A Further Development of Inland Aquaculture:

Toward Poverty Alleviation and Food Security in Rural Area

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Contents


Development of Inland Aquaculture
for Poverty Alleviation

Diversifying Livelihood Strategy

- In Asian monsoon rural areas, inland capture fisheries provide a major source of animal protein. They also culture juvenile wild fish in traditional way.
- Catch is unstable, and productivity of pond culture is very low. Nevertheless, farmers and community depend on inland fisheries as a source of additional income.
- Diversification is effective tool for survival in poor rural area.

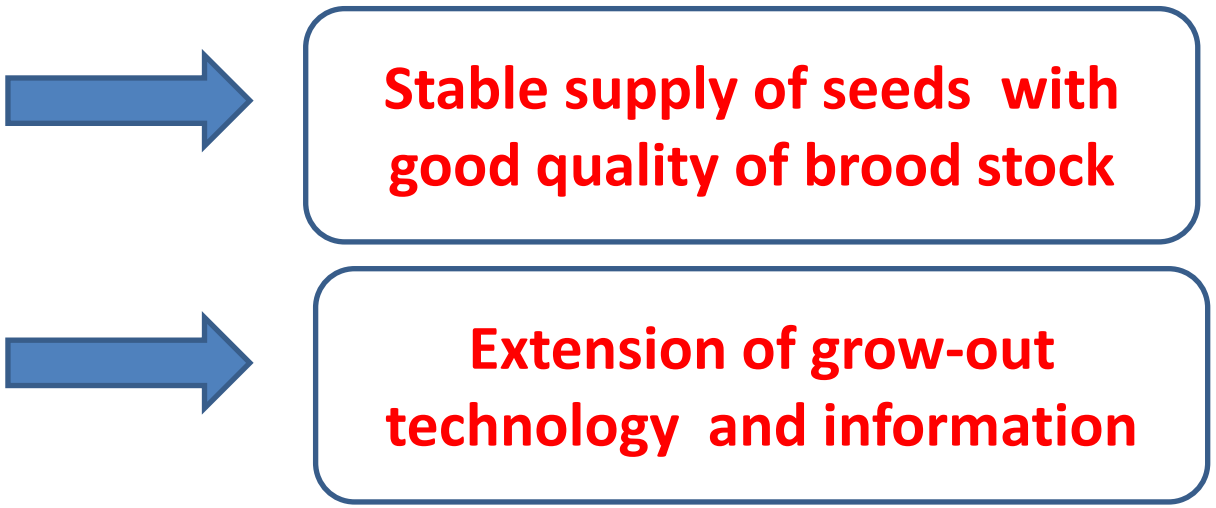
Integration of fish farming into agrarian economy

- Traditional fisheries are carried out in paddy field , ditch, cannel, river, reservoir, etc. In rainy season, farmers and their family often catch and trap fish anywhere.
- They dig a small pond at backyard. It has multi-purpose functions, not only for irrigation but also for daily life.
- Integrated farming method raises agriculture productivity and diversify household economy. Farmers use available resources effectively in cultivation, livestock, fish farming, and so on.

Fish farming contributes to the sustainability of agrarian economy, with providing animal protein, creating job opportunity, and bringing additional income source.

Seed farmers are at the center of inland aquaculture development

- Inland aquaculture has the potential to revitalizing local economy and achieve food security in poor rural area.
- Seed production technology is the most substantial factor to accelerate small-scale inland aquaculture.
- Seeds farmers are at the center of development.

