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UNDERSTANDING ADOPTION AND DISCONTINUANCE FOR GREATER IMPACT

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Résumé - Les plaines inondables sont caractérisées par une période où la terre est sous les eaux et non disponible pour l'agriculture. Durant cette période, cet espace est traditionnellement utilisé pour la pêche. Ces vastes espaces pourraient être utilisés pour pratiquer l'aquaculture communautaire afin de complémenter la production naturelle. Les expérimentations menées dans le Delta du Mékong (Vietnam et Cambodge) ainsi que dans le Delta du Gange au Bangladesh entre 2006 et 2009 ont souligné le potentiel et les limites de ce modèle. L'analyse comparative de ces expériences entre les pays, à l'échelle communautaire et des ménages selon différentes dimensions (gouvernance, économique, sociale, environnementale et technique) en utilisant à la fois des données qualitatives et quantitatives, permet de mieux comprendre les facteurs facilitant ou contraignant le succès de ce modèle. L'analyse montre que le contexte pour développer de telles actions collectives est plus propice au Bangladesh, avec un environnement socio-économique et des caractéristiques écologiques mieux adaptées. Le manque de confiance entre les participants ainsi qu'une capacité limitée à développer des actions collectives sont parmi les contraintes trouvées au Vietnam, où le bénéfice économique est le principal facteur pour l'adoption de ce modèle. L'étude des soi-disant «échecs» de ces interventions techniques nous a aidés à comprendre les différents facteurs nécessaires au développement de l'aquaculture communautaire et nous aide à mieux appréhender comment cette technologie peut être intégrée dans différents agro écosystèmes et contexte socio-économique.

Mots clés : plaines inondées, aquaculture communautaire

Abstract - Understanding adoption and discontinuance for greater impact
Floodplains are characterized by a period of several months when the land is not available for agriculture and large, open areas are used for fisheries. The enclosed part of these flooded areas can be utilized for fish production aside from naturally occurring self recruited species through a community-based management system. Experiences in the Vietnamese and Cambodian Mekong Delta and Ganges Delta in Bangladesh between 2006 and 2009 highlighted the potential of this model and its limitations. Comparative analysis between countries at community and household levels provide indications about enabling and constraining factors affecting the success of this model in a range of factors (governance, economic, social and, environmental/technical) using both qualitative and quantitative data.
The analysis shows that the Bangladesh context is more suitable than that of Vietnam and Cambodia to develop such collective action, with a more adapted socio-economic and natural environment. Absence of trust between participants and low capacity to develop collective action were found as important constraints in Vietnam, where individual economic benefit was the main driving factor and possibly the cement of community based action. The study of so called "failures" of technical interventions helped us to understand the different requirements needed to develop Community Based Fish Culture and how such technology can be integrated in other agro-ecosystems and socio-economic environments.

Keywords: floodplains, community based aquaculture

INTRODUCTION

Floodplains are a seasonally changing environment. From a rice production area in the dry season, these become a vast water body during the monsoon and its associated flood. According to Catling (1992) between 50 and 100 million of rural people live in deep flooded areas in Asia. Traditionally water bodies are open access areas used for fishing by local people. During this period, the portfolio of livelihood activities is limited and fishing remains an important resource. More than 70% of households are engaged in fishing in the flooded provinces of the Mekong Delta, Vietnam (An & Alm 2008; Pham & Guttman1999). In the lower Mekong Basin in Cambodia, two million hectares of seasonally inundated areas, rice fields and seasonal wetlands can, potentially provide a fish production of 100,000 to 300,000 tons per year, with a productivity of about 50-150 kg/ha (Gregory et al.1996; Gregory & Guttman, 1999; Troeung et al. 2003). In the Vietnamese Mekong Delta, an area of 1.2 to 1.9 million hectares is annually flooded, with about 1 million hectares inundated by more than 1 meter. In Bangladesh, those inundated areas are estimated to reach 4.5 million hectares. Thus, flooded areas represent a large fishing ground and an important resource for local people.

One option to increase water productivity in these flood prone areas is to integrate aquaculture in the production cycle, with concurrent or alternate rice-fish culture. Enhanced water productivity is the basis for the community-base fish culture concept, which has been tested by the WorldFish Center and national research partners in five countries (Vietnam, Cambodia, Bangladesh, China and Mali) since 2005. The objective of the project was to develop locally appropriate models for fish culture in seasonal water bodies where the costs of individual aquaculture systems are prohibitive for poor people. Thus Community Based Fish Culture (CBFC) introduced local institutions for collective management of fish culture although the technical design of fish culture does not differ from individual production systems.

