PERI-URBAN AQUATIC FOOD PRODUCTION SYSTEMS IN SE ASIA: AN OVERVIEW OF FOUR CITIES, BANGKOK, PHNOM PENH, HO CHI MINH CITY AND HANOI: 2. CONTRAST AND COMPARISONS

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General Objective of the Papussa Project:

To provide a detailed, holistic situation analysis of peri-urban aquatic food production in 4 cities in SE Asia.

In what context is this?

Decades of Unprecedented Urban Growth

Some Facts and Figures……

Urban populations in **developed countries** doubled from **448 million** in 1950 to **875 million** by 1990

Over the same period urban populations in **developing countries** more than quintupled from **280 million** to **1.6 billion**

By 2000 **six of the worlds largest cities** are found in the developing world

The World Bank estimated that by the year 2000 **50% of the poorest** segments of the developing world would be living in urban areas.

How will these populations feed themselves? Food security?

Urban food production in the development agenda

A UNDP-commissioned study (Smit, Ratta and Bernstein, 1996) estimated that **800 million people** were engaged in **urban agriculture** worldwide; of these, **200 million** were producing for the market and **150 million** being employed full time.

From the same study it suggested that worldwide **urban food production will continue to expand**. Between **1993 – 2005** urban agriculture may increase its share of world food production from **15% to 25-33%,** its share of vegetable, meat, fish and dairy products consumed in cities from **33% to 50%,** and the number of **urban farmers** from **200 million – 400 million by 2005.**

How does Papussa fit into this urban development debate ?

Firstly: What do we mean by Peri-urban?

There are no universally accepted definitions of Peri-urban (PU)

Detailed definition is outside the scope of this review

Peri-urban areas can be defined by what they lack as well as what they have eg basic infrastructure, reliable sources of water and poor sanitation services

There are often conflicts over land uses, and urban industries often move into these PU areas to escape restrictions and regulation

PU communities are often heterogeneous with respect to ethnicity, income levels, language and social norms

Increasing population density characterised by migration not just from rural people coming in from outside but also the addition of urban people radiating outwards from the core

Definitions

Peri-urban:

"A poorly planned and regulated mosaic of land, housing, agriculture and Industry, in a state of rapid change, from which a city obtains some of its resources and to which it discharges some of its wastes. It is a transition zone between rural and urban."
(Birley and Lock, 1999)

Peri-urban interface:

" An area characterised by strong urban influences, easy access to markets, services and other inputs, ready supplies of labour, but relative shortages of land and risks from pollution and urban growth."
(Anon., 1994)

Outer boundary/peri-urban limit:

" The outer boundary may also be defined as the limit of travel of daily market produce"
(Smit, J., 1999)

City/ Community Studied	Production System
Bangkok	
Lumsai Village, Lumlukka District,	Hybrid catfish culture
Nong Prao Ngai Village, Sai Noi District	Morning glory cultivation
Suan Prix Thai Village, Muang District	- Hybrid catfish culture + integrated fish culture and pigs
Srisa Jorakae Noi Village, Bangsaothong Minor-District,	Polyculture of tilapia, silver barb and rohu, some water mimosa
Phnom Penh	
Phum Muy	Pen/net enclosure of Pangasius in urban lake
Kbal Thom Nub	Morning Glory Production in waste water lake
Duong Village, Prek Phauv Commune	Earthpond culture of Pangasius, walking catfish and snakehead
Tnout Chrum Village	Morning Glory and Mimosa cultivation in large urban waste water lake
Ho Chi Minh City	
Binh My Commune	Morning glory and lotus cultivation with some fish culture
Da Phuoc Commune	Fish culture, tilapia, some rice fish also cultivation of water lotus
Phong Phu	Rice fish, production of fish seed (mainly tilapia/red tilapia, cultivation of water mimosa and lotus
Dong Thanh	Monoculture giant gourami, polyculture (integrated) tilapia/red tilapia, grass carp
Hanoi	
Dong My	VAC System integrated fish culture using waste water
Bang B village	Waste water fed Morning Glory, Water Mimosa, Water Dropwort, Water Cress – seasonal cultivation
Tran Phu	Waste water fed fish polyculture, tilapia, carps, catfish, also cultivation of morning glory and mimosa using waste water
Duc Thu	Non waste water fish culture VAC system, Red Tilapia