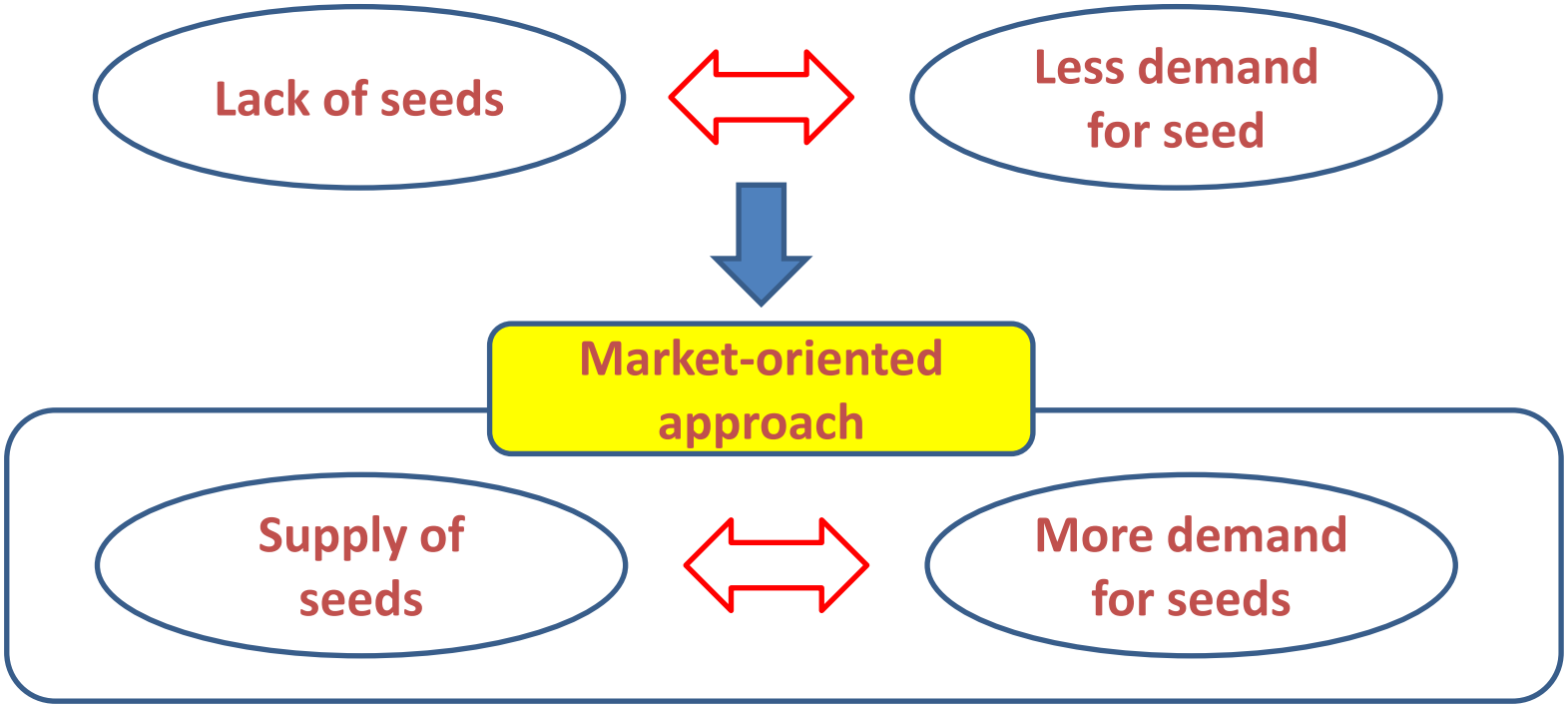


Demand for Seeds through Increasing Supply

- Growth of seed farmers has a dilemma.

  Lack of seeds is a great obstacle to expansion of fish farming.

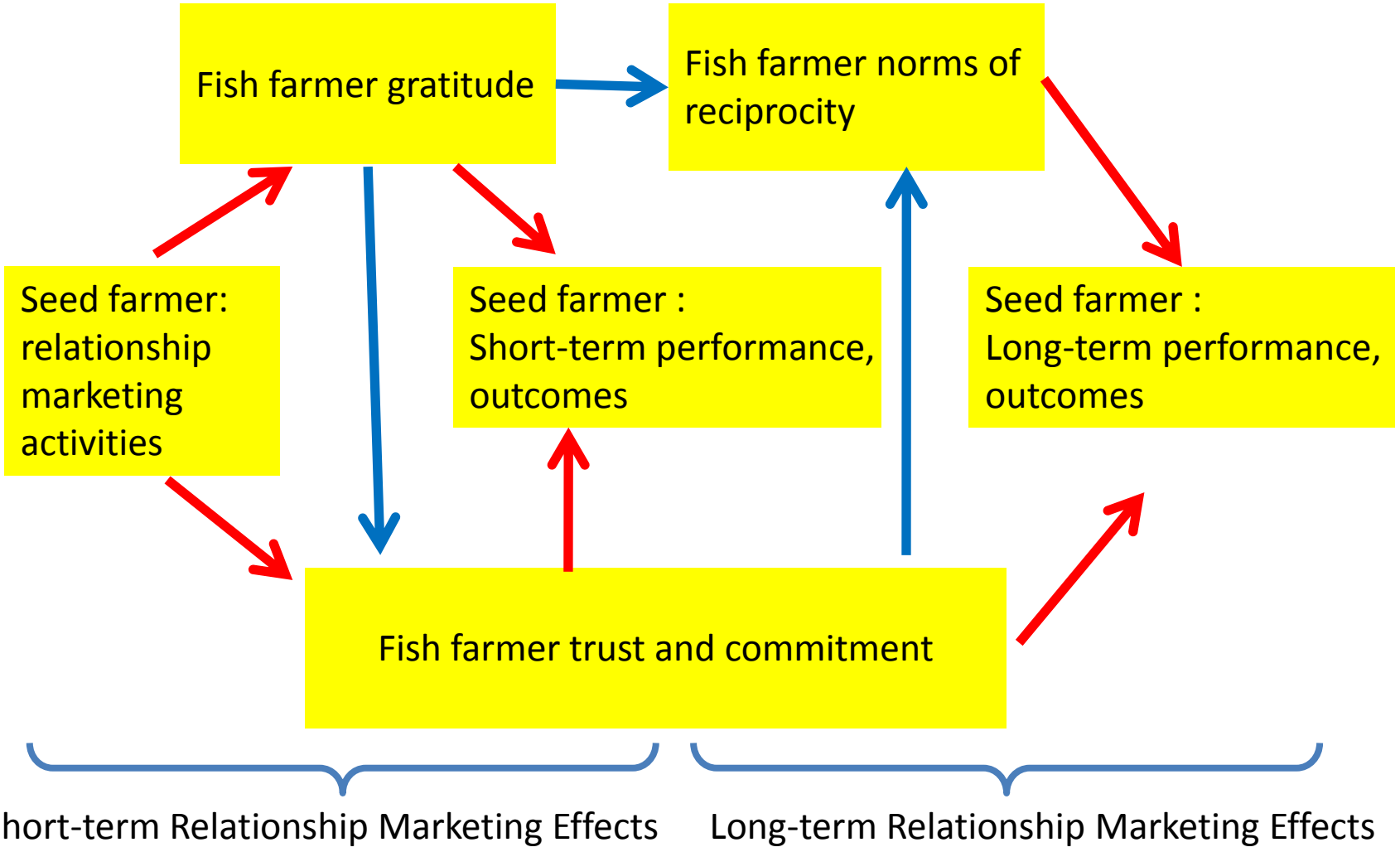
  Due to less demand for seeds, seed production can not expand.