There is a large literature on issues around common property resources (CPR), a social arrangement regulating the preservation, maintenance, harvesting or consumption of common pool resources among groups of people, from a governance perspective (McCay and Acheson 1987; Ostrom 1990, 2003; McCay and Jentoft 1998; Adger and Luttrell 2000; Ahmed and Hirsch 2000; Agrawal 2003; Meinzen-Dick et al. 2006). The transformation from open access fishing, which can lead to resource degradation in a context of over-capacity, to CPR-based fish farming poses questions on social exclusion, although not to the same extent as privatization. Floodplain rice systems offer further challenges to establishing CPR-based fish culture, as customary conversion to open access fishing reverts to private ownership when the flooding recedes.

After several months, fish culture activities were discontinued at a number of project sites. The causes of discontinuance, and conversely, the factors supporting success, showed both similarities across countries, as well as context specificity. This paper looks at how governance of this new CPR interacts with critical economic, social and environmental/technical factors to provide opportunities or constraints to enable seasonal community-based fish culture systems.

1. METHODS

1.1. Study Area

The CBFC project was implemented in the Mekong Delta, both in Vietnam and Cambodia and in the Gangetic Delta in Bangladesh. The climate follows a monsoon pattern of a dry season (December to mid May) and rainy season (mid May to November), with 80 to 90% of the rainfall occurring during the latter period. The average rainfall in the delta is 1,477 mm in Vietnam (An Giang Province) and 1,337 mm in Cambodia (Phnom Penh). The Gangetic Delta of Bangladesh presents similar climatic characteristics with a monsoon

season from June to November and an average rainfall varying between 1,300 and 3,000 for most part of the country.

Flood patterns are dependant on river discharge, local rainfall and water management infrastructure. In Cambodia, floods start to inundate rice fields in July until January, with no flood protection system to protect rice culture as is seen in Vietnam, where flooding is delayed until August or September with a well-developed flood protection system. Rice fields are drained in December to start the first rice crop. The maximum water level is around 1 meter. Rice production systems are rain-fed or based on recession rice in Cambodia, while in Vietnam rice culture is more intensive with two or three HYV rice crops per year.

In Bangladesh, floodplain topography is different compared to the Mekong Delta, with wide depressions, locally called "beels" flooded from June/July to December/January with a maximum water level that could reach more than 5 meters. These areas are used to produce HYV rice in the dry season from January to May and are important fishing ground in the flood season, while more elevated land is used to produce rain fed rice during the monsoon.

Field trials in community-based fish culture were carried out in 2 south western provinces in Cambodia (Prey veng and Takeo), 3 provinces in Vietnam (Can Tho, Vinh Long and Dong Thap provinces) and 3 provinces in Bangladesh (Rasjhahi, Mymenshigh and Ranjpur).

1.2. Study Sites and technical design

The models tested are based on "alternate rice-fish" culture, when fish culture is introduced between rice crops, using an extensive model in Vietnam and Bangladesh and a more intensified model in Cambodia with a smaller fish culture area (Table1). In each site, technical support and assistance for fish culture group management was provided by local partners. Fish culture groups were provided with funds in the first year of fish culture trials to purchase fingerlings and materials for maintaining the site boundary. If fish culture were successful, it was expected that some of the income would be returned to a central fund to support the purchase of fingerlings the following year, encouraging self-sufficiency of the farmer group.

Table 1: Technical design and organization of Community Based Fish Culture in Vietnam, Cambodia and Bangladesh

	Vietnam	*Cambodia*	*Bangladesh*
Number of sites	5	4	3
Cultivated area (ha)	19 – 120	0.65 – 2	31-40
Membership	Landowners	Open (Villagers)	Previous users and landowners
Number of members	7- 34	5 -21	124 – 214
Status of project sites	Discontinued (3) – Active (2)	Discontinued (4)	Active (3)
Rice Production system	Double- Triple rice crops	Rain fed rice	Dry Season rice

1.2.1. Vietnam

In 2006, four sites were selected for preliminary trials. The fish culture model was adapted based on those experiences (i.e species selection). Only one of those sites continue and was part of the five sites[1] selected to implement the project (Figure 1a), in areas of 2 or 3 rice

