



TRƯỜNG ĐẠI HỌC
Y TẾ CÔNG CỘNG

EcoZD-FBLI Ecohealth/One Health course

Hanam– 29 May 2013



Designing and implementing an integrative research project: lessons learned from a case study in Vietnam

Dr. Hung Nguyen-Viet

Hanoi School of Public Health (HSPH)



Swiss TPH





Content

- Context and conceptual framework development
- Case study in Vietnam
 - Environment
 - Health
 - Socio-economic research
- Training/involvement student by/for research
- Is it really Ecohealth research?
- Lessons learns and perspectives

Progress on Drinking Water and Sanitation 2012 UPDATE



unicef World Health Organization

The MDG drinking water target has been met

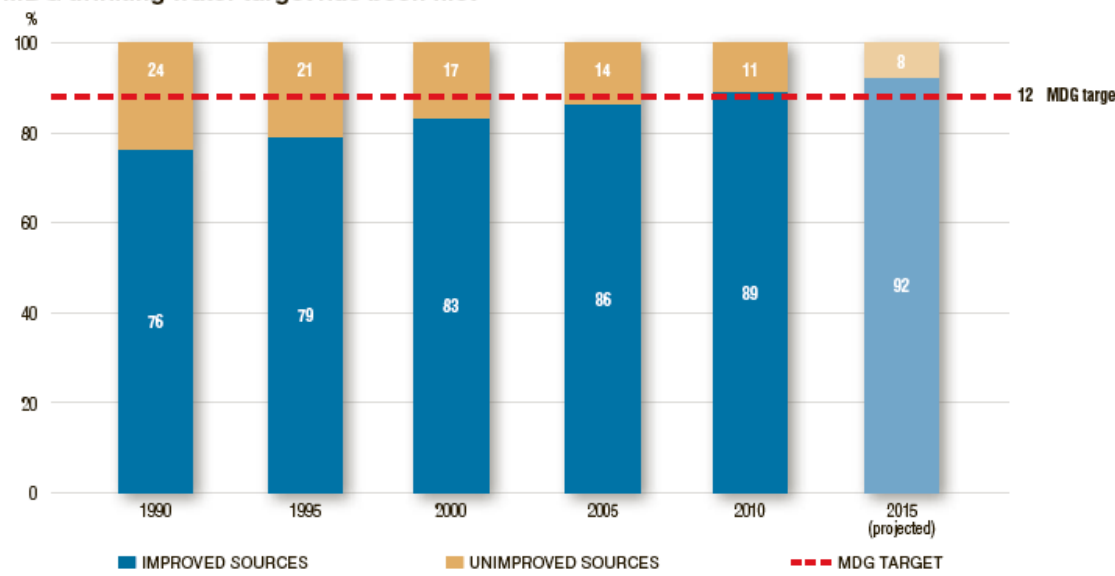
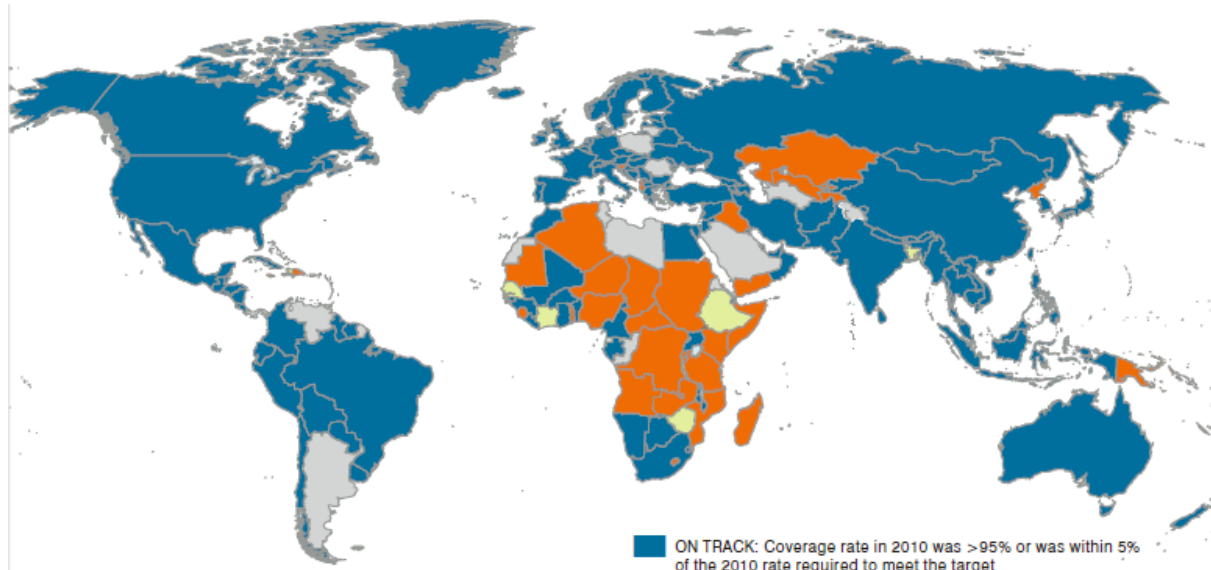