Market-oriented Approach to Foster Seed Farmers

- Conditions of selling seeds
  1) Less demand and unstable demand for seeds
  2) Lack of appropriate technology and knowledge about fish farming
  3) Farmers' demand for cultured fish is not much, etc.
- **Relationship marketing is applicable**;
  1) short-term and long-term effect of seed farmers can be achieved by value of customer (fish farmers) relationship
  2) communication beyond intrusive advertising guidance and advice on grow-out technology
  3) selling seeds within a narrow locality

Figure Model of Interpersonal Relationship Marketing



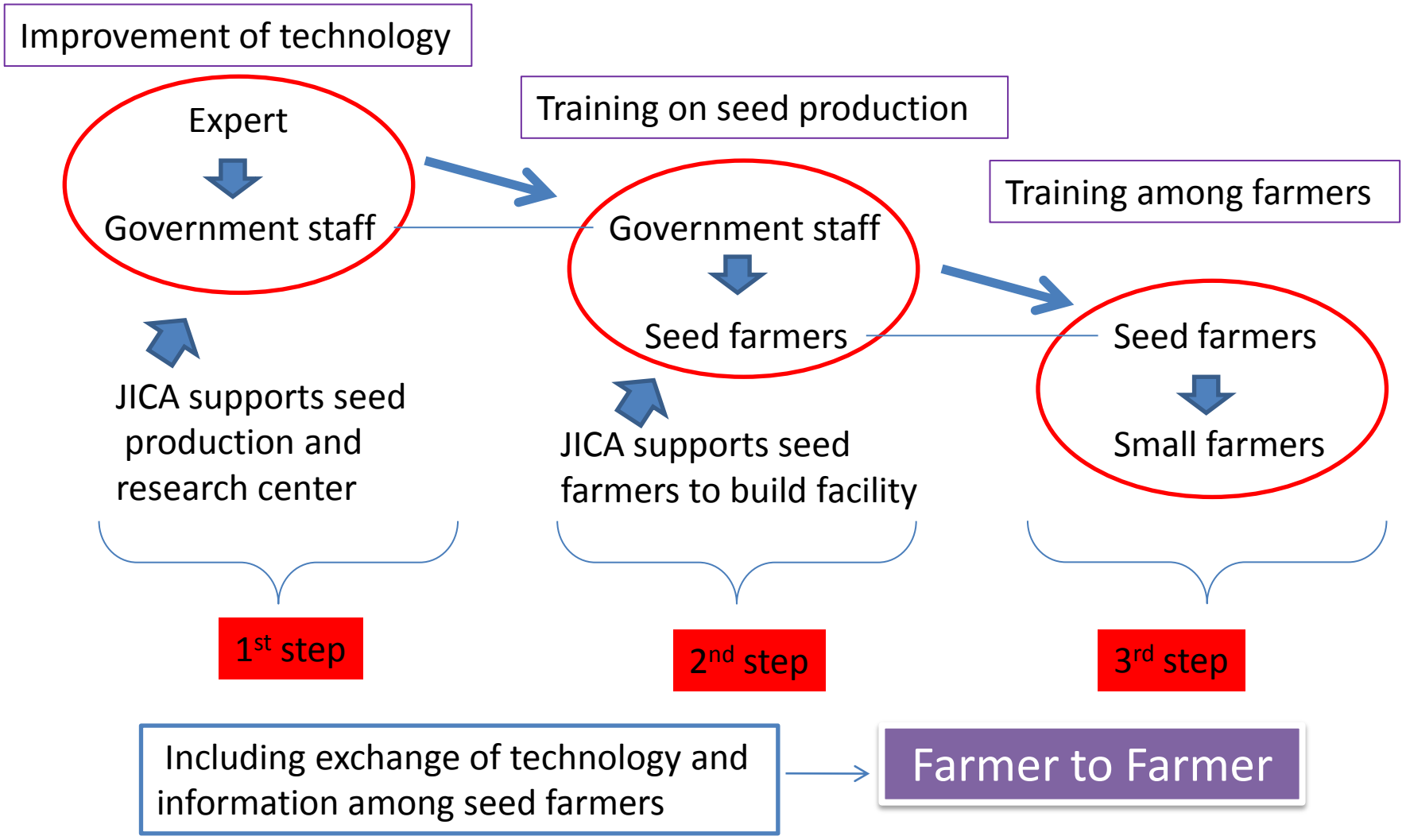
(source) Robert W. Palmatier 2008. Relationship Marketing


Successful Experience on
“Farmer-to-Famer Approach”

Framework of small-scale inland aquaculture

- Two or three steps of transferring technology
  (in JICA's project)
  1) Experts transfer technology to C/P (government staffs and aquaculture research/ development institutions)
  2) C/P transfer to seed farmers, extending information and knowledge on aquaculture
  3) Seed farmers transfer technology of grow-out to farmers
- Question arises:
  Research and aquaculture institutions are a target of technology transfer?