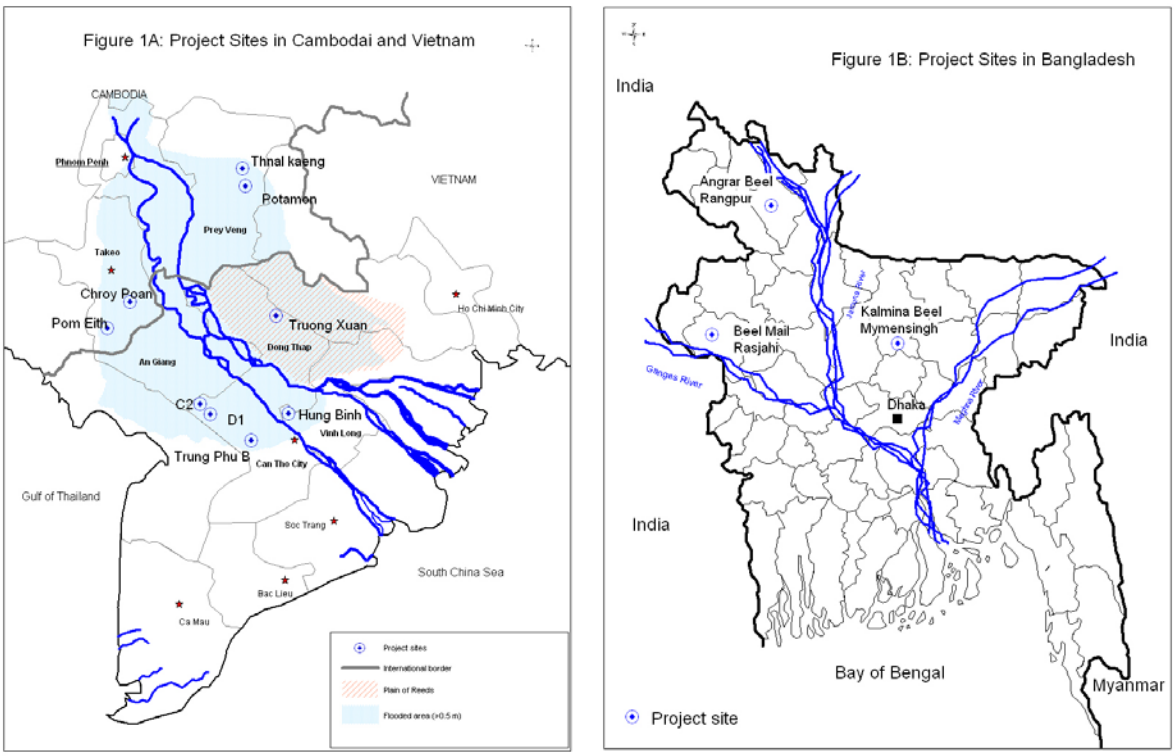
[1] Namely: D1, C2, Trung Phu B (TPB) hamlets (Can Tho Province); Truong Xuan (TX) hamlet (Dong Thap Province); Hung Binh (HB) hamlet in Vinh Long Province.

crops per year. The fish production area is delimited by dikes and fish are stocked in August and harvested in early December. The stocking density used was below 0.25 fish per square meter, with a polyculture composed of the following species: common carp (*Cyprinus carpio*), silver carp (*Hypophthalmichthys molitrix)* and bighead carp (*Hypophthalmichthys nobilis)*, with no additional feeding in all cases but one. The fish culture groups involved landowners and varied in size from 7 to 34 households. In Vietnam, three sites stopped activities after one year of implementation, one site continued fish culture for two years and a fifth site cultivated fish for three years, with a gap of a year's inactivity.

1.2.2. Cambodia

In Cambodia, four sites[2] were selected (Figure 1a) in flooded rice fields or public reservoirs. Due to the absence of dikes, the enclosures were small (0.65-2ha), delimited by a fence and poles and fish were stocked in higher density (1 to 2 fish per square meter) than in Vietnam or Bangladesh. Species raised in those sites were: silver barb *(Barbonymus gonionotus)* silver carp, tilapia *(Oreochromis niloticus)* and indian carp *(Catla catla).*

Figure 1a and 1b: Project sites in the Mekong Delta (Cambodia and Vietnam) and in the Gangetic Delta (Bangladesh).



