



INCO: International Scientific Cooperation Projects (1998-2002)

Contract number: ICA4-CT-2002-10020

Tensions between AFPS production systems and other land uses

(Report D09)

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August 2006

Keywords: tensions, conflicts, dynamics, peri-urban areas

Website: www.papussa.org

Contract number : ICA4-CT-2002-10020

**TITLE : PRODUCTION IN AQUATIC PERI-URBAN SYSTEMS IN
SOUTHEAST ASIA**

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1 Introduction

Aquatic Food Production Systems (AFPS), in the context of this research, involve the farming of species of fish and aquatic plants in or around the major cities of mainland Southeast Asia, namely, Hanoi, HCMC, Bangkok and Phnom Penh. Table 1 is a detailed list of species involved in aquatic food production in these cities based on a survey conducted during 2003-2004. Both scientific and vernacular names are provided, if they are available. A quick glance at Table 1 shows the diversity of species involved in AFPS, from various plant species to different species of fish. Not all of these species are, however, endemic to these areas. Most of them were introduced such as *Colosoma* and Nile Tilapia, among others. But they have found productive uses among small-scale households.

| English Common Name | Latin Name | Thai Common Name | Khmer Common Name | Vietnamese Common Name |
|--|---|------------------|------------------------|------------------------|
| Plants | | | | |
| Morning glory, Kangkong, Chinese water spinach, water convolvulus, water spinach, swamp cabbage, swamp morning glory, and tropical spinach | <i>Ipomoea aquatica</i> Forsskal | Pak Bung | Trarkoun | Rau Muong |
| Salvinia | <i>Salvinia molesta</i> | Jookhunu | | |
| Urticularia | <i>Urticularia sp.</i> | | | |
| Water cress | <i>Nasturtium officinale</i> R. Be | Watercress | | Xa lach son |
| Water dropwort | <i>Oenanthe javanica</i> (Blume) DC. | Pak chelom | Kro outchhouk | |
| Water hyacinth | <i>Eichhornia crassipes</i> | Topchawa | Komplork | Luc binh |
| Water lettuce | <i>Pistia stratiotes</i> | Jook | Chork thom | Rau diep |
| Water lily | <i>Nymphaea lotus</i> | Bua sai | Prohit | Sung |
| Water lotus | <i>Nelumbo nucifera</i> Gaertn | Bualuang | Chhouk | Sen |
| Water mimosa | <i>Neptunia oleracea</i> Lour. | Khachad | Kanchheet | Rau Nhut |
| Fish | | | | |
| Bighead carp | <i>Aristichthys nobilis</i> | Lin | Trey carb kbal thom | Me Hoa |
| Black carp | <i>Mylopharyngodon piceus</i> | | Trey carb khmao | Me den |
| Climbing perch | <i>Anabas testudineus</i> | Pla Mhor | Trey kranh | |
| Colosoma | <i>Colosoma sp.</i> | Pecu | | Chim trang |
| Common carp | <i>Cyprinus carpio</i> | Nai | Trey carb samanh | Ca chep |
| Giant freshwater prawn | <i>Macrobrachium rosenbergii</i> | Kungkamkram | Bongkong teok sap | Tom cang xanh |
| Giant gourami | <i>Osphromenus gourami</i> | Rad | Trey tror cheak damrey | Ca tai tuong |
| Giant snakehead | <i>Channa marulius</i> | Chado | Trey chhador | Ca loc |
| Grass carp | <i>Ctenopharyngodon idellus</i> | Gin yha | Trey carb sea samao | Ca tram co |
| Hybrid catfish | <i>Clarias macrocephalus / gariepenus hybrid?</i> | Duk oui | Trey anden koun kat | Ca tre lai |
| Kissing gourami | <i>Helostoma temmincki</i> | Mhor tarn | Trey kantrawb | Ca huong/mui |
| Mrigal | <i>Cirrhina mrigala/cirrhosus</i> | Nuan jun tade | Trey krawlang | Troi trang |
| Mud carp | <i>Cirrhina molitorella</i> | Gang | Trey phkar kor | Thoi loi |
| Nile tilapia | <i>Oreochromis niloticus</i> | Nin | Trey tilapia chhnoht | Ro phi |
| Pangasius catfish1 | <i>Pangasius bocourti</i> | Ai dong, yang | Trey bra | Ca basa |
| Pangasius catfish2 | <i>Pangasius hypophthalmus</i> | Sa whaai, suey | Trey bra | Ca tra |
| Red tail tinfoil | | | | |
| Red tilapia | <i>Oreochromis sp.</i> | Taptim | Trey tilapia krohorm | Dieu hong |

| | | | | |
|--------------------|------------------------------------|----------|--------------------|--------------|
| Rohu | <i>Labeo rohita</i> | Yisook | | Rohu |
| Silver barb | <i>Puntius gonionotus</i> | Tapian | Trey chhpin brak | Me vinh |
| Silver carp | <i>Hypophthalmichthys molitrix</i> | Sawai | Trey carb brak | Me trang |
| Snakeskin gouramy | <i>Trichogaster pectoralis</i> | Salid | Trey kawnthor | Ca sac |
| Striped snakehead | <i>Channa striata</i> | Chon | Trey phtuok / raws | Loc bong |
| Three spot gourami | <i>Trichogaster trichopterus</i> | Kradee | Trey kompleanh | |
| Trey Riel | <i>Henicorhynchus siamensis</i> | | Trey riel | |
| Walking catfish | <i>Clarias batrachus</i> | Dukdan | Trey andeng | Ca tre phi |
| Wild shirmp | | Kung Pra | Kampes | Tom tu nhien |

Table 1 List of organisms involved in or associated with aquatic food production in the peri-urban of Bangkok, Hanoi , HCMC, and Phnom Penh with their Latin and common names (Source: PAPUSSA Survey)

A significant number of households are involved in AFPS livelihoods and such systems not only sustain many thousands of people, but their outputs represent a critical component in urban food supply and urban food security. However, as the production systems with which this project are concerned straddle an area within close proximity to the urban core, it is expected that there will be tensions and conflicts in both system and livelihood terms. These tensions and conflicts may be played out in different settings, contexts or resource situations. Conflicts result from the build up and eventual release of tensions. Competition underlines these conflicts. Potentially, there are several avenues or theatres of competition. These may emerge in terms of conflicts over access to land and water resources. They may be articulated in the form of competition between resource users. They may lie in the latent conflicts between different land uses. Or they may be situated at the institutional level, that is, within the institutions concerned with the management of land, water, fisheries, agriculture, and urban development.

In order to understand some of these tensions, we will look at the importance of land in AFPS and to the households involved in this livelihood. As with all other human activities, land is an important component in AFPS. This report and all other reports in the project show that anything that happens on or to the land has ramifications on the sustainability of AFPS. We will also look at new developments and how these are being perceived and felt by AFPS households. Understanding the interaction of AFPS and other land uses therefore cannot be understated. In succeeding sections, we survey perceptions of future trends, both in aquatic production systems and the job prospects of children of AFPS household heads. Then these perspectives will be situated within their perception of rurality and urbanity vis-à-vis their current residential and livelihood locations and the characteristics of their economic activity.