Figure Three steps toward transferring of aquaculture technology in rural area



(source) Report on Final Evaluation of FAIMEX I. Author adds and corrects.

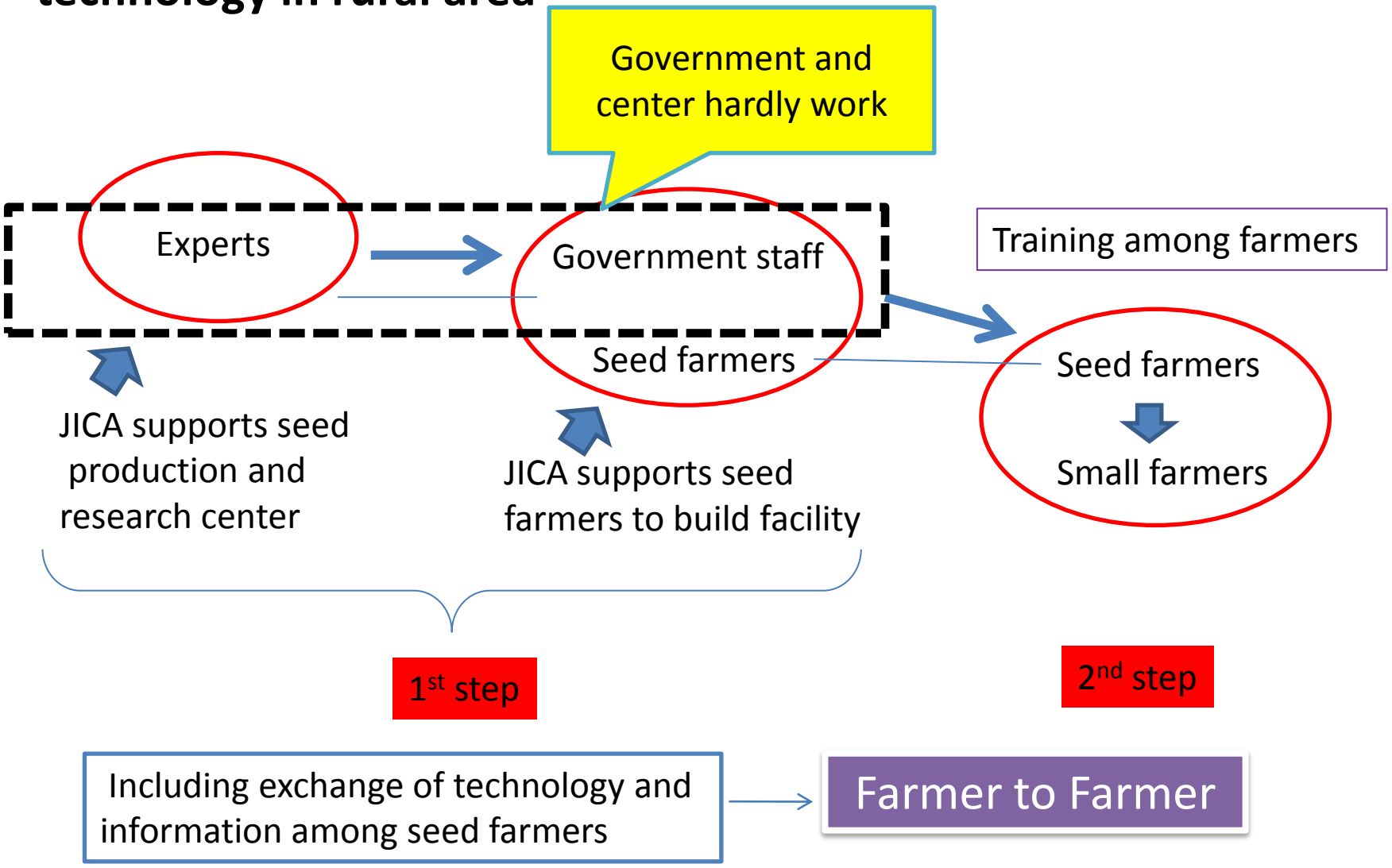
Alternative way to Transferring of Technology to Seed Farmers

- Government-based aquaculture center hardly works, due to lack of personnel and inefficient facility.
- Technology transfer may target to core farmers who want to involve in seed production, not passing through the 1st step.

It takes time and requires investment in facility.

- Two steps approach may be effective in some countries and regions.
- Of course, participation and involvement of government and center staffs are needed.

Figure Tow steps toward transferring of aquaculture technology in rural area



(source) Report on Final Evaluation of FAIMEX I. Author adds and corrects.