[2] Pom Eith (PE) and Chroy Poan (CP) villages in Takeo Province; Thnael Kang (TK) and Potamon (PT) village in Prey Veng Province

1.2.3. Bangladesh

In Bangladesh three sites[3] were selected (Figure 1b), including one on public land, while the two others were located on private land. The area of the water bodies was between 33 and 40 ha, with several villages and communities settled around them. The number of households involved in the fish culture activities varied from 124 to 214, including different stakeholders groups, such as landowners, fishers and landless. The last two stakeholders groups are previous users of the fisheries resources of the project area. The model was similar to the one applied in Vietnam, with low stocking density (0.07 – 0.18 fish per square meter) of common carp, bighead carp and silver carp. In Bangladesh, two sites cultivated fish more than two years consecutively and one site stopped during one year to restart again in the third year.

1.3. Institutional arrangement and access rights

Regulations governing access to the water body during the fish culture period, duties of each member of the group, election of a management group and benefit sharing arrangements were discussed during a general meeting facilitated by local partners. In all sites in Vietnam and Cambodia, fishing in the fish culture area during fish grow-out was prohibited, for members and non-members. In Bangladesh previous users of the area (landless, fishers, landowners) are allowed to fish self recruited species using extensive fishing gears.

1.4. Production and economic results of the systems

Between 2006 and 2009, a wide range of production and economic results were recorded. In Bangladesh productivity of the systems was the highest, with positive economic return (Table 2). In Vietnam, the production results were less positive, with lower productivity and in some case a negative economic return; similarly in Cambodia the model faced technical constraints and a very high price for fish fingerlings.

Table 2: Range of productivity and economic results in the different countries between 2006 and 2009 (1USD = 17,429 Vietnamese Dong or 68 Bangladeshi Taka or 4,074 Cambodian riels)

	Productivity (kg/ha)	*Gross Return (USD/ha)*	*Net Return (USD/ha)*
Bangladesh	196-636	195-506	28-244
Cambodia	0-55	0-88	Negative
Vietnam	92-179	12-80	Negative - 41

1.5. Data collection & analysis

To understand the factors supporting adoption of the models or those constraining community based fish culture, we used a comparative approach within and between countries. The method included semi-structured interviews and Focus Group Discussion (FGD) with local partners, local authorities, and project beneficiaries, guided by a detailed research framework to address issues of socio-ecological context, incentives and motivation, and technical factors. More than 50% of the beneficiaries in Vietnam (n=64) and Cambodia

[3] Beel Mail (BM) in Rasjahi Province, Angrar Beel (AB) in Ranjpur Province and Kalmina Beel (KB) in , Mymenshigh Province

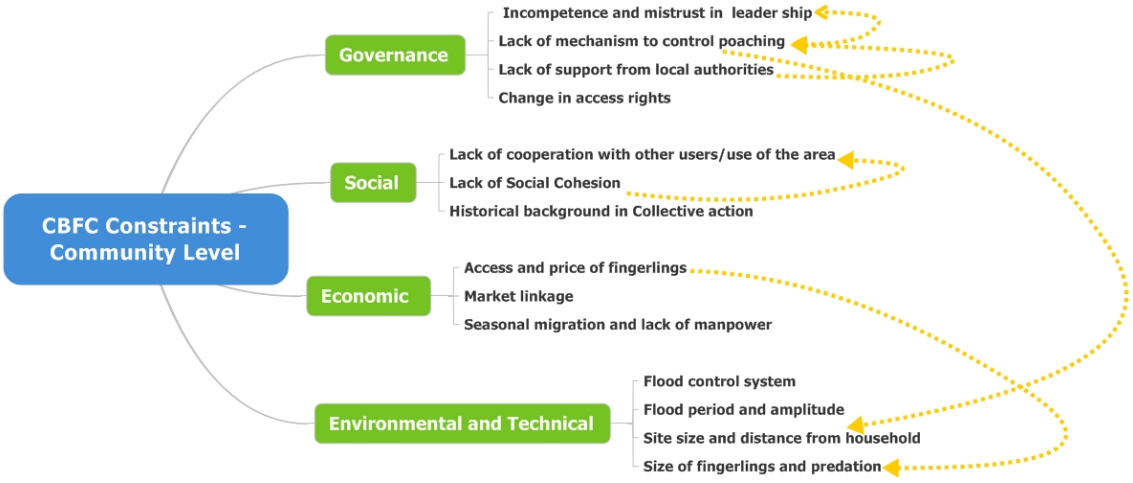
(n=36) were interviewed, while in Bangladesh FGD were conducted with the different stakeholder groups (landowners, fisher and landless) in each project site, due to a higher number of beneficiaries (more than 100 per site, compared to a maximum of 34 per site in Vietnam and Cambodia).

