussions (46): Ndiamb Fall 18, Pambal 14, Mboudaye 14.

Tools for data analysis (inductive approach):
Sphinx for questionnaire design & data collection; Python programming language (modules Pandas, RapidFuzz and openpyxl) for cleaning & coding of responses; Gephi for network and information flow analysis.

RESULTS AND DISCUSSION

1. Socio-demographic results

- Proportion of female group members: highest in Pambal with 100%, in Mboudaye 83% and in Ndiamb Fall 85%.
- Age class distribution: In Ndiamb Fall, more than 60% of the group members are younger than 37 years, while in Mboudaye and Pambal, more than 60% of the group members are older than 48 years (Fig. 1).
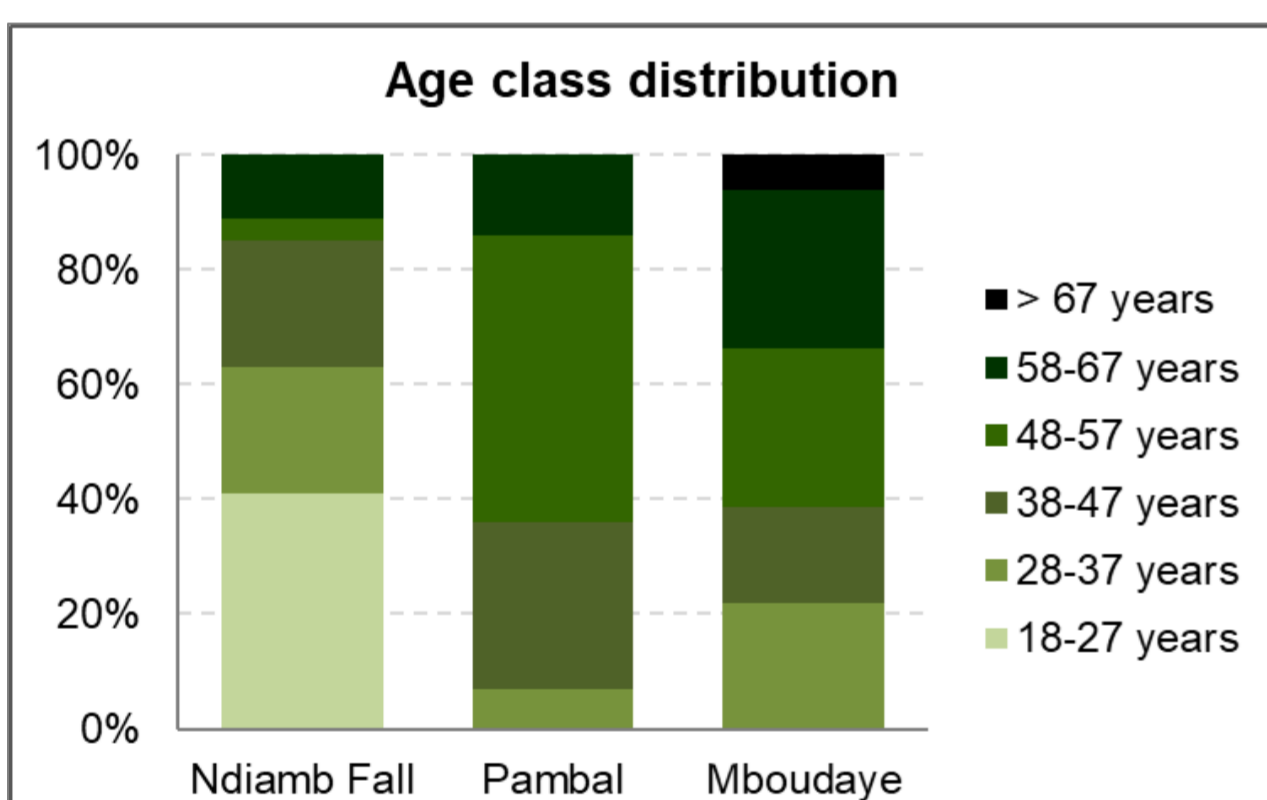- Most group members in Mboudaye and Pambal are illiterate (Fig. 2).