Duong village, Peri-urban Phnom Penh
Fish Pond construction – non waste water Fed – Clarias and Pangasius culture

Fish culture – tilapia and fish seed production Binh Chanh, HCMC

Giant Gourami Monoculture
Binh My HCMC

Phnom Penh, Beung Cheung Ek Lake: Morning glory production in waste water

Seasonality, climate, and characterisation of waste water

	Bangkok	Phnom Penh	HCMC	Ha Noi
Population (www.citypopulation.de/world 2002)	6.32 million	1.07 million	4.80 million	1.725 million
Climate	Tropical with Rainy and dry seasons	Tropical with Rainy and dry seasons	Tropical with Rainy and Dry seasons	Rainy and dry seasons but lower temperatures in Dec - Jan
Seasonality in Aquatic Production	All year round production of aquatic plants and cultured fish	All year round production of aquatic plants (MG) and fish but poor water quality in dry season affects sales of Morning glory	All year round production of Fish, Morning glory (MG) and Water Mimosa	Rotation of MG/mimosa (summer) and water cress, water dropwort (winter). All year round fish culture but disease/breeding problems during winter months
Waste Water (WW)	"Waste water" irrigation canals supplying fish and plant culture normally faecally contaminated but also high levels of agro chemicals	City's WW mainly sewage channelled and pumped into large lake(s)- morning glory – increasing industrial effluents	WW - Industrial and domestic sewage mixed – flows characterised by HCMC daily tidal regimes	WW – Domestic and Industrial often mixed – distinct WW channels rivers carrying ww out of city. Farmers pump ww for fish and plants culture

Marketing of Aquatic Produce

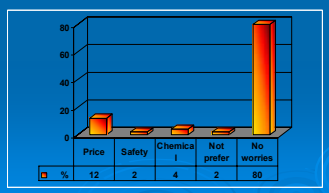
	Bangkok	Phnom Penh	HCMC	Ha Noi
Markets transport 	Well developed, good transport network – motorised- trucks and pick-ups – well developed road network	Motorbike and bicycle for aquatic plants, mainly motorbike (mb) for fish with some smaller trucks – poorer roads system outside city	Aquatic plants (AP) now more in smaller trucks, fish on motorbikes (mb) and truck	AP still largely on bicycle/mb – fish mainly motorbike with smaller trucks increasing
Markets infrastructure 	Large centralised wholesale markets supplying retailers - increasing growth in supermarkets	Distinction between wholesale and retail less clear	Well developed fish wholesale sector, increasing supermarkets	Construction of new wholesale markets. Urban street/retail markets causing increasing traffic congestion
Adding value/packaging processing 	AP increasingly sold packaged, fish still sold live/also processing + packaging for supermarkets	No packaging for AP – sold fresh – some sold for livestock food. Some smoking of catfish but small market. Fish sold live/fresh.	Beginning to change with packaging for AP + influence of supermarkets sector.	Fish markets still based on selling live fish. Aquatic plants sold fresh and unpackaged.

Significant findings in the marketing of Peri-urban aquatic products

Considerable Aquatic plants consumption in cities met entirely by production within peri-urban areas of these cities – this production almost entirely using "waste water"

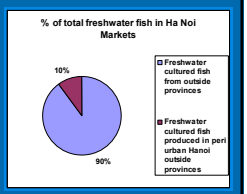
"Food on every plate". Aquatic plants, particularly morning glory can be found as a major daily constituent part of urban peoples diet in each of the four cities

Consumer surveys indicate few preferences against eating aquatic plants even if they are produced in urban waste water



Consumer preferences: HCMC consumers views on eating aquatic plants

Story with fish consumption quite different – most urban consumers eat either marine fish or freshwater cultured fish produced and brought in from outside regions



This would be qualified by saying peri-urban fish – often produced in ww - are consumed mainly by lower income urban consumers and sold directly to households or on street markets – no contact with wholesale – Confirmation from Ernesto Morales work in North Vietnam.

However we found evidence of significant % of peri-urban ww produced fish actually being transported directly outside the cities eg Ha Noi – ie not actually entering any of the cities larger markets

Although difficult to assess urban consumers have preference against eating fish produced in cities due to perceptions of waste water/contamination and possible health risks.