Qualitative data were analyzed using an analytical framework to evaluate enabling and constraining factors at community, household and individual level in terms of four different dimensions or factors: governance, economic, social, and environmental (including technical factors). Additional information on environmental and economic context was collected to understand the interactions within the socio-ecological interface. Cross analysis between sites and between countries highlighted the different constraints and incentives for the development of community based fish culture.

2. RESULTS & DISCUSION

In the following section we analyze and discuss the different constraints limiting the adoptions of Community Based Fish Culture at community and household levels. The main constraints at the community level and their interactions are illustrated in Figure 2.

Figure 2: Diversity and interactions of constraint limiting the development of Community Based Fish Culture (CBCF) at the community level.



2.1. Governance factors

The project, in essence, sought to transform a seasonal open-access system to a seasonal CPR system. Thus, governance factors were inevitably important at the community level. Constraints included, lack of support from the commune, mistrust in leadership and transparency mechanisms, poaching control and modification of access rights.

In Vietnam, lack of transparency in accounting and decision making by the management group was cited by respondents (12%) as one reason to leave the project. Similar constraints were reported at one site in Bangladesh, where poaching was related to mismanagement. These constraints were also dependant on structure of group organisation, with a lack of sharing of decision-making powers found both in Vietnam and Bangladesh sites, leading to mistrust in leadership and discontinuance of the collective action.

Poaching and lack of efficient mechanisms to control it was found in all countries. In Vietnam, this was cited by 47% of the respondents as a reason constraint. It was related to lack of manpower to guard large fish farming areas at night and changes in access rights of

former resource users. Like in Cambodia, poaching in Vietnam was also the consequence of fish culture development in a previously open access area, used by local and migrant fishers for fishing. Although the project sought to include as many water resource users as possible, some exclusion was inevitable, leading to poaching and vandalism. Protecting the stocked fish therefore requires support from local authorities for law enforcement.

A similar result was reported in Lao PDR, with the modification of access right to a fishing ground (Tubtim and Hirsch 2005). Conflict with previous users can be avoided if there is access to other fishing grounds or, as in Bangladesh, resource users are also project beneficiaries with specific agreements on access rights. Compared to Vietnam and Cambodia, previous users of the area in Bangladesh, such as fishers and landless were involved in the project and were allowed to fish self recruited species (wild fish trapped in the cultured area). Similar options are described by Saphakdy et al. (2009) in culture based fisheries in one community in Lao, where access rights are limited to extensive fishing gear (hook line, scoop device) before the main harvest period.

Institutional arrangements in Vietnam and Cambodia were more prone to develop conflict and might be considered less socially acceptable than in Bangladesh, where previous usage and users of the resources were taken in account in the new management regime.

2.2. Economic and market factors

At the community level, economic constraints were most important in Vietnam (42% of the respondents) with low market prices during the marketing period and a lack of market linkages. The harvest period corresponds to the bulk of wild fish harvest and local fish prices for cultivated species drop by 3 times in local markets. For example, the average selling price of common carp in Vietnam was 0.46 USD/kg, while in Bangladesh it was one USD/kg during the project period. In Bangladesh successive harvests every two to three months and more diversified marketing chains, including direct marketing and auctions at the landing site allowed a better economic return from the fish culture. In Vietnam, harvesting was completed during a short period. Marketing a large amount of fish (more than 10 tons in some cases) did not facilitate bargaining with middlemen. In Cambodia, the absence of market linkages to sell fish and the high cost of fingerlings (between 3.5 and 4.7 USD/kg, equivalent to 4 times that of Bangladesh) did not make the model economically profitable and attractive to villagers.

At household and individual level, economic incentives emerged as the most important motivating factor - more important than food security. In the different project sites in Vietnam, the absence of or limited profit was the main reason for 51% of the respondents to stop the project. In contrast, economic benefits in Bangladesh were sufficient for the different stakeholders to motivate them to continue. In Kalmina and Beel Mail, all stakeholders benefited from the project, with landowners earning income (more than 70 USD/ha in Kalmina Beel) from otherwise flooded and un-productive land. Fishers claimed to increase their income by four times in the flooded season, with a maximum of 294 USD/person in Beel Mail. Meanwhile, landless households benefited from higher fish catches of self recruited species. Moreover, salaries for fish harvesting in the fish culture group in Beel Mail were 2.5 times higher than the daily wage labour rate in agriculture (5.88 USD/day for harvesting and 1.7-2.2 USD/day as agricultural labour), creating a sufficient incentive for fishers to participate in project activities. In addition, the increased fish production in this site, with fish yields over 600 kg/ha, benefited the entire community with lower fish prices (0.51 USD/kg for silver carp) at the village level compared to the local market (1.02 USD/kg for the same species).