2 Importance of land

Land is an important asset among small-scale agricultural households whether rural or peri-urban. Land holds all human activities. Among AFPS households, the access to land plays important role in the success of the livelihood. Such access may be in the form of direct ownership, renting, leasing, sharing or borrowing. Mr Cao Van Phuong in Hanoi intimated in an interview that “land is the most important thing to the farmer” (Appendix 1). The same sentiment is echoed by Mr Nguyen Thi Hanh Tien: “If I have land, I will have much money. If you do not have land, you will only be a hired labourer”. Thus, access to land is often

associated with a certain level of well-being. In the case of Bangkok, land is a “crucial resource in the task of household reproduction, and access to new opportunities for status and livelihood have been historically tied to the accumulation, preservation and transmission of land” and it means many things to the landowner as “alienable property (*sapsin*), a place for living (*thi yu*), a livelihood resource (*thi din*) and household inheritance (*moradok*)” (Askew 2003: 318). This view of the land is likely to be similar across all study sites. Farmers and aquaculturists tend to be closely connected with the land that has been the bases of their livelihood and social life, although their land requirements may differ as described by Leschen et al. (2005: 3):

The attributes of the land required by the urban farmer are considerably less stringent than for the person cultivating fish or aquatic vegetables. Growing crops and even livestock can often be carried out very successfully within cities utilising relatively small areas of marginal land, which can be enhanced using chemical or organic fertilisers. However, the prospective fish or aquatic vegetable farmer has to not only find and retain access to the necessary area of land, but also obtain a source of water that is reliable both in terms of seasonal availability and quality (it does not deteriorate due to effluents from surrounding factories or other detrimental human activities). These factors can restrict and pre-determine to a large extent where more permanent periurban aquatic systems are located. (Leschen et al. 2005:3)

Ownership of land among surveyed households in AFPS production in both Bangkok and HCMC is high while this is not the case for either Phnom Penh or Hanoi (Table 2). Farmers in Hanoi do not consider themselves to be ‘owners’ of the land they are using. On first sight and surprisingly this is not the case in Viet Nam’s other city, HCMC. Despite the bestowal of long term use rights on agricultural lands by the state, farmers in Hanoi are aware that, ultimately, the state retains ownership. Households receive contracts for the use of the land for agriculture or aquaculture from the People’s Committee at the commune or district levels. Despite the continuing view among farmers in Hanoi that land is owned by the state, de facto private ownership is beginning to emerge. Increasing numbers of households are parcelling out some of their lands for rental by other households (11% of land) and a brisk land market is developing. The trade in land use rights is subject to state regulation, with the People’s Committee in the commune or district having to agree to the sale of the remaining years of the contract. It may be that in time farmers will gradually come to see the land they use as ‘their’ land, as farmers appear to do in HCMC where 68% of plots are regarded as owned. The remaining plots in HCMC are rented in from other farmers (30%) or used as a common property resource (1%). Overall, the pattern of ownership in HCMC more closely mirrors the situation in Bangkok and Phnom Penh than in Hanoi (Table 2).

As noted above, the difference in patterns of land ownership in Hanoi and HCMC is noticeable given that both cities operate under the same land code. However, we suspect that it reflects the histories of the two cities and a certain inertia among farmers – or the role of collective memory – in their relative views and perceptions of who ‘owns’ the land they operate. In Hanoi, the state progressively took control of land through cooperativisation and the introduction of communes from 1954 onwards. Only since the introduction of significant agricultural reforms in the late 1980s and the revised land law in 1993 has this process been reversed. In HCMC, by contrast, private land ownership was the norm through to the mid-1970s. While the Vietnamese state may have tried to introduce

cooperatives in the Mekong Delta in the years immediately following reunification this effort was not only short lived but also generally unsuccessful. In other words private land ownership has been the dominant system in HCMC over the last half century, while in Hanoi the state has maintained ownership.

| Nature of access rights | City ^a | | | | Total |
|---|-------------------|------------|--------|--------|--------|
| | Bangkok | Phnom Penh | HCMC | Hanoi | |
| Owned by household | 165 | 84 | 157 | 1 | 407 |
| | 56.7% | 37.3% | 68.3% | .2% | 33.6% |
| Rented in from others | 112 | 133 | 68 | 127 | 440 |
| | 38.5% | 59.1% | 29.6% | 27.4% | 36.4% |
| Rented out to others | 8 | 5 | 2 | 53 | 68 |
| | 2.7% | 2.2% | .9% | 11.4% | 5.6% |
| Common property resource | 3 | 1 | 3 | 3 | 10 |
| | 1.0% | .4% | 1.3% | .6% | .8% |
| Part-share with others | | | | 10 | 10 |
| | | | | 2.2% | .8% |
| Loaned without charge | 2 | | | | 2 |
| | .7% | | | | .2% |
| Belong to family or relatives | 1 | 2 | | 1 | 4 |
| | .3% | .9% | | .2% | .3% |
| Indefinite lease from state (i.e house plot) | | | | 1 | 1 |
| | | | | .2% | .1% |
| Leased from state (5-50yrs) | | | | 197 | 197 |
| | | | | 42.5% | 16.3% |
| Rented in from commune | | | | 68 | 68 |
| | | | | 14.7% | 5.6% |
| Rented in from church | | | | 3 | 3 |
| | | | | .6% | .2% |
| Total | 291 | 225 | 230 | 464 | 1210 |
| | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

a. % within city

Table 2 Nature of access rights of land used for agriculture/aquaculture

How plots have been acquired varies significantly between Bangkok and HCMC on the one hand, and Phnom Penh on the other (Table 3). Acquisition by inheritance characterises HCMC (72%) and Bangkok (69%) while it is by purchase in Phnom Penh (73%). A land market exists in Phnom Penh despite the absence of stable and formal land management systems. Furthermore, this situation in Phnom Penh also reflects the settlement history of the research sites. Their demographic histories reveal that a sizeable proportion of the households in Phnom Penh were resettled to their current place of residence from elsewhere following the end of the Pol Pot period. As such, there was no prior ownership of the land and therefore little scope for transfer and acquisition through inheritance. In Thailand, by contrast, the settlement history of the research sites is much longer and land has been bequeathed from one generation to the next over several generations. The situation

in HCMC where nearly three quarters of land has been inherited is more surprising. However if we discount the short period following reunification (1976-1980) as an aberration in which the Vietnamese government largely failed in its attempts at cooperativisation (as discussed above), then what we see is the persistence of de facto private ownership between the two periods, reflected in the apparently widely accepted view among farmers that their land has been inherited.