FIGURE 1 Trends in global drinking water coverage, 1990-2010, projected to 2015



- ON TRACK:** Coverage rate in 2010 was >95% or was within 5% of the 2010 rate required to meet the target
- PROGRESS BUT INSUFFICIENT:** Coverage rate in 2010 was between 5% and 10% of the 2010 rate required to meet the target
- NOT ON TRACK:** Coverage rate in 2010 was the same or lower than the rate in 1990 or below 10% of the 2010 rate required to meet the target

If current trends continue, the world will not meet the MDG sanitation target

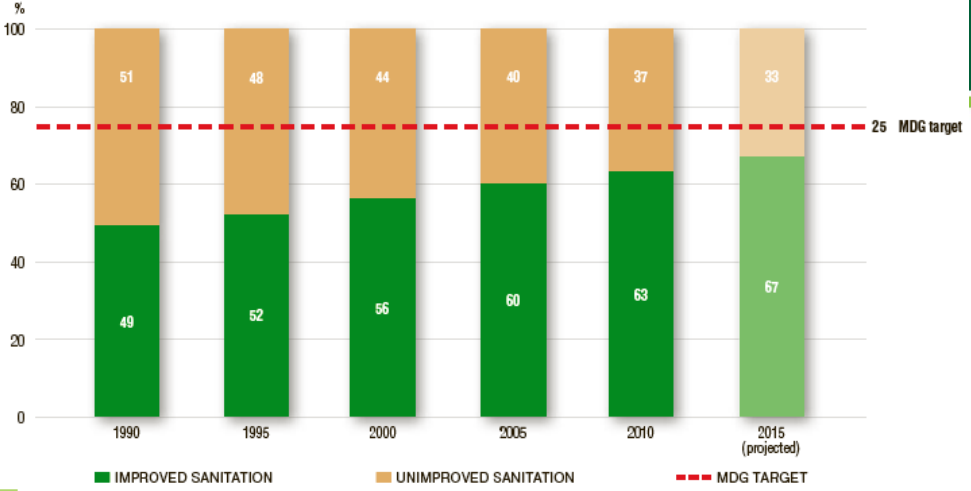


FIGURE 13 Trends in global sanitation coverage 1990-2010, projected to 2015

The world is not on track to meet the MDG sanitation target

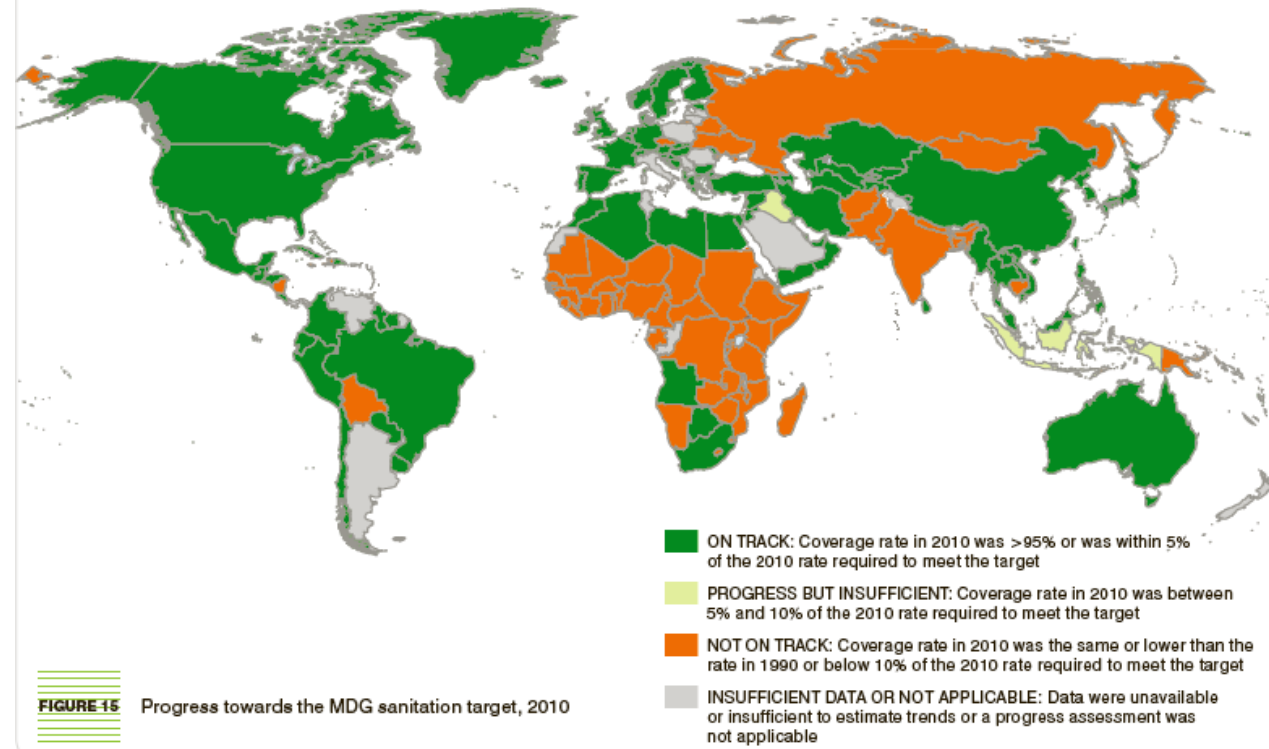


FIGURE 15 Progress towards the MDG sanitation target, 2010

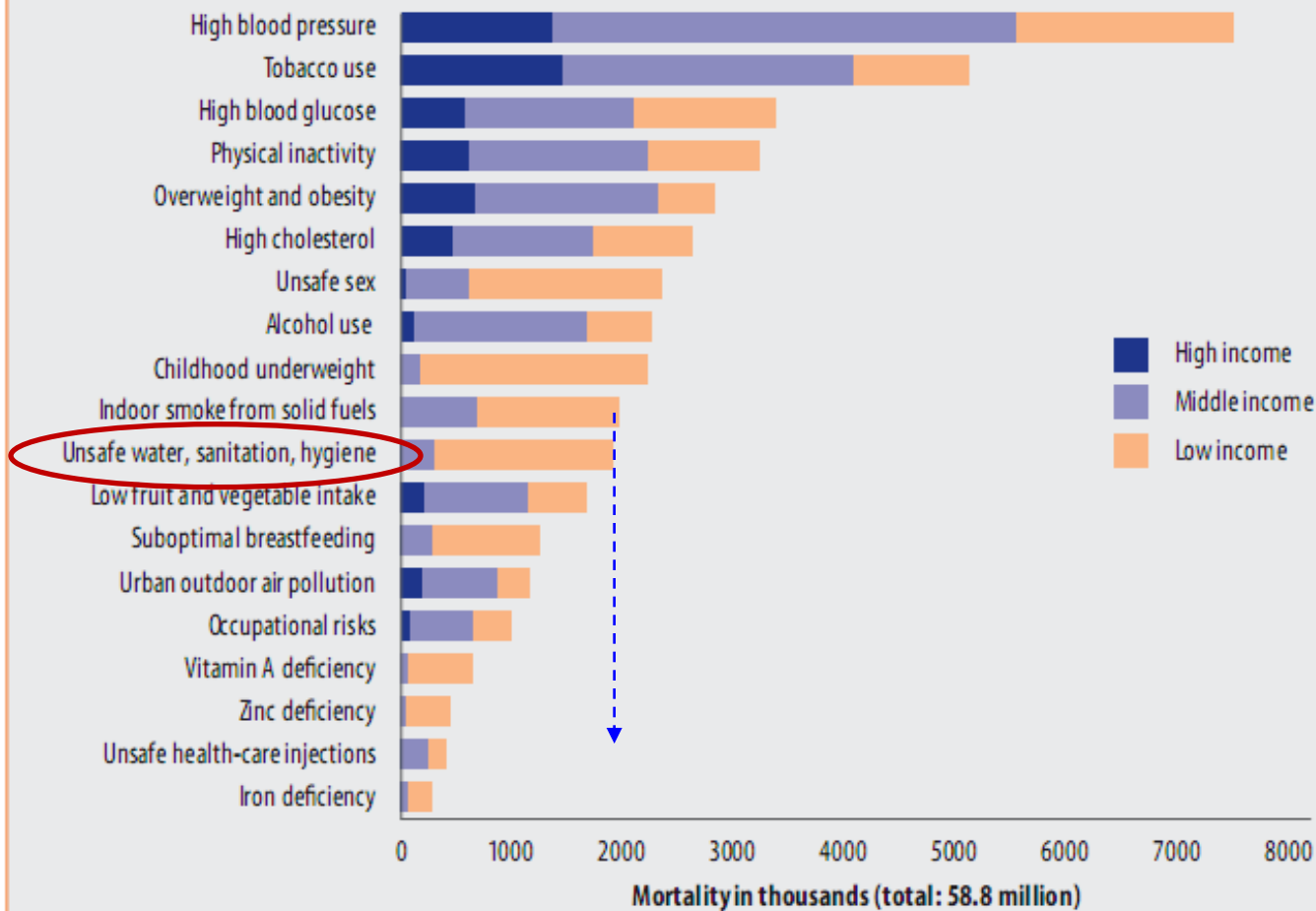
2.6 billion people world-wide still do not have any improved sanitation