Roles of Core Farmers (1)

- At Step I & II, core farmers are selected

  1) Trained seed production and grow-out technology

  2) Good quality of brood stock

  They invest in hatchery facilities and ponds, with financial support.

⇒ They become small entrepreneurs with transferred technology .

- Experiment of grow-out technology that is fitted into with local environment and socio-economic conditions.

⇒ They are responsible for improving technology and creating package.

A core farmer prepared pond, and started with support of JICA.

Madagascar in 2012

Core farmers invest in facilities. They belong to a relatively higher economic class.

Core farmers improve breeding and grow-out technology, with support of extension officers and experts.

They exchange experiences between core farmers.

Roles of Core Farmers (2)

- At Step III, "Farmer-to-Farmer" extension system works.
  1) Core farmers transfer technology and provide information on fish farming.
  2) Effective and cost-extensive technology can be adopted in rural society.
- In collaboration with local government and extension service staff, seed producers expand fish farming.

They may act as extension service staffs.
Relationship marketing method is adopted.

Seed farmers sell to farmers. Neighbors are regular customers.

Roles of Core Farmers (3)

- Seed farmers (who own wider land and diversify livelihood) grow up to accumulate capital through the expansion of hatchery business.

⇨ They become entrepreneurs, creating job opportunities and income sources in rural areas.

- Established network of core farmers functions like a major producing center, increasing supply of seeds at cheaper prices. This will possibly develop fish farming.

⇨ Rural hatchery business becomes agro-based industry.

Some farmers successfully expand aquaculture business.

They contribute to local economy with providing job opportunity.

Expansion of Fish Farming

- In SEA, rice farmers diversify livelihood activities. Fish farming is integrated into their diversity.
- By-products of other activities, natural feed, and dregs are fully used. Less-cost fish farming is extended widely with a supply of seeds.
- Improved indigenous technology can be adopted.

Multi-purpose pond at backyard: linked to paddy field

Project introduced a simple system to use cow manure.

Various Types of Fish Farming

- With supply of seeds, farmers have figured out fish farming in their farms, including both extensive and intensive ways.
- Fish raise is a lucrative activity , increasing income and household consumption. Increasing supply of cheaper seeds gives a great impetus to expansion of fish farming.

Aspects of Food Security

- Under framework of free trade in Southeast Asia, highly commercialized and industrialized hatchery business has developed so far. Less developed countries import seeds, feeds and any necessary materials from neighboring countries.
- To foster domestic inland aquaculture, a hatchery business has a decisive role.
- With sustainable seed supply at cheaper prices, poor farmers can afford to start or expand fish production at backyard and in paddy field. Consumption of fish will bring nutritional improvement. Supply of freshwater fish to local market is effective tool to achieve food security.

New Phase of Inland Aquaculture in Rural Area

Issues and Topics to be Discussed

Factors Affecting to Success of “Famer to Farmer Approach” (1)

- **Projects successfully improve traditional fish farming.**

  In monsoon Asia, extensive traditional fish farming had existed. Projects improved technology for more productive fish farming. In rice production area, such an approach gives great impetus to expansion of fish farming.

- **Diversification strategy of poor farmers**

  By using technologies improved by JICA projects, poor farmers have effectively used agricultural and natural resources. They diversify livelihood activity.

Factors Affecting to Success of “Famer to Farmer Approach” (2)

- **Core farmers (seed farmers) actively invest in hatchery**

  Relying on the transferred technology and guidance services provided by projects, they invested in hatchery and ponds. Such a heavy investment enlarged capacity of seeds and develop supply chain.

- **Projects properly select candidates for core farmers.**

  Candidates were selected as core farmers, by using various indicators.

  “Selection and concentration” is a very workable method.

  Core farmers had entrepreneurship enough to receive training of seed production.

Factors Affecting to Success of “Famer to Farmer Approach” (3)

- **Potential to develop hatchery business in particular areas**

  Accumulation of seed farmers in particular rural areas contributed to the growth of hatchery business. “Economies of scale” in terms of seed production began to work at regional (provincial) level.

Factors Affecting to Success of “Famer to Farmer Approach” (4)