| Mode of acquisition | City ^a | | | | Total |
|---|-------------------|------------|--------|--------|--------|
| | Bangkok | Phnom Penh | HCMC | Hanoi | |
| Bought | 38 | 52 | 32 | 1 | 123 |
| | 23.5% | 73.2% | 22.1% | 50.0% | 32.4% |
| Invaded/squatted | | 3 | 5 | | 8 |
| | | 4.2% | 3.4% | | 2.1% |
| Inherited/given | 112 | 7 | 105 | | 224 |
| | 69.1% | 9.9% | 72.4% | | 58.9% |
| Resettled | 2 | 1 | 2 | | 5 |
| | 1.2% | 1.4% | 1.4% | | 1.3% |
| Use right given by local leader | 2 | 5 | 1 | | 8 |
| | 1.2% | 7.0% | .7% | | 2.1% |
| Received from decollectivisation | | 3 | | | 3 |
| | | 4.2% | | | .8% |
| Agrarian reform | 8 | | | | 8 |
| | 4.9% | | | | 2.1% |
| Other government programmes | | | | 1 | 1 |
| | | | | 50.0% | .3% |
| Total | 162 | 71 | 145 | 2 | 380 |
| | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

a. % within city

Table 3 Mode of acquisition of owned agricultural/aquacultural land

To more fully ascertain the situation in HCMC, we need to know when those who inherited land acquired their lands. Table 4 shows that 45% of inherited lands in HCMC were acquired or possibly transferred to current owners prior to the period of decollectivisation in the early 1990s. Despite the fact that private land ownership was not the norm during that period, a land market probably did exist, although this would have been informal and shielded from the eyes of the state (Akram-Lodhi 2001). If land can be sold then it is also likely that land may be transferred from one family member to another.

| Year | City ^a | | | Total |
|--------------------|-------------------|-------------|---------------|---------------|
| | Bangkok | Phnom Penh | HCMC | |
| After 2000 | 12 10.7% | 1 14.3% | 5 4.8% | 18 8.0% |
| 1991-2000 | 46 41.1% | 1 14.3% | 53 50.5% | 100 44.6% |
| 1981-1990 | 27 24.1% | 2 28.6% | 25 23.8% | 54 24.1% |
| 1971-1980 | 11 9.8% | 3 42.9% | 13 12.4% | 27 12.1% |
| Before 1970 | 16 14.3% | | 9 8.6% | 25 11.2% |
| Total | 112 100.0% | 7 100.0% | 105 100.0% | 224 100.0% |

a. % within city

Table 4 Year inherited lands acquired

Reflecting the nature of their land tenure institutions, each city has different certificates of ownership (Table 5). Interestingly, none of the landowners in Phnom Penh and only a handful in HCMC could actually show a deed as proof of ownership, although they claimed to own the land they were using. In Phnom Penh, 42% of these 'owners' could only show an 'occupancy license', while another 19% had what was claimed to be a 'legal title', and a further 14% possessed a paper from the person who sold the land attesting to the sale.

In HCMC, 89% of households can show an 'occupancy license' and another 9% legal title. Two households claimed to have a 'deed' as proof of ownership. In contrast, 94% of landowners in Bangkok have 'deeds' as proof of ownership. These patterns of proof of ownership (or long term use rights) between the cities largely reflect the institutions and land management systems in place in each country and their respective maturity. It has been claimed that in Thailand tenure formalisation has led to dramatic improvements in farm productivity (Feder *et al.* 1988), which is not the case with other countries that attempted various forms of land tenure reforms (Maxwell and Wiebe 1998: 21).

| Type of document | City ^a | | | | Total |
|--|-------------------|------------|--------|--------|--------|
| | Bangkok | Phnom Penh | HCMC | Hanoi | |
| Occupancy license | 1 | 30 | 129 | | 160 |
| | .6% | 41.7% | 89.0% | | 42.0% |
| Legal title | | 14 | 13 | 1 | 28 |
| | | 19.4% | 9.0% | 50.0% | 7.3% |
| Paper from person who sold land | 2 | 10 | | | 12 |
| | 1.2% | 13.9% | | | 3.1% |
| Deed | 153 | | 2 | 1 | 156 |
| | 94.4% | | 1.4% | 50.0% | 40.9% |
| None | 6 | 18 | 1 | | 25 |
| | 3.7% | 25.0% | .7% | | 6.6% |
| Total | 162 | 72 | 145 | 2 | 381 |
| | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

a. % within city

Table 5 Proof of ownership of owned land

As this brief discussion indicates, land management systems in Cambodia are still undeveloped and a clear process of formalising ownership is not in place. This may largely be due to the low capacity of formal institutions in the country, including those concerning land. The country's revised Land Law was only passed in 2001 and there is an on-going process of developing its implementing guidelines, educating people about its provisions, and establishing a systematic mechanism of registering lands. There are at least two possibilities for the likely future development of land management and ownership systems in Phnom Penh regarding AFPS operators. The first will see the gradual formalisation of land ownership in Phnom Penh as the capacity of the institutions of land management¹ increase and the instruments of the revised Land Law are brought to bear. A second possibility, however, recognises the contested nature of the terrain in peri-urban areas, the heightened competition for land between AFPS operators and other land users, and the marginal nature of these zones. In such a context, AFPS operators may be squeezed out by other wealthier, more powerful, better networked and more aware land users. Already we are seeing tensions emerging in Boueng Cheung Ek with obvious land filling activities going on along the banks of the lake for residential and commercial purposes. Although the lake is planned as a biotreatment facility for the city's sewage (Balmisse and Maisonhaute 2005), large-scale development and encroachment² increasingly characterises the area.

Looking at the mode through which land is owned in Bangkok, Phnom Penh and HCMC tells us about the respective processes of land acquisition in the cities. Clearly, the social and political histories of each country define the ways land is

¹ The extent to which this claim may come to fruition may be limited by recent developments where by The World Bank suspended the project that pursues these goals due to reported corruption in the implementation of the project (The World Bank 2006: 3).

² Part of the lake was originally the Fishing Lot No 1, but was released by Prime Minister Hun Sen recently (i.e. early quarter of the decade) for community use.

transferred and acquired. Among the cities, Bangkok and Hanoi have the largest plots used for AFPS production with means of 1.58 ha (SD=2.84) and 1.14 ha (SD=3.86) respectively, whereas Phnom Penh and HCMC have mean plot sizes less than half these figures at 0.48 ha (SD=.54) and 0.49 ha (SD=.56) (Table 6). The data for Hanoi is interesting because households in the Red River Delta have only 0.3-0.5 ha of agricultural lands (Luu *et al.* 2002: 56).

| City | Number of plots | Minimum (ha) | Maximum (ha) | Sum (ha) | Mean (ha) | Std. Deviation |
|------------|-----------------|--------------|--------------|----------|-----------|----------------|
| Bangkok | 291 | .010 | 32.000 | 460.323 | 1.58187 | 2.840671 |
| Phnom Penh | 226 | .004 | 4.000 | 107.503 | .47568 | .543307 |
| HCMC | 230 | .005 | 3.200 | 112.981 | .49122 | .557684 |
| Hanoi | 760 | .002 | 51.480 | 867.853 | 1.14191 | 3.856511 |