Age class distribution
Legend: > 67 years, 58-67 years, 48-57 years, 38-47 years, 28-37 years, 18-27 years

Fig 1: Age class distribution in the three FFS groups.

Education level
Legend: Others, University, High school, Secondary school, Primary school, Koranic school, no schooling
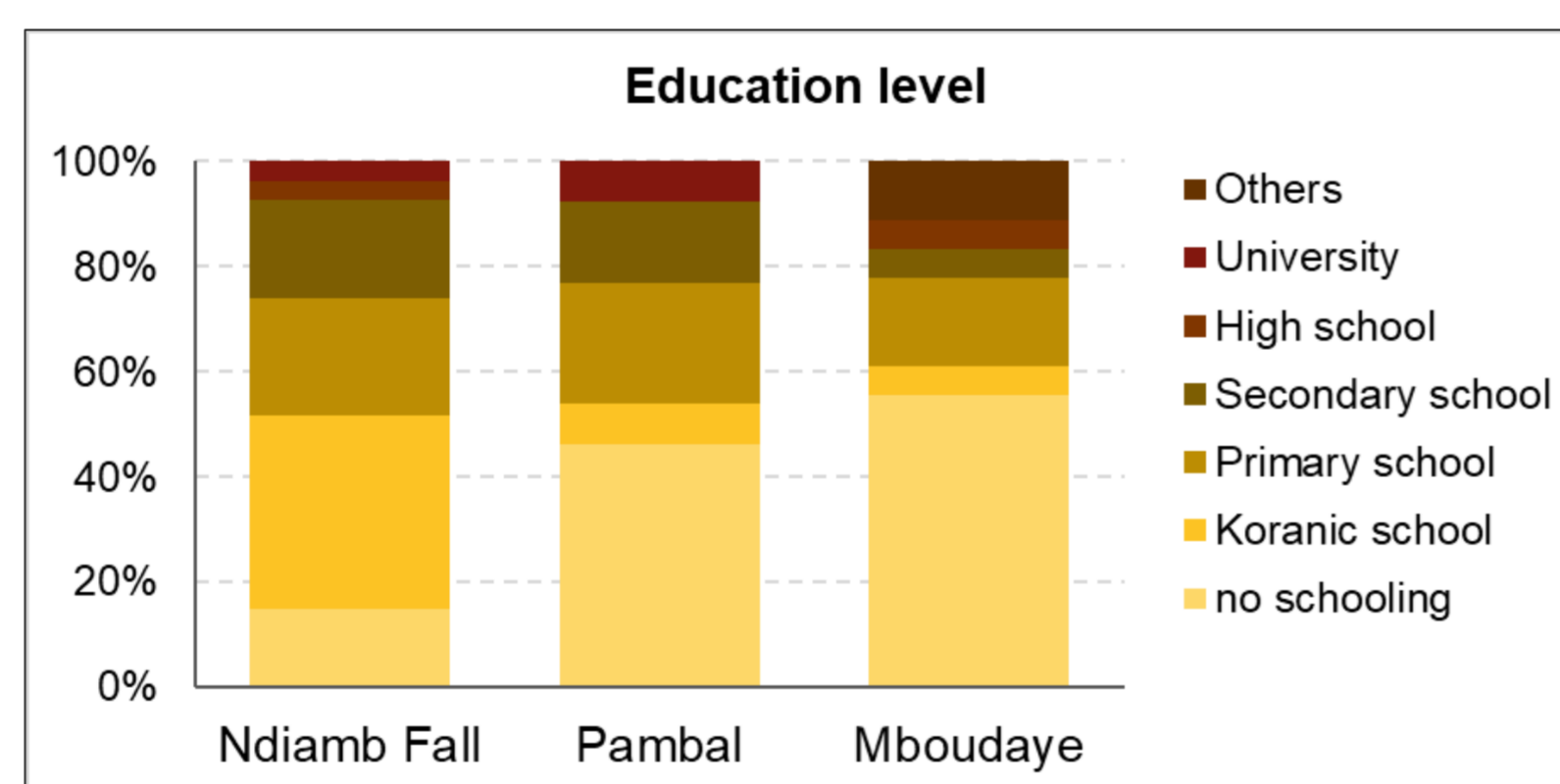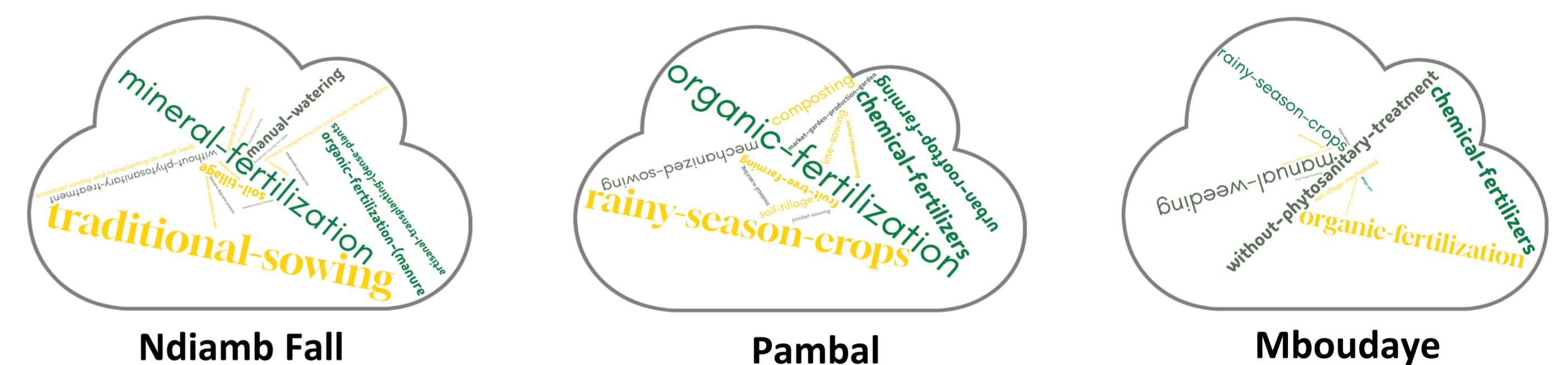
Fig 2: Level of formal education in the three FFS groups.