Significant Institutional Related Findings

Aquatic plant (AP) growers:

- Lacking in formal or non formal extension/training/technology transfer compared to peri-urban fish farmers
- Almost non existent voice in the urban planning process
- Few signs of group/association formation to protect interests
- Some positive urban development plans (eg HCMC) have set aside areas for AP

Fish Farmers:

- Extension and training better but still suffer from Govt/NGO's greater interest and involvement in more commercially related aquaculture development in provincial areas.
- Again poor group/trade association formation to protect interests or help in marketing – some positive signs of this in Bangkok
- Better representation at urban planning table through Fisheries Depts but overall still little influence

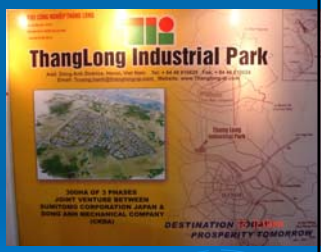
Institutional Findings Continued

Local Planners/District/ Commune Officials

Some form of de-centralised administration in Bangkok Metropolis however this still doesn't give local officials much influence in planning process

Most local officials merely have role of **informing and providing statistics** for higher centralised urban policy makers

Increasing role of **larger construction and real estate development** (overseas?) in Ha Noi and Phnom Penh – to a large extent this has already happened in Bangkok and HCMC



Institutional Findings

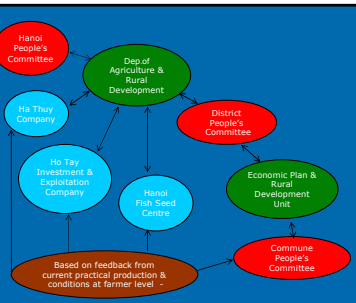
Centralised Planners Policy Makers

Appear to be lacking in information, materials and background about the relative importance of urban produced fish and aquatic plants to the communities, for job and income creation, for providing a localised food supply, creating a "greener" more attractive city whilst also recycling urban waste.

Also communication between main players in planning process demand driven from other more influential government ministries and outside stakeholders – construction/industry and real estate.

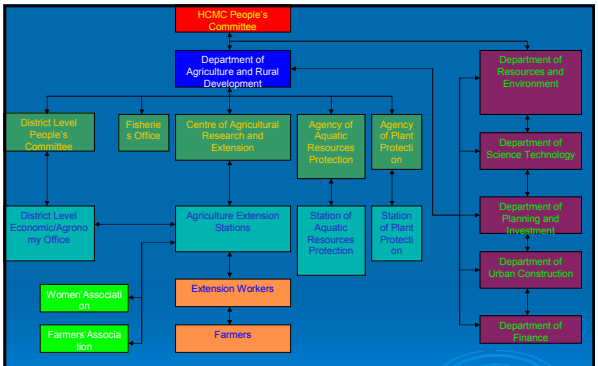
From our survey limited provision for future development or even maintenance of urban fish and aquatic plants cultivation in previous city development plans. Policy of "zoning" in peri-urban HCMC and to a lesser extent Ha Noi

Source : Ha Noi 50 Years Development Exhibition October 2004



Relationship of Hanoi's institutions in implementing and developing aquaculture

–Is this the Ideal Picture ??



Schematic structure of institutions having relations to implement and develop PUAFPS in HCMC

MORE OF THE REALITY??

Urbanisation: A Dynamic and Changing Process

What of the future of aquatic food production systems in and around these cities?