Table 6 Size characteristics of plots of land used for the production systems

3 New developments

Given the different degrees of urbanisation (see another Papussa related report for discussion on this issue, Rigg and Salamanca 2006a) among the cities surveyed in PAPUSSA, the mix of new developments will naturally also be different. However, observations made by respondents indicate that expected new developments will be related either to a further expansion of aquaculture or to the further development of physical infrastructure (Table 7). To some extent these two areas of development are competitive rather than complementary. New infrastructure developments noted include road building, the construction of bridges, and the maintenance of existing infrastructure such as roads and canals. The latter is prominent in Bangkok where 38% of observations among respondents noted such new developments. The construction of new roads and bridges (54% of observations), are particularly noticeable in Hanoi where the Ring Road III and the Thanh Tri Bridge are currently under construction as part of on-going improvements to the city's transport infrastructure. It should be noted that the construction of roads and bridges are damaging not only in themselves – through disturbing drainage patterns in the immediate vicinity, for example – but more widely and more generally in terms of how they open up areas for speculation and development as was shown in the case of Nonthaburi in Thailand, where massive changes in the landscape followed after infrastructures were put in place and large-scale housing subdivisions were constructed (Jongkroy 2006: 57-58). In HCMC, new towns are being built in districts where AFPS are also prevalent. These new developments prompted some respondents to notice a decline in the area devoted to aquaculture. This appears to be particularly severe in HCMC where proportionately more respondents (22%) reported such a decline than they did in Bangkok, Phnom Penh, and Hanoi. Indeed, in these latter three cities proportionately more respondents anticipated an expansion rather than a decline in the land devoted to aquaculture. A distinctive feature of developments in Phnom Penh was an anticipated increase in housing (19%), land farming activities (17%), and people (7%).

While taking note of the differences in survey administration which may be significant, the pattern of observations regarding new developments in each city may offer some clues regarding the sources of dynamism in the peri-urban landscape. These observations came from respondents' perceptions about changes within their immediate vicinities. If we look at the total number of observations in each city, we discover that Hanoi has by far the highest number of observations, which is in some ways a reflection of the level of development currently underway in the city and the tangibility of its impact. The number of observations then decreases, by city, in the following order: Phnom Penh, HCMC, Bangkok. While this is far from being a nuanced means of gauging the respective levels of development and disruption in each city it may be taken as a rough indicator and certainly reflects the observed situation in each site.

| Development changes | City ^a | | | | Total |
|---|-------------------|------------|--------|--------|--------|
| | Bangkok | Phnom Penh | HCMC | Hanoi | |
| More factories and industries | 2 | 7 | 8 | 2 | 19 |
| | 2.3% | 2.7% | 7.3% | .2% | 1.3% |
| New infrastructure (e.g., roads and bridges) | 12 | 5 | 26 | 516 | 559 |
| | 14.0% | 1.9% | 23.6% | 54.2% | 39.6% |
| New towns | 2 | | 27 | 30 | 59 |
| | 2.3% | | 24.5% | 3.2% | 4.2% |
| New subdivisions | | | 1 | 2 | 3 |
| | | | .9% | .2% | .2% |
| More offices | | | 1 | 38 | 39 |
| | | | .9% | 4.0% | 2.8% |
| Less land farming activities | 4 | | 11 | 42 | 57 |
| | 4.7% | | 10.0% | 4.4% | 4.0% |
| Declining aquaculture activities | 6 | 17 | 22 | 58 | 103 |
| | 7.0% | 6.5% | 20.0% | 6.1% | 7.3% |
| More aquaculture activities | 27 | 118 | 13 | 229 | 387 |
| | 31.4% | 45.0% | 11.8% | 24.1% | 27.4% |
| More maintenance of infrastructure | 33 | | | | 33 |
| | 38.4% | | | | 2.3% |
| More houses | | 49 | | 1 | 50 |
| | | 18.7% | | .1% | 3.5% |
| More people | | 18 | | | 18 |
| | | 6.9% | | | 1.3% |
| More landfilling | | 3 | | 28 | 31 |
| | | 1.1% | | 2.9% | 2.2% |
| More land farming activities | | 45 | | 6 | 51 |
| | | 17.2% | | .6% | 3.6% |
| New urbanisation plan | | | 1 | | 1 |
| | | | .9% | | .1% |
| Total | 86 | 262 | 110 | 952 | 1410 |
| | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

a. % within city

Table 7 New developments in village or commune

4 Future trends in aquatic production

| % within City | | | | | |
|-----------------------------------|----------------------|--------------------|-------------------------------|-------------------------|--------------------|
| Trends in aquatic production | City | | | | Total ^e |
| | Bangkok ^a | Hanoi ^b | Ho Chi Minh City ^c | Phnom Penh ^d | |
| Relocate production system | | | 1.4% | | .3% |
| Productivity will increase | | | .5% | 2.6% | .6% |
| Productivity will fall | .5% | | | 6.1% | 1.4% |
| No change | 49.2% | 25.2% | 79.1% | 42.3% | 46.0% |
| More government support | | .9% | | | .3% |
| More fish and decrease rice | | .3% | | | .1% |
| Lake become land | | | | 1.0% | .2% |
| Increase production area | 15.6% | 3.5% | 6.0% | 5.6% | 7.0% |
| Increase intensity | 1.0% | 21.4% | 2.8% | 12.2% | 11.0% |
| Do not work in fish culture | | .3% | | | .1% |
| Diversify species | .5% | 5.3% | 3.3% | 1.0% | 2.9% |
| Diversify production system | | 7.6% | .5% | 3.6% | 3.6% |
| Decrease production area | 30.7% | 11.1% | 1.9% | 21.4% | 15.2% |
| Decrease intensity | 1.0% | 1.2% | | 2.6% | 1.2% |
| Change to high value species | 1.5% | 23.2% | 1.4% | | 8.9% |
| Change occupation | | | 2.3% | | .5% |
| Become an aquatic plant collector | | | .5% | | .1% |
| Abandon current production | | | .5% | 1.5% | .4% |
| Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

a. n=199

b. n=341

c. n=215

d. n=196

e. Total = 951

Table 8 Future trends in aquatic production

Table 8 lists the trends identified by AFPS producers. Although it is notable that a sizeable number of producers indicated that they expected no change in their current aquatic production methods and systems, more than half of respondents in three of the four cities were anticipating significant changes. The exception was HCMC where 79% of respondents said that they expected no change in their current pattern of activities. The respective figures for Bangkok, Phnom Penh and Hanoi were 49%, 42% and 25%. The 'no change' response for HCMC is surprising given the fact that this is the city where vigorous change is occurring reflected in the development of new towns and associated infrastructures (Table 7). It may be that because these developments lie outside the control of individual households to manage or influence they are simply discounted. So what we see in the figures is

not so much a reflection of dynamism and instability in the wider urban context but rather household level dynamism and expected changes at the household level.