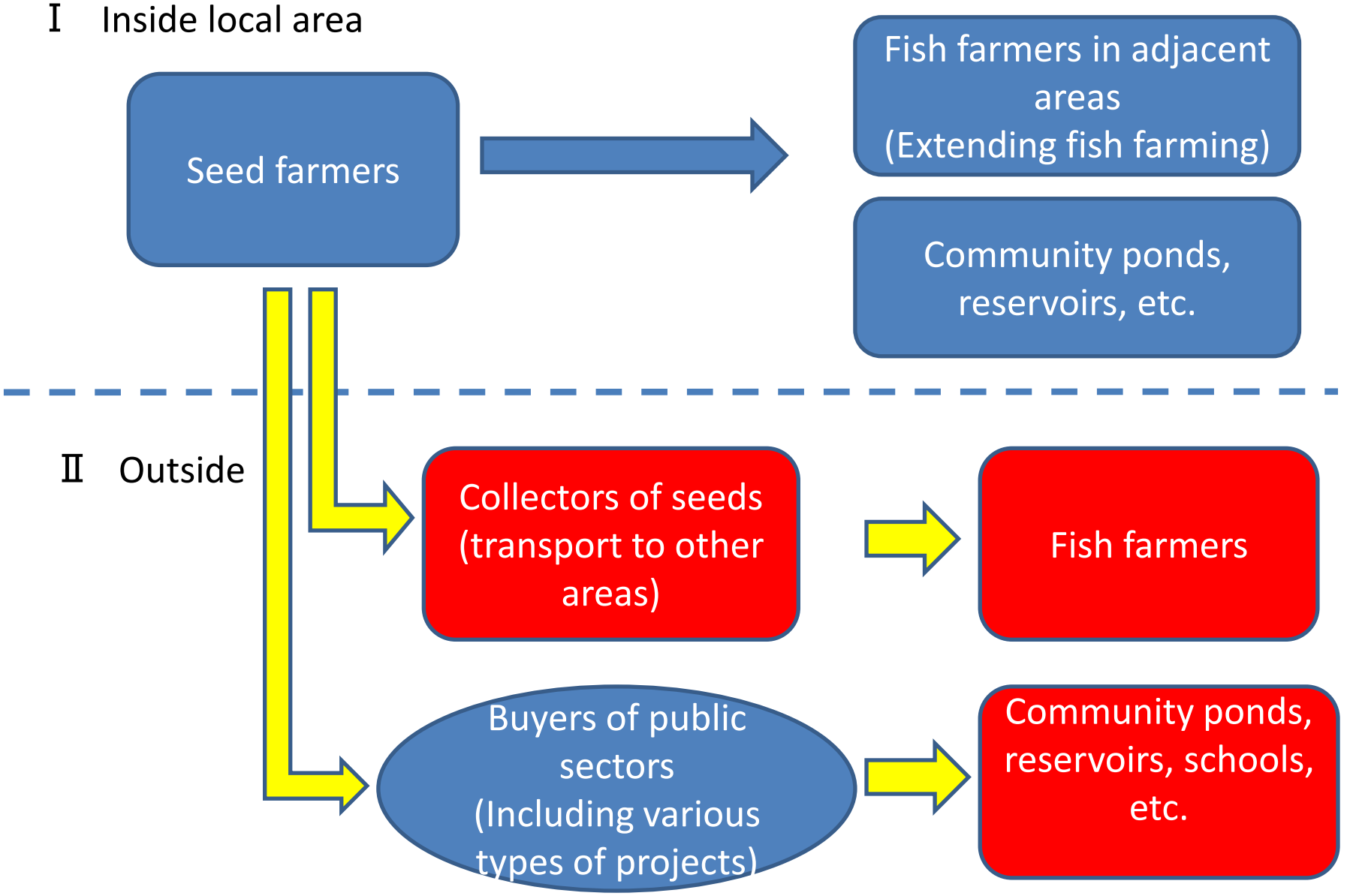
- **Demand from public sector and development projects**

  An increasing volume of seeds was in demand.

  Releasing of fingerings into reservoirs, cannels, rivers, community ponds, etc. Such public demand was a lucrative channel of seed farmers.

Seed farmers, JICA projects, C/P, and related organizations have successfully created stable demand for seeds.