GLOBAL HEALTH RISKS

Mortality and burden of disease attributable to selected major risks

Figure 6: Deaths attributed to 19 leading risk factors, by country income level, 2004.

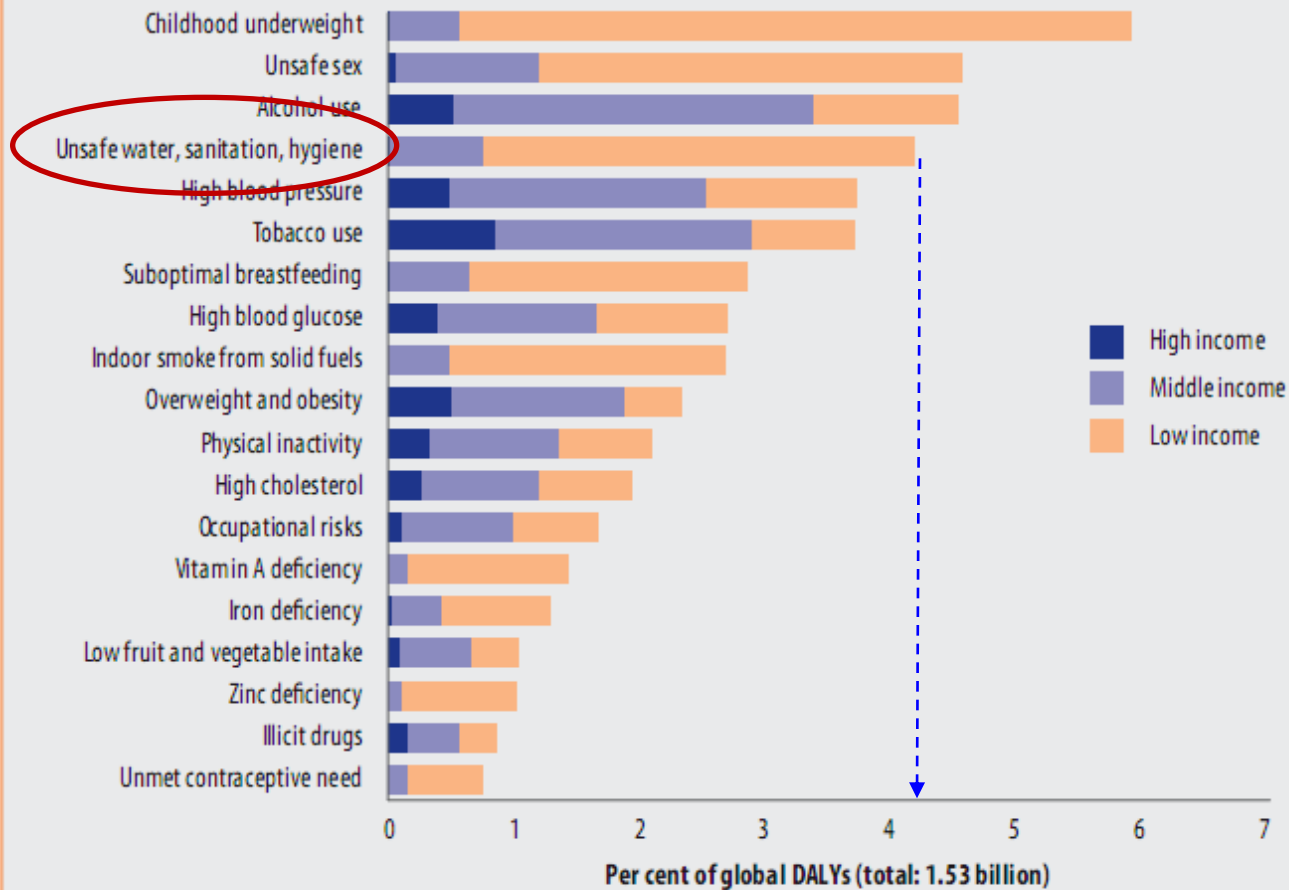




GLOBAL HEALTH RISKS

Mortality and burden of disease attributable to selected major risks

Figure 7: Percentage of disability-adjusted life years (DALYs) attributed to 19 leading risk factors, by country income level, 2004.





MDG



UNITED NATIONS
Pursuing Progress



1



ERADICATE EXTREME
POVERTY AND HUNGER

2



ACHIEVE UNIVERSAL
PRIMARY EDUCATION

3



PROMOTE GENDER
EQUALITY AND
EMPOWER WOMEN

4



REDUCE
CHILD MORTALITY

5



IMPROVE MATERNAL
HEALTH

6



COMBAT HIV/AIDS,
MALARIA AND OTHER
DISEASES

7



ENSURE
ENVIRONMENTAL
SUSTAINABILITY

8



GLOBAL
PARTNERSHIP FOR
DEVELOPMENT



Human Development Report, 2006: The toilet and the latrine, which helped revolutionize public health in New York, London and Paris more than a century ago, are among the most underused tools to combat poverty and disease in the developing world.

Water and Sanitation intervention

- *Reduces child diarrhea by 22%-36%.*
- *Reduces 9,1% burden of disease for humans (DALYs)*
- *Reduces 6.3% deaths worldwide each year*



World Toilet Organization (WTO)





Rational for conceptual framework development

- Lack of integrated framework of assessment of health, environment and society
- Optimizing natural resource use and health improvement
- Understand local need from different perspectives (cultural, perception, willingness to change/pay)
- Target most effective interventions to archive MDG goals on water, sanitation and health