In Bangkok, a decrease in production area (31%) is rated high among other expected changes. In Hanoi, there is an anticipated increase in intensity (20%) and change to high value species (23%). In Phnom Penh, producers reported that they expected a decrease in the production area (16%) and an increase in intensity (10%).

Although respondents would not seem to be too worried about the future, they know there are looming threats to their production systems, which are categorised and listed in Table 9. In terms of the overall picture, 43% of total observations relate to future production losses linked to diseases, pests, poaching, natural disasters, pollution, lack of knowledge, lack of suitable equipment, low quality of seed, and lack of water. These production system-linked factors loom large in respondents' perception of the future and raise questions about the long-term sustainability of AFPS.

The category of production losses is highest in Hanoi with 88% of respondents mentioning it as a threat to aquatic production, followed by Bangkok at 60% and then HCMC and Phnom Penh at 54% and 32%, respectively. Potential production losses in Hanoi stem from several threats of which pests and diseases (31%), lack of water for production (25%), low seed quality (18%), and lack of knowledge of suitable techniques (13%) are the main ones. The major suggestion of some respondents in Hanoi to deal with these threats of pests and diseases in their production system is to ask for help from the government either in the form of technical assistance or subsidies. Approaching the government whether to ask to build a new canal, to improve seed quality or to provide technical assistance is also seen as a major way of dealing with threats of lack of water for their production systems, low seed quality, and lack of knowledge.

The main concern of production losses in Bangkok come largely from pests and diseases (82%) for which, according to some respondents, help should be sought from the government for either subsidies or technical assistance in combating them.

In HCMC, production losses are feared to come from natural disasters such as typhoons and floods (42%), pests and diseases (37%), and poaching (10%). To deal with threats of typhoons and flooding, some respondents in HCMC mentioned the need to lobby the government for support, to build higher walls to contain the flood waters, to relocate to other areas, or to replace farmed species with more suitable alternatives. To prevent poaching, respondents mentioned seeking support from the government, building fences, or relocating their farms as some of the measures.

| Threat categories | City | | | | Total ^b |
|---|---------------------------------|-------------------------------|---|------------------------------------|--------------------|
| | Bangkok (N=212) ^a | Hanoi (N=209) ^a | Ho Chi Minh City (N=197) ^a | Phnom Penh (N=200) ^a | |
| Production losses | 128 60.4% | 183 87.6% | 106 53.8% | 64 32.0% | 481 42.6% |
| Problems with water sources | 5 2.4% | 120 57.4% | | 14 7.0% | 139 12.3% |
| Marketing problems | 27 12.7% | 67 32.0% | 22 11.2% | 31 15.5% | 147 13.0% |
| Limitations imposed by existing institutions | | 36 17.2% | | 4 2.0% | 40 3.5% |
| Land/ capital substitution | 16 7.5% | 12 5.7% | 1 .5% | 27 13.5% | 56 5.0% |
| Lack of labour | 6 2.8% | | | | 6 .5% |
| Lack of capital | 5 2.4% | 62 29.7% | 5 2.5% | 7 3.5% | 79 7.0% |
| Increasing input costs | 35 16.5% | 79 37.8% | 40 20.3% | 18 9.0% | 172 15.2% |
| Health problems of producers | 1 .5% | 3 1.4% | 2 1.0% | 4 2.0% | 10 .9% |
| Total | 223 | 562 | 176 | 169 | 1130 100.0% |

a. % within N

b. % within total observations

Table 9 Categories of perceived threats to aquatic production systems in the next 5 years

While this threat category in Phnom Penh is not as significant as in the other cities, it is still the main one. This threat is primarily caused by pests and diseases (53%), pollution (25%), and natural disasters (8%). Like other cities, asking the government for support to minimise the negative impacts of these threats is still what some respondents thought to be the best way to deal with them.

Other threat categories that are worthy of attention are increasing input costs (15% of total observations), marketing problems (13% of total observations), and problems with water sources (12% of total observations). The problem of increasing input costs is particularly well noted in Hanoi where 38% of respondents in this city perceived this threat category. Some of the inputs respondents were referring to include chemicals, feeds, labour, transport and electricity.

Other problems reported in Hanoi include sources of water (57% of respondents) and marketing (32% of respondents). The water source problem refers to the diminishing quality of water due to contamination or pollution or

sometimes its decreasing flow into the production system. At times, too much water from flooding is also reported to be a problem. On the other hand, the marketing problems respondents are referring to essentially include falling market prices, bad road condition that affects timely delivery of produce, and lack of access to markets.

Addressing these key threats in the cities studied will have implications for the future of AFPS – both in terms of the form that they take and, perhaps, in terms of whether they persist at all. However, in Phnom Penh, an additional issue is the problem of land which a number of respondents (14%) have noted as an important threat. In highlighting this issue, they are referring to in the perceived growing risk that the production system will be displaced by other land uses. There is now an array of activities and uses that compete with AFPS in this city's peri-urban. Prices of land have been increasing of late and there has been, specifically in Boueng Cheung Ek Lake, a number of instances where land is reclaimed or purchased by outside investors for other uses. If this trend continues, it is likely that there will be a shift in the overall make up of the production system which people depend on for their livelihood. Thus, timely interventions need to be made by the responsible government agencies and civil society entities to address this. These interventions may lie outside the remit of aquaculture or fisheries but in the realm of better urban land management and urban planning. Otherwise the issue of safety nets to buffer those households that will be affected need to be pursued in wider policy discussions as there is a need to mitigate potential negative impacts on household well-being at least over the short-term.

5 Future job prospects of succeeding generations of AFPS producers³

If current AFPS producers have their way, it appears that the future of AFPS in the sites surveyed in Bangkok, Hanoi, and Phnom Penh is bleak. All of those interviewed in the qualitative interviews would prefer that their children embrace other occupations that are not related with AFPS production. They would prefer their children to work in factories or other non-farm based occupations. Mr Nguyen Van Binh in Hanoi is unequivocal when asked whether he wants his children to find other jobs: "Yes, I want them to work in factories", he said. Mrs Nguyen Thi Che in Hanoi also thinks the same way. Some lament the fact that AFPS production is back-breaking and only provides a meagre return. Others, especially in Hanoi and Phnom Penh, are hoping that urbanisation will bring more factories that might deliver employment opportunities for their children. Uncertainties associated with small-scale agriculture or aquaculture in general underlay parental concerns about their children's future. Mr Ravee in Lumsai, Bangkok confides that:

I am really worried every time I see them...I don't want them to grow fish but they [son-in-law and daughter] don't have other things to do here either.

When asked whether it is good or bad if increasing numbers of young people do not want to work with aquatic plants, Mr Ng Duy Thanh in Hanoi replied:

They'd be better off to work in other jobs. They can earn 700.000-1.000.000 VND/month. If they are unskilled labourers, they have to work in the farm but it is poor.

