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Peter Edwards writes on

# Rural Aquaculture

## A knowledge-base for rural aquaculture

In my column in the July-September 2001 issue (Volume VI:3), I wrote about the need to develop a knowledge base for rural aquaculture which I divided into a series of subject matter fields. These were subsequently used to produce an open-ended questionnaire to solicit the views of individuals with experience in field-based R & D who have been involved in project activities at grass roots level in developing countries. The questionnaire solicited views on:

- What knowledge exists and in what form and language?
- Is more knowledge required in a particular area, and if so, how should it be produced, and in what form and language should it be produced?
- How should the new knowledge be disseminated?

Some of the major finding and quotations are used for this issue's column to provide a "flavor" of what is to come in a paper being produced on the survey.

Most respondents stated a need for rural aquaculture, particularly where wild fisheries are in decline, but even in areas with abundant wild fish in the rainy season, poor people may not be able to catch sufficient wild fish in the dry season. However, it is simplistic to believe that aquaculture can replace capture fisheries and there is a need for knowledge of the complex interrelationships between aquaculture and wild fisheries.

The degree of involvement of small-scale farmers in aquaculture varies widely from, for example, almost none in Africa and in Sri Lanka in Asia, to very few in Cambodia and Laos compared to Bangladesh and Vietnam where there are significant numbers. Small-scale farmers who now farm fish could benefit even more from aquaculture if constraints to gaps between current and potential yields were addressed in both Africa and Asia. There is huge potential for more small-scale farmers to farm fish if various limiting factors, depending on context, were addressed.

The intricate relationship between aquaculture and other farming systems is not understood by professionals in aquaculture and other development sectors and "a fundamental change in the education system is necessary to



*Participatory on-farm research - weighing nursed fingerlings in Northeast Thailand*

develop appropriate knowledge and skills of students and staff in the fisheries sector". There was consensus regarding the question of how rural aquaculture technology should be developed or improved for farmers:

- Rural aquaculture should be demand driven
- A participatory approach used for both development or improvement of technology rather than technology transfer.
- It should be more focused on resource-poor farmers.
- There is a need to better understand farmer decision-making processes.
- There is a need to strengthen participation of government at all levels down to local level
- Involve NGOs.

Concerning the attention aquaculture receives in national policy compared to other development sectors, policies in Africa were reported to be weak, incomplete or lacking and even where they exist, strategies to implement policy are lacking. Policies for aquaculture in Asia are improving

although allocation of resources may not correspond to recognition. Some countries are increasing government investment in rural aquaculture e.g., Vietnam's program "Sustainable Aquaculture for Poverty Alleviation or SAPA.

Turning now to a series of technical issues, the limited availability of quality seed is regarded as a constraint in Africa and many areas of Asia, especially the timely availability of large fingerlings. In response to a question on which groups of species are now farmed and which have the greatest potential, the answers are aptly summarized by a respondent who wrote "more confusion than clarity exists in regard to the issue of native and exotic species", suggesting the need for knowledge on their relative merits, both positive and negative.

The question concerning the adequacy of existing breeds of indigenous and exotic fish provoked a varied response. A majority view was that "existing species" are sufficient" and that "technical preoccupation on new introductions should not be a high priority at the current stage of development". One respondent wrote that awareness of new breeds has prompted many to misdirect attention of poor growth of adequate fish from poor management. However, several respondents mentioned the issue of seed quality as nicely summarized by a respondent from Bangladesh: "I doubt if many hatchery workers understand the basis of broodstock management and simple genetics to obtain decent fingerlings".



*Exploring the possible role of aquaculture for a poor Cambodian family*

There was general consensus that the principles and practice of effective pond fertilization are poorly understood. Sub-optimal fertilization is probably one of the major management weaknesses in Africa and the same applies to most of Asia. Respondents from Bangladesh called for more knowledge on "green water" culture techniques. There is inadequate knowledge of use of ingredients for feeds and feeding in Africa and Asia but as one respondent pointed out, this level of intensification may be largely outside the scope of poor farmers. One commented that much of the knowledge generated by the

Western mode of nutrition research has little relevance for small-scale farmers in developing countries.

Disease was reported not to be a major issue in Africa at the current level of aquaculture development and generally ranks below seed and feed as issues in rural aquaculture in Asia. Disease was stated by one respondent to not be a major problem in Bangladesh although poor production due to poor management is often attributed to "disease".

There appears to be poor knowledge in both Africa and Asia regarding stock management.

With regard to culture systems, respondents pointed out that technology and literature are readily available for rice / fish culture but there has usually been a low adoption rate and, as a consequence, hardly any information on its sustainability as a profitable enterprise or on "scaling-up". Pond culture is the most common culture system in most areas although many ponds receive little management once they have been stocked with seed. Most respondents considered ponds to have huge potential although one respondent considered them to have low priority for poverty alleviation. Fish are usually cultured in cages by better-off farmers but some respondents felt that they have potential for small-scale farmers. Wastewater-fed aquaculture is practiced in peri-urban areas in some countries in Asia but more knowledge is required on



*The professor receiving a lesson from the farmer in Vietnam*



*Asking a farmer in Northeast Thailand for his opinion on integrating aquaculture into his resource-poor farm*

its economics and safety for possible wider dissemination. There is an erroneous view that coastal aquaculture farmers are mostly the better-off; it has considerable potential for poverty alleviation if small-scale farmers are targeted.

As most respondents had field level experience, the inadequacy of commonly used “top-down” or “trickle-down” systems of R and D (extension) were severely criticized. Rural aquaculture requires technology either created or upgraded by the farmer. Traditional development programmes do not reach the poorest of the poor, only the richest part of society. There is a need for alternative extension methodologies as current services are also understaffed and underfunded. There is a need to avoid “model farmer” approaches. Extension services should be trained to be people centered and participatory. They should include also farmer extension with an experiential learning approach and the creation of “farmer to farmer” learning opportunities.

The need for participatory farming systems R & D approaches is increasingly understood but there is a huge need for capacity building and scaling up. One respondent from Bangladesh wrote that “most NGOs speak well on such approaches but do not do it in reality”. In Sri Lanka there is use of rhetoric (participatory, market-oriented, community management and co-management) but it is a façade for

continuing high-tech, production-oriented, top-down approaches. One respondent, recognizing that participatory approaches appear to be an effective way to reach out to the small-scale farmer, asked do we have documented “models”? Other respondents provided answers:

- In Africa “there are certainly sites which could serve as case studies of successful small-scale aquaculture”

- “most aquaculture systems in Asia are poorly documented and rarely brought out as educational materials to help teaching and plan research activities”.
- “surprisingly limited and inaccessible – a priority”
- “there are lots but few have been documented and disseminated”.

In conclusion in the words of respondents concerning knowledge:

- “sharing knowledge is the biggest issue in all fields of knowledge”.
- “knowledge exists in limited networks, in limited media and few languages”.
- “the components are probably available but need to be integrated, evaluated and distilled in a regional context”.

And regarding the level of knowledge of teachers, trainers and researchers in participatory, farming systems approaches:

- “very limited, huge capacity building drive essential. We are supposed to halve world poverty by 2015. It will not happen unless we fund this”
- “large investment in this area to build the capacity of staff involved in teaching, research and development would result in multiple benefits”.
- “huge field of educational work itself to develop the capacity of teachers, trainers and researchers in applying approaches”.



*Field-testing extension materials in Northeast Thailand prior to wider dissemination.*