In Vietnam, other forms of off-farm and non-farm labor can provide higher incomes during the flood period, with farmers engaging in a range of activities, such as rice post-

harvest processing or construction work with estimated income ranging from 30 to 120 USD per activity/per person/per flood season. Moreover, Adger (2002) estimated that remittance and off farm income in the Mekong Delta represented more than 30% of household income. In three sites in Cambodia, more than 70% of the households interviewed have at least one active member migrating for seasonal wage labor, limiting the labor force for fish culture. Villagers perceived the project as a new technology, without any guarantee of results, while potential benefits could be realized only at the end of the flood season. In contrast, other activities could provide daily income for household needs.

Other types of land use during the flood can be more economically attractive and represent a lower level of risk than fish culture , for example renting flooded rice fields to migrant duck raisers in Vietnam, (with a lease costing between 5 and 28 USD/ha), or directly investing in duck raising or fishing to provide the daily needs. The choice of alternative land use or the opportunity to be involved in non-farm activities found at sites in Vietnam and Cambodia reflect similar behaviors as described by Pretty and Ward (2001) where farmers revert to previous practices when there is no more incentives to continue new activities. If farmers are convinced that the benefit from group or collectives action is greater than from individual activities then they are more likely to invest in that approach. To persist, the benefit must exceed both financial and time costs of engaging in individual activities. Therefore, a comparative analysis of costs of and returns from other local agricultural production, including capture fisheries and migrant labor opportunities is needed to assess the profitability of the model.

2.3. Environment and technical factors

Community Based Fish Culture is dependent on flood patterns (duration and amplitude). From this point of view, the technical setting (nature of the enclosure) will depend on the flood pattern and local infrastructure. The absence of water management infrastructure in Cambodia increased technical constraints compared to other countries. Here the development of enclosures was the only affordable option but was not adapted to the local environment, with a physically fragile system dependant on fluctuating flood patterns, with water levels which were too high or too low, varying annually.

From a purely technical perspective, fingerling size was an important parameter. Fingerlings which are too small (under 6g per individual) can face high predation rates, low survival rates (under 10%) and not meet market requirement sizes (300 to 500 grams per individuals) at harvest. This last consideration is even more important in Vietnam, where the grow-out period is shorter in duration, due to the integration of fish culture within a double or triple rice cropping area. In this country, the size of the cultured area was also an important factor with large areas (65 ha or 120 ha in some sites) being difficult to guard and to harvest. The ratio of cultivated area per beneficiary should not be too high (lower than 5 ha/person) for adequate implementation of activities.

The local natural environment was more prone to support fish production in Bangladesh with suitable water management infrastructure (dike and sluice gate), longer flood periods (more than 5 months) and higher water levels. In this environment the use of appropriate fingerling size (over 30 grams per individuals) and a longer growth period allowed stocked fish to reach market size, facilitating marketing and improving economic performance of the system.

2.4. Social factors

A community-based approach requires high cohesion of the community. Successful previous experiences of collective action in natural resource management is an important factor to take in account, not only for beneficiaries but also for other stakeholders including local authorities and partners. In Bangladesh, the Community Based Fishery Management

model is now well developed, with more than 250 community based organizations operating since 1990. According to local partners and villagers, this previous experience in collective approaches facilitates the success of collective fish culture.