³ Appendices 1 to 3 list the dates of the interviews referred in this section.

While future economic stability is a major concern among parents, there are other concerns that dictate their preference for their children's occupations. This is particularly true among households where children are all girls. Parents, especially mothers, are worried about subjecting their children to the same hardships that they have had to face. Referring to her experiences in Hanoi, Mrs Pham Thi Lan's reply is poignant:

Question: Do you want your children to be involved in fish farming like you?

Mrs Pham Thi Lan: No.

Question: Why not?

Mrs Pham Thi Lan: Because they are girls. They are not healthy enough to work in the farm. When we harvest, we need boys to remove the fish. My daughter only stands on the bank to record.

Question: But you can work with your husband?

Mrs Pham Thi Lan: I have been working since I was small so I am used to hard work. They study and after that they go to work so they are weak. And they do not want to work in fish farming. We work so they have to follow.

To an extent, urbanisation itself is also responsible for the changes in preference among the next generation's job choices. Mr Sos Ty in Phnom Penh observes that "The ideals of the younger generation are already urbanised". By this, he meant that they are now less attuned to a rural lifestyle and prefer the tastes that city-life brings. Once children are attracted to urban lifestyles, it is hard for them to come back to manual work in the farm, which Mr Ng Duy Thanh in Hanoi described as "hard work, dirty and ugly", unless options are really limited and some degree of desperation creeps in.

However, to say that the demise of AFPS is associated only with the absence of takers among the children of current producers assumes that only those whose parents are engaged in AFPS will take on such work. There will be others who are surely attracted to the occupation in view of its continuing demand in cities in Southeast Asia especially as it was discussed in other reports of PAPUSSA (see, for example, Huynh Pham Viet Huy and Le Thanh Hung 2006, Kuong, Little, and Leschen 2006, Nguyen Thi Dieu Phuong *et al.* 2006, Rigg and Salamanca 2006a, 2006b) that the uptake of AFPS is not a result of inherited knowledge but more of locational factors engendering interests among producers. Demise can be averted when these new entrants continue the occupation or adjust their production systems to current conditions. At the moment, factors that will spell the end of AFPS are associated with current market and institutional environments and the quality of water supply. When asked about the conditions that will stop Mr Do Quang Chung in Hanoi from culturing fish, he replied that "If the water is too polluted and the income is less than the tax, then we will stop culturing fish". More than anything else, the perceived income from AFPS production will sustain it.

What seems to emerge from the survey results and the interviews is that AFPS are likely – if at all – to be sustained not by the inter-generational transfer of

land and knowledge but by the influx of new producers populating the peri-urban space.

6 Perspectives on rurality and urbanity⁴

Peri-urban areas are neither truly urban nor truly rural. It is an interface zone that marks a transition space between the urban core and the rural hinterlands. Within peri-urban areas lives and livelihoods are at some points 'rural' while at other times they can be counted as 'urban'. Households are within easy reach of the city centre due to good transport links. As a result, their livelihoods are sometimes more urban than rural. What makes for a rural livelihood? The easy answer would be to equate a rural livelihood with engagement with and on the land. That is, the more land-centric (i.e. agricultural) the occupation is, the more rural it – and therefore the livelihood – is perceived to be. But because, as discussed earlier, households engage with not one but a range of occupations the collective livelihood of a peri-urban household is likely to comprise of a mix of rurality and urbanity. There is a further complication, which is that rurality cannot be simply read-off on the basis of a household's or individual's occupation. It is also a state of mind which is linked to lifestyle as much as to livelihood. To put it another way, rurality (or urbanity) is not just *living* in a rural space, or embracing a rural livelihood, it is also socially constructed. This overlapping of different conceptualisations of rural and urban was reflected in the responses of key informants during the qualitative interviews conducted in Bangkok, Hanoi and Phnom Penh.

When Mr Vichai in Lumsai, Bangkok was asked whether his village was urban or rural, he replied that "A rural area is not easy to develop. But when the village estates company starts to build a housing project then it will start to develop [and become urban]." For Mr Vichai, it seems, a housing project is a necessary precursor for other developments which transform a rural into an urban area. For the wife of Mr Pon, who was interviewed in the baseline survey, her district of Nongpaongai, Bangkok is "still rural because we still have a lot of rice farming". To her a rural area is one where "...[it] has a lot of rice farming...[whereas] a city is more developed than it is today. [There are] more roads and the roads are smooth." In Hanoi, Mr Ng Duy Thanh also categorically stated that his village was rural "because we have to farm". The same thinking is shared by Mr Do Quang Chung who replied that he was living in a rural area "because 70% of our activities is in agriculture". Mrs Pham Thi Lan outlines the dichotomy in these terms:

Rural is working in pond, farm. Urban is working in factory, company, industry.

Such occupational differentiation between rural and urban is reflected in another observation by Mrs Srey from Bough Kak, a lake located very close to Phnom Penh city. She said:

If I refer to my occupation as a fish or pig farmer, I think I live in a rural area, although the place I live in is actually an urban area... The rural is quiet while the urban is crowded like the other side of the lake.

⁴ Appendices 1 to 3 list the dates of the interviews referred in this section.

Aside from agriculture, the absence of certain natural phenomenon occurring at regular intensities such as flooding is associated with urban lifestyles as there is a perception that urban areas have good infrastructure which prevents flooding and roads are cemented so are not wet during monsoon seasons or dusty during summer. The opposite of this defines a rural area as noted by Mrs Bunthach, who lives in Boueng Cheung Ek Lake located just a few kilometres from Phnom Penh city centre:

I feel that I live in a rural [area]. This area can not be considered an urban area yet because it's an agricultural area. The village also is still flooded. For the city people, they won't live here.

Thus, agriculture outlines the difference between a rural and an urban area and such difference is captured eloquently by Mr Nguyen Van Binh in Hanoi:

Rural is agriculture. If a rural area has industry, it will be urbanised. In the past, our grandparents did not have an extra job so urbanization was very slow. For example in Tu Liem District, the government took some hundred hectares of land back to construct buildings so urbanisation happened very quickly.

But rurality-urbanity cannot be reduced only to occupation. It is also defined in terms of the nature of the expenses the household incurs, income, the degree of familiarity among neighbours, the extent of transport network penetration, and the availability of certain amenities. Mr Leoung in Boueng Cheung Ek Lake, Phnom Penh observes that:

The living standard is different. We have to spend money all the time in town, but in the rural area, if we have [a] plot of rice we can depend on that. On the other hand, people who live in town don't know much about each other even if their houses are close to each other. For rural people, they know all their neighbours in almost the whole village.