Interdisciplinary team





Interdisciplinary team



Epidemiologist

Anthropologist

Medical doctor

Engineer

Biologist

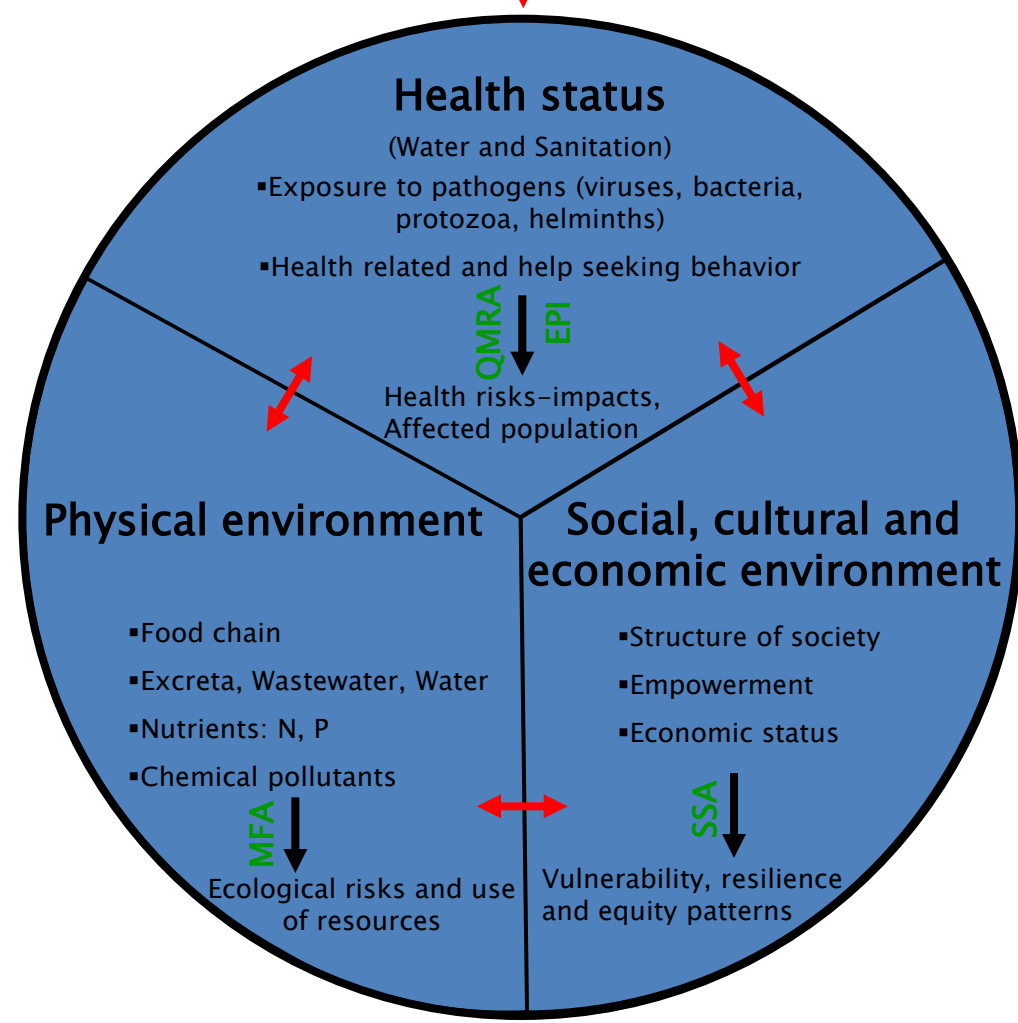


Objective: to develop a conceptual framework for **improving environmental sanitation and health**

by **combining** assessment of health, **physical environment**, and **social environment**, leading to **extended characterization of risks for health**, **physical and social environments** and finally proposing **integral interventions**

Analysis of interrelations between environmental sanitation systems, health status and well-being