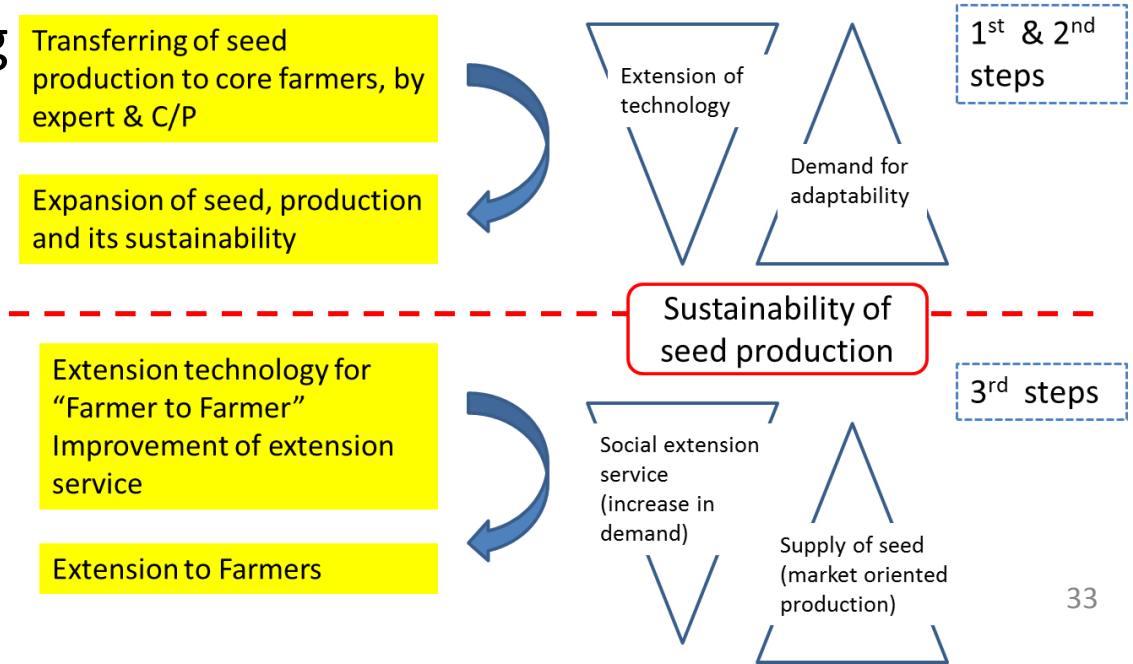
Figure Marketing Channels of seeds



Issues 1:
Sustainability of Seed Farmers

- Sustainable business management of seed farmers is a decisive factor to develop rural aquaculture.
- Consultation on how to run a hatchery business is required, in terms of technology transfer and marketing.
- On 3rd step, relationship marketing with farmers focusses on guidance of technology and information.

Figure Transferring of seed production technology, and sustainability of hatchery business

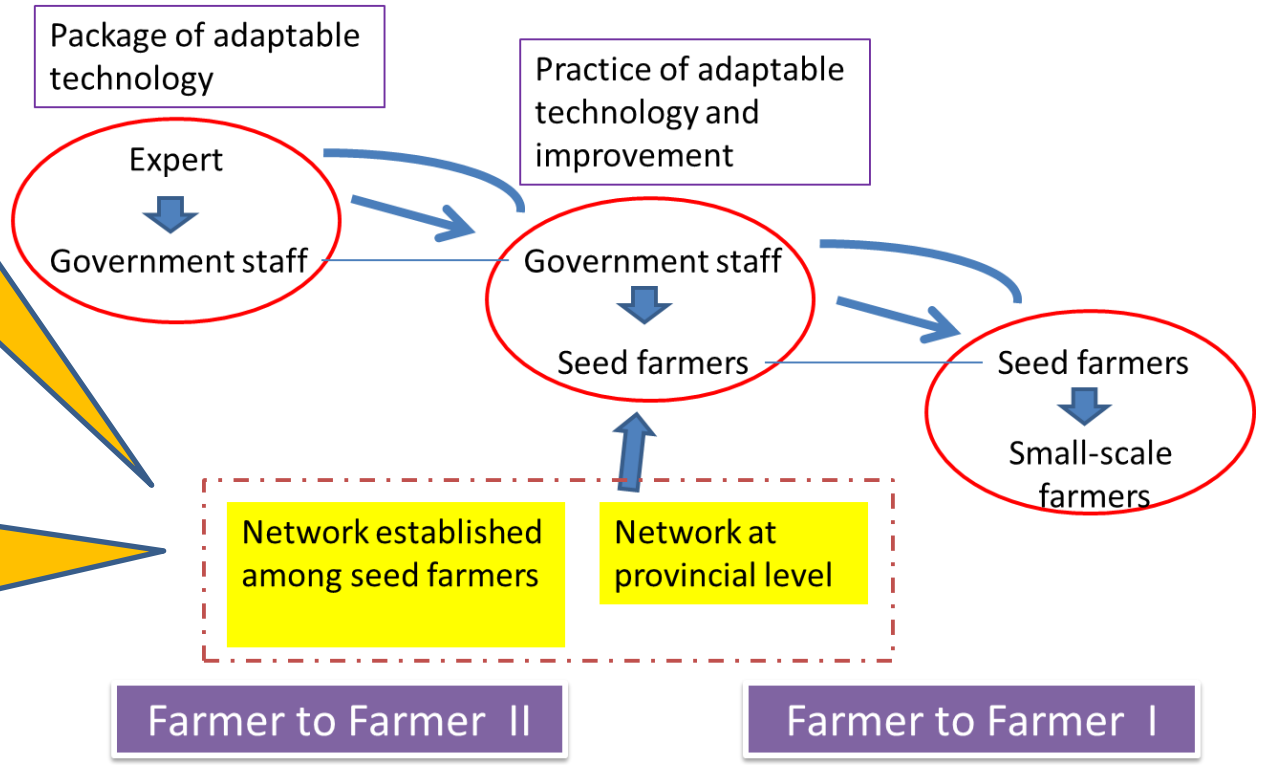


Issues 2:
Development of “F-to-F” among Seed Farmers

Level-up of acquisition of technics: exchanging experiences and knowledge among seed farmers

Cooperative activities: marketing, micro finance, advertising, etc.