Mr Teemu in Suanprixthai associates rurality or urbanity with income. He said that he is in a rural area because he has no income. Obviously his underlying assumption is that urban living is associated with wealth and disposable income, while rural living can be linked to paucity. But it is not just the total amount of income which is important, but also how that income is earned in terms of its periodicity. Mr Sos Ty in Phnom Penh observed:

The difference is in the nature of the jobs between the rural and urban people. For the urban people, they earn money every day, but for the rural people, their income is annual. In this village, the villagers' daily expense is similar to the urban people but their income is different. So that I think I live in half rural and half urban area.

Mr Manu, the imam of a local mosque in Suanprixthai, Bangkok playfully describes expenses incurred in the city as "like a shadow" as "it follows you everywhere". He also noted that one difference between his village now and in the past which can be attributed to urbanisation is the kind of amenities they have now. Before, he said, their toilets were the forests or anywhere outside their house so that people literally take a walk to relieve themselves. Now, villagers only need to go upstairs where toilets are located in their raised bungalows.

There is also the recognition among some respondents that rural/urban is as much an administrative divide as one dictated by occupation or amenities. Mrs Vu Thi Thuy in Hanoi reckons that her village is urban on paper only; that is, it is an urban area by virtue of government designation. The transitory nature of the peri-urban was also reflected in Mrs Vu Thi Thuy's observation that while she was living an urban life to the degree that she was paying high prices for basic necessities such as electricity, she was also living a rural life because "the way to earn money is rural".

Based on these responses, it is evident that respondents approached the issue and defined rural/urban in different ways, using different sets of criteria. One thing is clear, however. That is, perceptions of rurality and urbanity are conditioned by the experiences of the individual and how far in the course of their daily lives they crossed the rural/urban divide whether in terms of occupation, consumption, patterns of earning, or their social experiences. Mrs Samran in Suanprixthai used the term 'chanmuang', which literally means the urban area surrounding Bangkok, to describe the area where she lived.

Is, then, AFPS a rural or an urban activity? The views of key informants from Bangkok to Phnom Penh are unequivocal that it is a purely rural activity. In fact, such rural connection often defines their perspectives that they are living in a rural area despite the many and dramatic changes happening in the surrounding landscape which are drawing them functionally and experientially closer to the urban core. Ms Samran in Suanprixthai again perceptively noted that AFPS "activities are only done in the rural area because land in the city is limited".

7 Conclusion

The tensions outlined above are, therefore, apportioned at different levels: the individual, production system, landscape, and institutions. Different levels have different tensions but are nonetheless uncompartimentalised. Instead, they are interacting and spatialised. At the centre of these tensions is the individual and his/her production system. The individual decides and pursues objectives which are determined by his needs and the limits of his production system. They are spatialised in a sense that the landscape is what holds everything together.

At the level of the individual and production system, tensions occur because of perceptions. Understanding perceptual basis of tensions is admittedly complicated. But in the case of AFPS, we can narrow this down to perceptions of rurality and urbanity, which was discussed earlier, as well as on perceptions of future welfare of family members especially with respect to their future choice of occupation. Though the choices may be stark, producers are convinced that they prefer their children to do something else other than be involved in AFPS as an occupation. In most instances, they prefer their children to go to the city and do factory work. Future sustainability, therefore, of AFPS is implicated in this tension. With respect to rurality or urbanity, the tension emanates from their perception that their livelihood is rural, but their location is urban. This affects how households adjust to possible changes brought about by an urbanising environment. When a rural livelihood meets the vicissitudes of the urban environment, the former is likely to give way as the forces shaping the urban landscape are relentless. However, we cannot ascertain for now the shape of the encounter and how rural livelihoods are going to adjust, but we can surmise given the experiences on land use change in the global south where urbanisation is an everyday phenomenon that the urban

always wins. It is easy to imagine how a rural household adapts to another rural occupation as the changes that occur are likely to be familiar and households have already the wherewithal to be able to withstand and adjust its vulnerability as has been the case in the shift from rice farming to morning glory farming in all the cities studied in this project. But when the change shifts from a rural livelihood to an urban one, the chance of attaining successful adoption for a rural household may be limited as the demands are different and other attending factors unique to urban living come into play such as the need to commute regularly and pay for certain services which were unheard before urbanisation. For instance, a mature fish producer in Hanoi who has been in the business for most of his adult life may have less chances of attaining the same level of emotional satisfaction doing work in an urban environment where the options for living are limited to factory work. Surviving is not the issue as human ingenuity will always ensure that one survives despite all the challenges. What is at issue here is how to thrive in a new environment.

Although not explicitly covered above, it bears mentioning that further sources of individual tensions come from the food safety aspect of producing fish and aquatic plants in wastewater especially in the case of Hanoi and to some extent HCMC and Phnom Penh. Farmers are aware that they are using water with waste component in it, but they do not necessarily see it as problematic. Consumers, however, see it differently. There is an increasing changing preference among consumers in Hanoi or HCMC for fish that are not produced using wastes. Such preference is often associated with improving living standards and the penetration of supermarkets as sources of produce and an indicator of social class. That is to say, to shop in supermarkets and to consume food untainted with 'wastes' is the way an elite urban lifestyle should be. The same can be said of Phnom Penh where the urban elites tend to shun away from morning glory if they know it is produce from Boeung Cheung Ek.

Landscape changes as far as AFPS is concern comes from changing land uses and the increasing penetration of transport networks. Some producers are already worried that the areas they currently use for production will decrease and that production losses resulting from pest and diseases, pollution, and natural calamities, among other things, will escalate. Rapid urbanisation is one process propping up this tension. At the rate urbanisation is shaping in the region, it is obviously an important forces the landscape and its corresponding production systems will reckon with.

Finally, there are tensions emanating at the institutional⁵ level. Although the nature of this tension is not adequately discussed above, it is a tension that provides the undercurrent for all the other tensions by virtue of the fact that it is the role of the government to ensure that these tensions will not build up into conflicts. The case of Hanoi and HCMC is particularly telling in this instance as the national government are not keen on supporting production systems using wastes due to the bad public relations it projects as the country markets its tourism sector. To cite an example, the practise of constructing overhung latrines on fish ponds are supposed to be banned, but one can still see this practised in peri-urban areas. A corresponding report (Rigg and Salamanca 2006a) discusses these tensions in detail. It fleshes out the institutional aspects of AFPS using the problems identified

⁵ When we speak of institutions here, we are referring to the formal ones. Informal ones are admittedly also of utmost importance. But they have not been properly addressed in the foregoing research.

by key informants in participatory community appraisal exercises as the starting point of discussion.