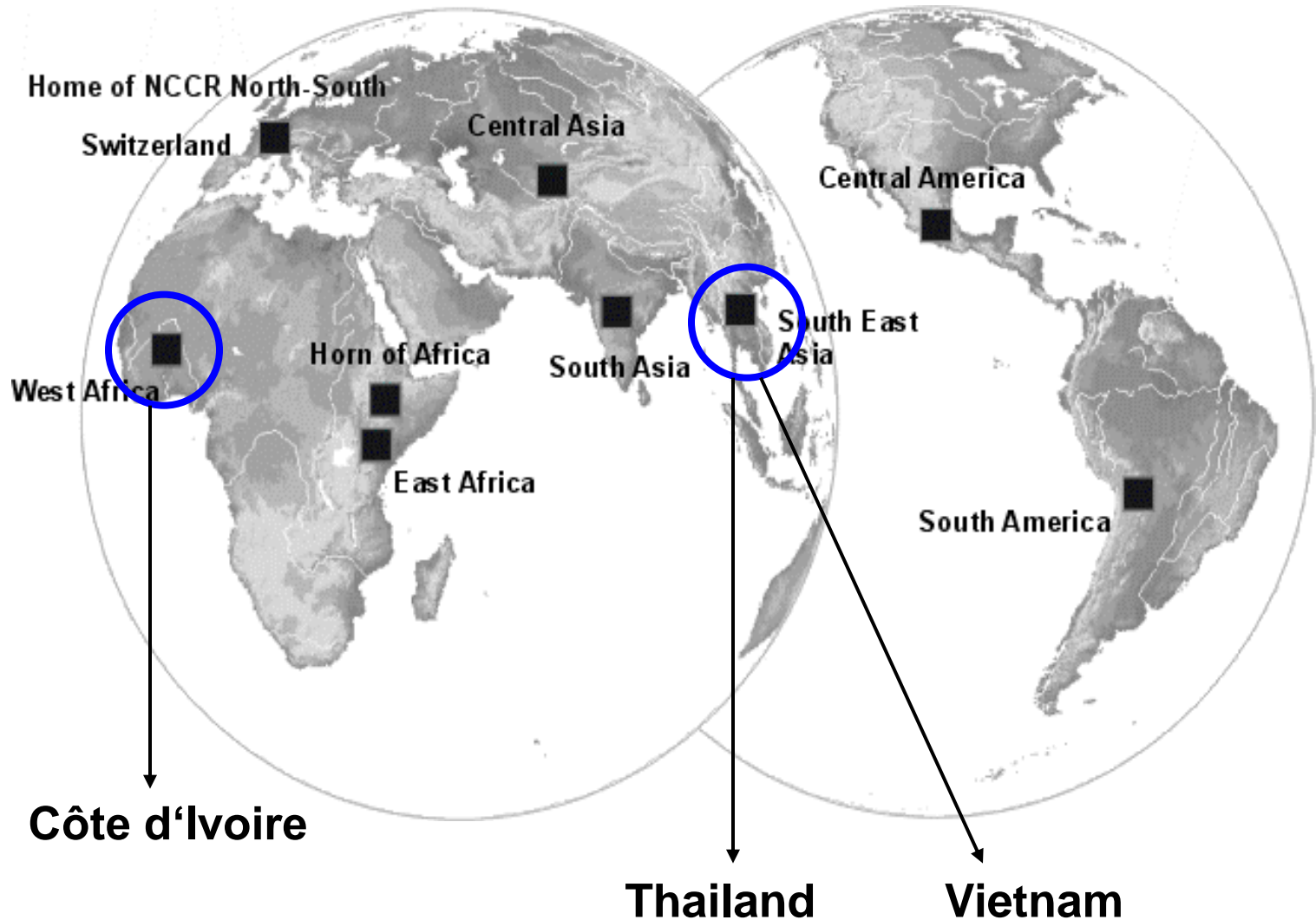
Dynamic interactions
↔
between systems and interventions



Critical control points: comprehensive biomedical, epidemiological, ecological, social, cultural and economic assessment