In Cambodia, even if Community Based Natural Resources Management has developed in recent years, the different stakeholders involved in the project had not experienced this specific kind of collective action for establishing fish culture. In addition, members of the fish culture group often chose to migrate out of the community to work in other locations, leaving the fish culture group with too few members to provide the labour inputs needed for fish culture. Another reason for the reluctance of villagers to engage in collective action might be due their negative experiences in enforced collectivization in recent history (Khmer Rouge era and *Krom Samaki* developed by the People's Republic of Kampuchea). Such traumatic experiences might affect motivations to engage in collective action in Cambodia. In Vietnam, farmers in the Mekong Delta are well known for not being motivated by collective action in agriculture such as cooperatives (Le Coq et al. 2004; Lemeur et al. 2005). For example, in D1 and C2 hamlets in Vietnam, 16% and 20% of the respondents found it difficult to manage a group of farmers. Project members claimed that community based action is not possible because of incapacity of finding common agreement illustrated by the sentiment commonly expressed by respondents during interviews, "*too many people, too many ideas*" and perceiving fish production as a public good ("*public fish*"). Comparisons were often made with rice production, which requires a certain level of collective action but the harvest belongs to each individual, while in the case of community based fish culture the production belongs to the group and decisions on harvesting and marketing are taken collectively.

A specific constraint was found in Vietnam, with the integration of fish culture within an intensive rice culture area. Cooperation between farmers for the integration of fish culture in a rice based farming system was found to be difficult. The succession of two or three crops in the same rice field requires adjustment in timing, coordination of irrigation and drainage. The addition of fish culture might create conflict with other users and requires the agreement of other landowners. It necessitates the definition of a calendar for drainage of rice fields at the end of the fish culture and the absence of land preparation activity until the fish are harvested. Fish culture duration will also depend on the cropping calendar, with shorter fish culture periods in a three rice crop area, with a late rice harvest in August, delaying fish stocking. Thus, fish culture in seasonally inundated rice fields is easier to develop in areas of less intensive rice culture. Comparatively, in Bangladesh and Cambodia, the development of fish culture in rice fields supporting only one rice crop reduces these constraints, requiring less cooperation and allowing a longer growth period for fish.

3. CONCLUSION

3.1. Multiple constraints

Community Based Fish Culture in Seasonal Flood Plain is an apparently efficient way to enhance fishery productivity through fish stocking in areas where the costs or local environmental conditions make individual fish culture prohibitive, yet the technology is subject to a set of diverse constraining factors. Our study found that in transforming a seasonal open access system to a CPR, governance factors interact with technical/environmental and socioeconomic factors to strongly influence adoption of the technology. A comparative analysis between countries shows that the environment in Bangladesh is more favorable, with longer flood and grow-out periods for fish, and relatively few competing land uses. In Vietnam, where farmers invest in one single agro-ecological environment, economic benefit is the driving factor, while Cambodia faced important technical, environmental and socio-economic constraints. However, besides the technical constraints, comparison of approaches among these countries highlights that constraints are more complex than only economic factors. Social and governance factors, such as social

cohesion and change in access rights , play an important role in the adoption of community based fish culture.

3.2. What model is better for adoption?

By using an integrated and systemic approach, we have a better understanding of the context in which community based fish culture has a higher chance of success and what factors need to be taken in account to select appropriate sites and areas before an intervention.

To achieve significant economic benefits, implementation requires adjustment to overcome several constraining factors, such as competition for land use with other productive activities, water management infrastructure and flood duration, and market linkages. The reluctance of groups to continue the trials for more than one year in some project sites in Vietnam and Cambodia, suggests that:

- Sufficient livelihood alternatives which generated greater benefits than fish culture were available to participants;
- Alternative options delivered livelihood benefits that fish culture could not provide;
- Demands on labor were sufficiently high that participants had to choose between fish culture and other options.

Therefore, areas with low wage labour rates and few employment opportunities have a higher potential for community based aquaculture, providing better economic incentives for beneficiaries. Areas where flood duration is longer and deeper but with built structures to delimit the culture area are more suitable. Absence of competition for space, such as with duck farming, allows a longer growth period and requires less cooperation and coordination with users of the areas.

Change in access rights in Bangladesh were more flexible and less dramatic than in Vietnam or Cambodia, resulting in less conflicts and a better acceptance of the project by the community, due to social inclusion of previous users of the area. In addition to adjustments in access rights, development of transparent mechanisms of management and accounting are needed to create trust between members, facilitating collective action. A higher economic return from adopting this model might create sufficient incentives to overcome conflicts and improve community capacity to organise effective groups for fish culture in flooded rice fields, as was the case in Bangladesh.

Documenting and analyzing the causes of so called “failure” of the project was an important step toward learning and finding suitable solutions to improve farmers’ livelihoods. Lessons learnt during the project and documented using this approach are already being used in project out-scaling in Bangladesh and in re-designing the model of floodplain aquaculture for greater sustainability and impact in Cambodia and Vietnam.

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