8 Acknowledgement

This report was produced with the involvement of all project partners. In particular, we would like to acknowledge Dr Dave Little and Will Leschen from the University of Stirling; Nguyen Thi Dieu Phuong, Nguyen Thi Hanh Tien, Ho Kim Diep, Pham Bau, and Dr Tuan from the Research Institute of Aquaculture 1 in Hanoi; Kuong Kuov, Sok Darem, Seyha, Khuntheang, Sam An, Rumunny, and Borin from the Royal University of Agriculture in Phnom Penh; Dr Le Than Hung, Huynh Pham Viet Huy, Tam, Thao, Tuc, Minh, and Binh from Nong Lam University in HCMC; Dr Cam, Tuan Anh, Tuan, Tram, and Phuc from the National Institute of Health and Epidemiology in Hanoi; Dr Ruangvit Yoonpundh, Dr Varunthat Dulyapurk, Chumpol Sritong, Komsan Silma, Thanasorn Rukdontri, Rattanachai Rungsunsert; and, Ms Wanwisa Saelee Gamucci and Prof C. Kwei Lin of the Asian Institute of Technology in Bangkok. Special thanks to the AARM-Aqua Outreach Program of the Asian Institute of Technology for hosting Mr Albert M Salamanca during the duration of his fieldwork. Any shortcoming of this report should be attributed to us. Financial support for PAPUSSA (Production in Aquatic Peri-Urban Systems in Southeast Asia) came from the European Union through its International Scientific Cooperation Projects (1998-2002) (INCO, Contract number: ICA4-CT-2002-10020). This project ran from 2002 to 2006.

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10 Appendices

| Hanoi | Place | Date |
|------------------------|--|------------------|
| Farmers | | |
| 1. Mr Ng Duy Thanh | Bang B Village, Hoang Liet Commune, Hoang Mai District | 17 August 2005 |
| 2. Mrs Vu Thi Thuy | Bang B Village, Hoang Liet Commune, Hoang Mai District | 17 August 2005 |
| 3. Mrs Luu Thi Chung | Bang B Village, Hoang Liet Commune, Hoang Mai District | 17 August 2005 |
| 4. Mrs Nguyen Thi Ngo | Khuyen Luong Village, Tran Phu Commune Hoang Mai District | 17 August 2005 |
| 5. Mr Cao Van Phuong | Khuyen Luong Village, Tran Phu Commune Hoang Mai District | 17 August 2005 |
| 6. Mr Nguyen Van Binh | Khuyen Luong Village, Tran Phu Commune Hoang Mai District | 17 August 2005 |
| 7. Mrs Pham Thi Lan | Thon 2 Village, Dong My Commune, Thanh Tri District | 19 August 2005 |
| 8. Mr Nguyen Van Kiem | Thon 5 Village, Dong My Commune, Thanh Tri District | 19 August 2005 |
| 9. Mr Pham Ngac | Thon 3 Village, Dong My Commune, Thanh Tri District | 19 August 2005 |
| 10. Mrs Nguyen Thi Che | Dong Dau Village, Duc Tu Commune, Dong Anh District | 19 August 2005 |
| 11. Mr Do Quang Chung | Duc Tu 1 Village, Duc Tu Commune, Dong Anh District | 19 August 2005 |
| 12. Mr Do Van Da | Duc Tu 2 Village, Duc Tu Commune, Dong Anh District | 19 August 2005 |
| Organisations | | |
| 1. Dr Iwata Shizuo | Program Manager, Comprehensive Urban Development Programme in Hanoi Capital City | 1 September 2005 |
| 2. Mr Nguyen Hong Tien | Vice Director, Department of Urban Infrastructure, Ministry of Construction | 29 August 2005 |
| 3. Mr Pham Bau | Research Officer Research Institute for Aquaculture 1 Hanoi | 25 August 2005 |

Appendix 1 List of individuals interviewed in the qualitative interviews in Hanoi

| Bangkok | Place | Date |
|--|--|---------------|
| Government | | |
| 1. Dr Douglas Webster | Team Leader Planning for Sustainable Urbanization Project Office of the National Economic and Social Development Board Krung Kasem Road, Pomprab | 22 July 2003 |
| Farmers | | |
| 1. Mr Manuwan Mohamad | Suanprixthai, Pathumthani | 22 April 2005 |
| 2. Mrs Teemu Jaewae | Suanprixthai, Pathumthani | 23 April 2005 |
| 3. Mr Yong Tanom Suk | Suanprixthai, Pathumthani | 26 April 2005 |
| 4. Mrs Samran Buakanthong | Suanprixthai, Pathumthani | 26 April 2005 |
| 5. Mr Pon Kongdun | Nongpraongai, Nonthaburi | 27 April 2005 |
| 6. Mrs Pew Thaiwet | Nongpraongai, Nonthaburi | 02 May 2005 |
| 7. Mrs Penpan Chewnawin/Mrs Yean Suthichai | Lumsai, Pathumthani | 03 May 2005 |
| 8. Mr Vichai Suthikongka | Lumsai, Pathumthani | 03 May 2005 |
| 9. Mrs Ravee Pethin | Lumsai, Pathumthani | 03 May 2005 |

Appendix 2 List of individuals interviewed in the qualitative interviews in Bangkok

| Phnom Penh | Place | Date |
|----------------------|--|------------------|
| Government | | |
| 1. Mr Aunny Ieng | Architect and Urban Planner Deputy Chief of Cabinet and Director of Bureau of Urban Affairs Municipality of Phnom Penh | 10 November 2005 |
| | | |
| Farmers | | |
| 1. Ms Keang Bunthach | Kbal Tomnub Village, Boeung Tompun Commune, Meanchey District, Phnom Penh | 10 May 2005 |
| 2. Ms Shom Phom | Kbal Tomnub Village, Boeung Tompun Commune, Meanchey District, Phnom Penh | 11 May 2005 |
| 3. Mr Sous Leoung | Kbal Tomnub Village, Boeung Tompun Commune, Meanchey District, Phnom Penh | 11 May 2005 |
| 4. Ms Siv Sa | Thnout Chrum Village, Boeung Tompun Commune, Meanchey District, Phnom Penh | 12 May 2005 |
| 5. Mr Nob Phim | Thnout Chrum Village, Boeung Tompun Commune, Meanchey District, Phnom Penh | 12 May 2005 |
| 6. Mr Euo Sarom | Duong Village, Prek Phnov Commune, Ponhealoeu District, Kandal Province | 13 May 2005 |
| 7. Mr Chao Bunthong | Duong Village, Prek Phnov Commune, Ponhealoeu District, Kandal Province | 13 May 2005 |
| 8. Ms Tang Seng Yiek | Duong Village, Prek Phnov Commune, Ponhealoeu District, Kandal Province | 13 May 2005 |
| 9. Mr Meas Sophat | Duong Village, Prek Phnov Commune, Ponhealoeu District, Kandal Province | 13 May 2005 |
| 10. Mr Sos Ty | Boun Village, Chraing Chamres Commune, Reussey Keo District, Kandal Province | 17 May 2005 |
| 11. Mrs San Sas | Boun Village, Chraing Chamres Commune, Reussey Keo District, Kandal Province | 17 May 2005 |
| 12. Mrs Srey Thy | Phum Mouy Village, Sras Chork Commune, Daun Penh District, Phnom Penh | 17 May 2005 |

Appendix 3 List of individuals interviewed in the qualitative interviews in Phnom Penh