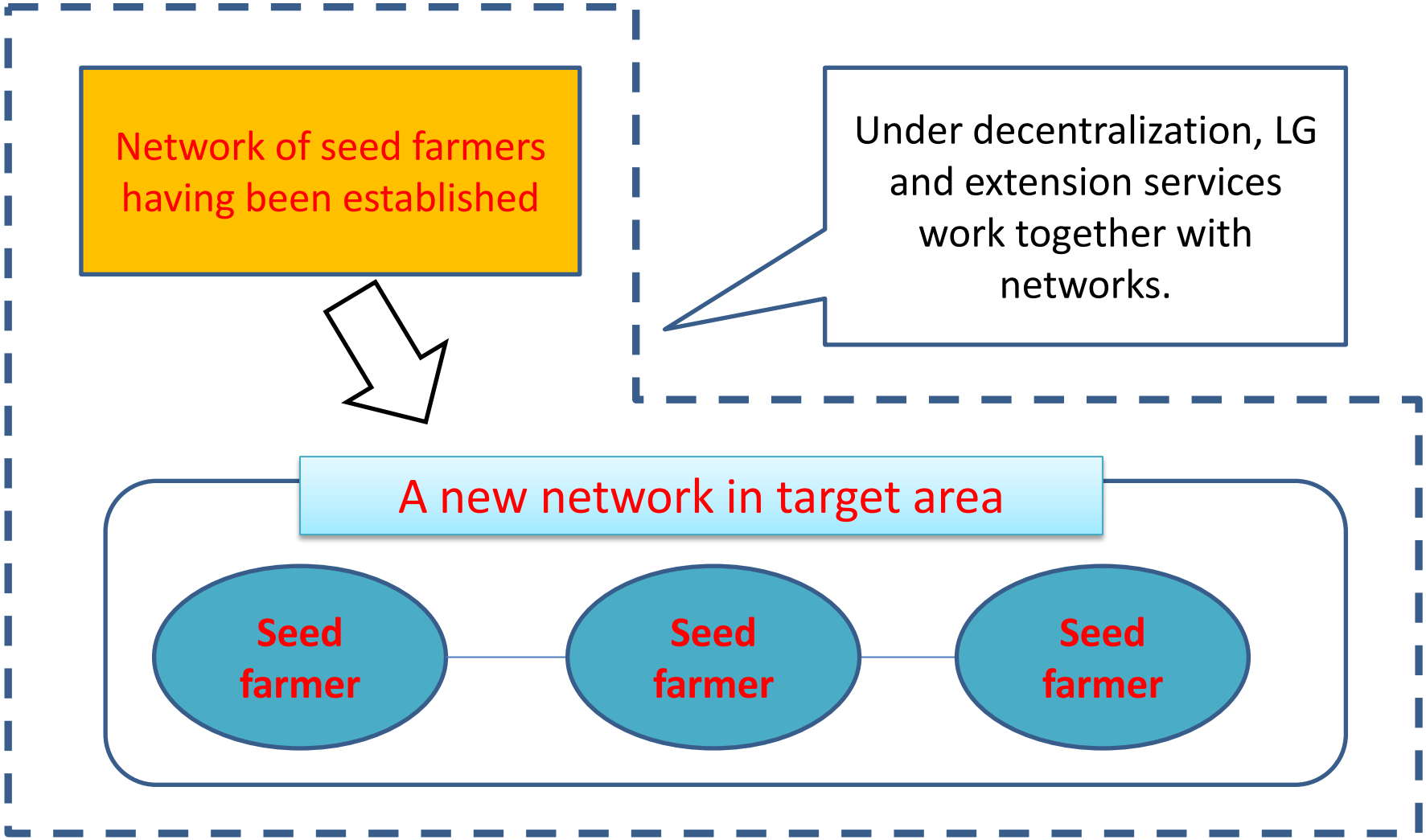
Figure Development of three steps extension system



Issues 3:
Projects and Decentralization

- Local government (LG) and extension service may promote fish farming. Under decentralization, people and community actively participate in planning and implementation.
- In many countries, decentralization has proceeded. Encouraging LG and community to involve in extension of fish farming is a hard task, but a key issue. They suffer from lack of personnel and insufficient funds.
- Workable framework of collaboration with networks of seed farmers is needed.

Figure Networks of seed farmers at the national and regional levels



Issues 4:
Management of Reservoirs and Community ponds

- Releasing fingering and brood stock to community ponds and reservoirs are often included as a project activity. People and community involve in management with participatory approach.
- Through consultation with LG and stakeholders, sustainable use of fish resources is achieved. Poor farmers also benefit catch of fish in community ponds, rivers, and paddy fields.
- Issues to be discussed are as follows:

1) Adjustment of conflict as regards water use between agriculture and fisheries
2) Cost-effective, less-time consuming monitoring and management are required to prevent illegal fishing.
3) Benefit of common pool resources have to be distributed equally.

Issues 5:
Seed farmers may fierce competition

- Aquaculture industry has developed so fast (particularly in SEA). Division of labor in inland aquaculture is also expanding through the region as a whole. Even small rural seed farmers may face a stiff competition with highly commercialized and industrialized ones.
- While raising productivity and profitability, seed farmers should explore a new business pattern, relying on relationship marketing.
- How to strengthen the competitiveness of small-scale seed farms should be considered. Not only their sustainability but also business expansion are important.


Conclusion

Sharing Responsibility and Process Management

- Appropriate sharing of responsibility should be established among aquaculture center, extension services, local government, NGOs, community, people, project, so on.
- Process management of technology transfer is fitted into local reality and level of fish farmers.
- Target species and culture technology vary according to local environment and people's demand. Projects flexibly explore cost-effective farming methods.
- Capacity enhancement of seed and fish farmers are the most decisive factor to succeed the projects.

Paddy field, mango tree and fish
in Madagascar

Thank you for your attention.