Bangkok	Phnom Penh	HCMC	Ha Noi
Lumsai Village, Lumlukka District, Hybrid Catfish culture – pressure on land from other users, no room for expansion, water quality problems	Phum Muy –pen enclosure Pangasius – fish farmers increased over last 5 years however decreasing water quality and surrounding urbanisation do not bode well for future	Binh My Commune – fish culture and Aquatic plants – this area has already been designated for Agric. Production so future secure for next 5-10 years	Dong My VAC Fish culture – presently safe but long term future unsure due to industrial and residential development
Nong Prao Ngai Village, Sai Noi District – Morning Glory – peri-urban area with gradually increasing pressure on land use-	Kbal Thom Nub – Morning Glory in ww lake – factory discharge, silting up and land fill of lake, and unsure tenure of villagers make this production system vulnerable	Da Phoc Commune – Fish Culture – likely to survive but problems with getting labour and new industrial development and pollution	Bang B village Aquatic Plants(AP) – land pressure for construction. Likely to disappear in next 5 years
Suan Prix Thai Village, Muang District – fish-pig integration + mimosa. Increasing water pollution in canal especially in dry season – long term future unsure	Duong Village, Prek Phauv Commune – Fish culture – peri-urban – now developing	Phong Phu- Fish Culture and AP – Under increasing threat of losing land- farmers have problem with re-locating to other areas – ornamental fish production	Tran Phu Fish Culture/AP – flooded areas however industrial and residential development increasingly affecting land use
Srisa Jorakae Noi Village, Bangsaothong Minor-District, fish polyculture – increasing land prices – construction of airport, nos of fish farmers decreasing. Production systems unlikely to survive in next 5 years	Tnout Chrum Village –Morning Glory in ww lake – Increasing nos of factories discharging into lake-water quality decreasing, MG production affected in dry season, lake beginning to silt up and margins land filled for construction. Long term future under threat	Dong Thanh – Fish Culture – PU area designated for agricultural production. Farmers have problems with poor water quality – also dairy cows now more profitable than fish culture	Duc Thu Fish Culture – more periurban – likely to develop in next 5 years

So what of the future…..? What lessons do we learn?

Disappearance of some systems inevitable – urbanisation, pressure on land for construction

Urban fish farmers and aquatic plant growers reluctant to invest more to improve their current production due to uncertainty - short term land leases and auction systems

Gradual shift of aquatic production systems to further out peri-urban areas

Building into future urban development planning incentives and benefits for helping fish farmers/ aquatic plant growers to re-locate to more special peri-urban zones where they have more security of land tenure and can invest in long term future.

In HCMC progressive policy to designate/zone areas for agric production – Positive Policy of Zoning beneficial for longer term stability of these systems

As quality of urban ww deteriorates with urbanisation - progression of aquatic production systems from fish culture – carps → tilapia → catfish → aquatic plants → morning glory, mimosa etc - Aquatic plants more tolerant of poorer water quality

Need to separate domestic and industrial waste water effluents to allow for safer use and recycling of nutrient rich resource – waste water – Engineering/ waste water disposal solutions

Urban consumers increasing perceptions of health aspects of eating aquatic products – especially fish produced using waste water need to be properly researched – "Grey Area" which requires standardised data and findings available to a wider public

Future lessons and recommendations

-Peri-urban Aquatic food production systems + the communities involved in them need much higher profile and representation in the urban development and planning process – voice to be heard – a debate rather than fait acomplit

-Aquaculturalists and researchers need to focus their efforts more on producing food through aquaculture in cities (using waste water as a valuable source of nutrients) rather than concentrating on more traditional commercial aquaculture normally in more under-developed rural areas

-Interdisciplinarity and information exchange opened up between various senior stakeholder groups – not just Department of Fisheries – but waste water treatment and disposal planners/engineers, Ministry of Agric, Dept of Environment, Ministries and developers responsible for leisure and tourism

-Related to above to study and learn from recent successes in promotion and development of urban agriculture – seen as more of a food production system than farming

--Building into future urban development planning incentives and benefits for helping fish farmers/ aquatic plant growers to re-locate to more special peri-urban -zones where they have more security of land tenure

References

Birdlife, M., and Lock, K., 1999. The Health Impacts of Peri-urban, Natural Resource Development. Cromwell Press, UK

City Population, 2004. Website www.citypopulation.de, November 2004

Costa-Pierce, B., 2002. Ecological Aquaculture:The evolution of the blue revolution. Blackwell Science Ltd

Drechsel, P., and Kunze, D., 2001. Waste composting for urban and peri-urban agriculture. CABI Publishing . IWMI and FAO

Edwards, P., and Pullin, R., 1990. Wastewater fed aquaculture. Proceedings of the International Seminar on Wastewater Reclamation and Re-use for Aquaculture, Calcutta, India. Dec 1988

Koc et al 1999. Hunger Proof Cities. Sustainable Development Towards. International Development Research Centre, Ottawa, Canada.

Moreau, E., 2004. Self Recruiting Species : Their Role in Farmer Managed Aquatic Systems. Paper presented at 7th Asian Fisheries Forum, Penang, Malaysia, November 2004

Papussa 2004. Market Analyses, Institutional Analyses and (4X) Participatory Community Appraisal Reports From 4 SE Asian Cities

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