2. Most common agricultural practices

Ndiamb Fall (mineral-fertilization, traditional-sowing)

Pambal (organic-fertilization, rainy-season-crops, chemical-fertilization)

Mboudaye (manual-weeding, organic-fertilization)
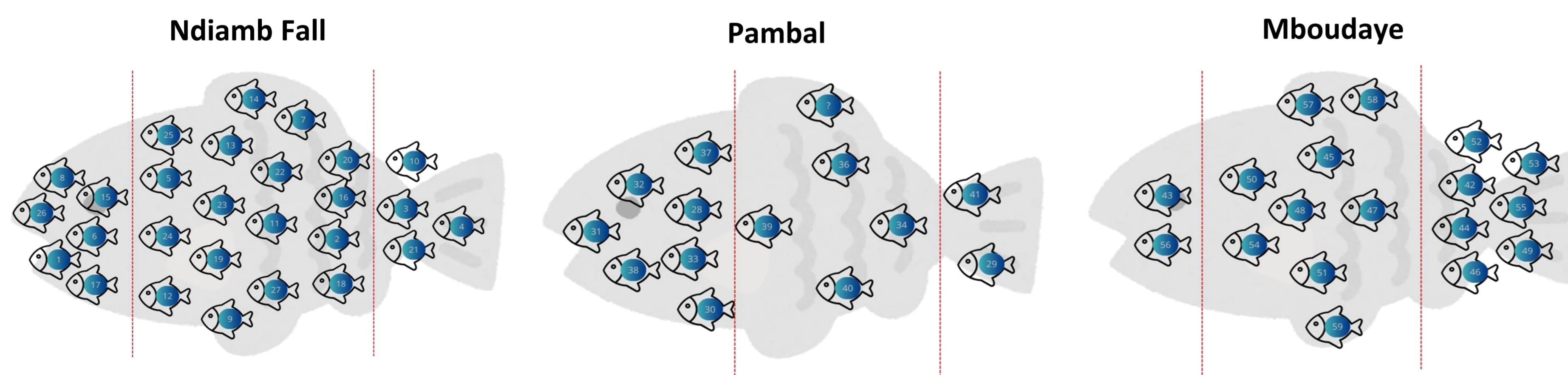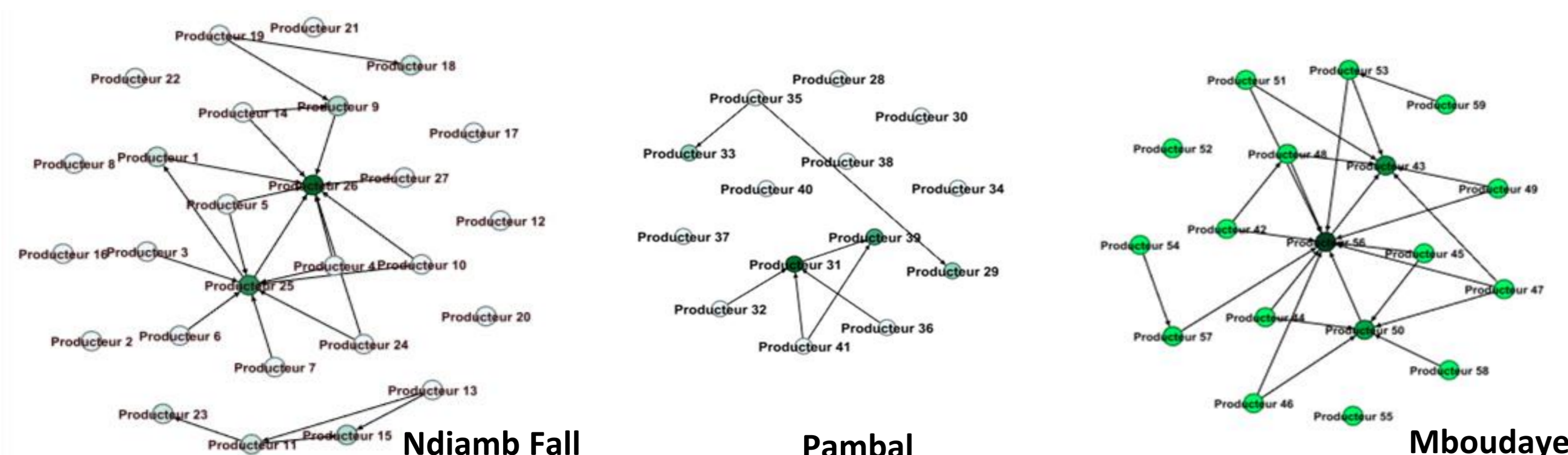
- Ndiamb Fall group members mainly use conventional, but traditional farming techniques, e.g. mineral fertilization, manual sowing and manual watering.
- Pambal group members mainly follow the agro-ecological pathway including organic fertilization and roof top farming, but mineral fertilizer is still being used.
- Mboudaye group members are mainly traditional farmers with little external input use such as mineral fertilizers or pesticides.

3. Network and information flow analysis

Fish game: farmers' self assessments on leadership done during focus group discussions

Ndiamb Fall   Pambal   Mboudaye

- Ndiamb Fall: rather young members, has a **dispersed, weakly-connected network** with many isolated members and very low interconnectedness, which may result in limited network integration and activity.
- Pambal: **highly disconnected** network with high percentage of isolates. Several leaders, who might not pull into the same direction. Little meaningful relationship and hardly any nodes have connectivity within the network.
- Mboudaye: rather elderly members, high group density with clear leadership but **fragmented network** with little possible connections realized. The question of succession will certainly arise in the coming years.

Network analysis: Who do the group members ask for support regarding FFS activities

Ndiamb Fall   Pambal   Mboudaye

Indicator network analysis	Ndiamb Fall	Pambal	Mboudaye
Number of nodes	27	14	18
Number of links	25	7	25
Density	0.04	0.04	0.08
Mean degree centrality	1.9	1.0	2.8
Proportion of isolates	26%	39%	11%
Central node	Farmers 25 and 26	Farmer 31	Farmer 56

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