Interventions (biomedical, systems, engineering, behavioral or in combination):
Efficacy, effectiveness and equity studies measured in relation to risks

Case studies to test the conceptual framework





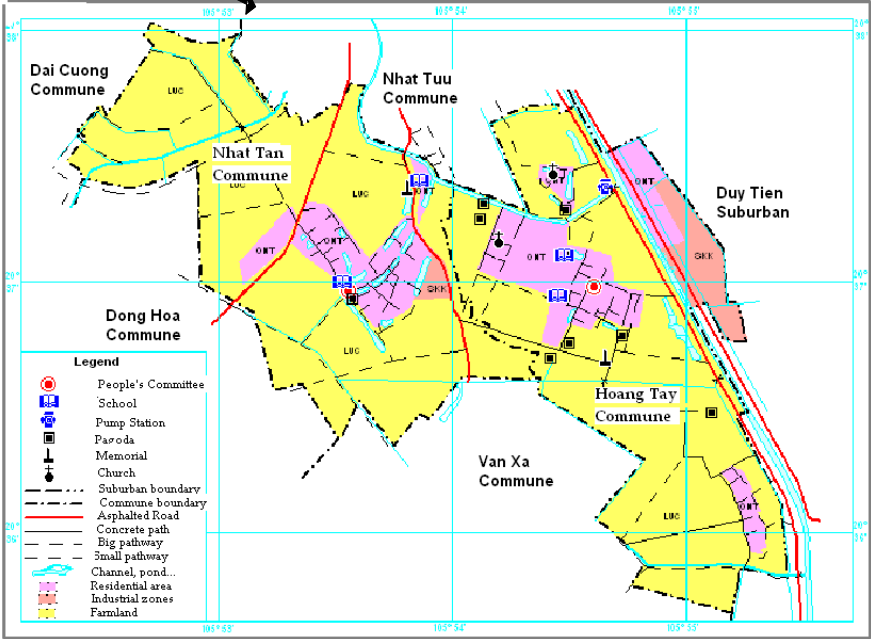
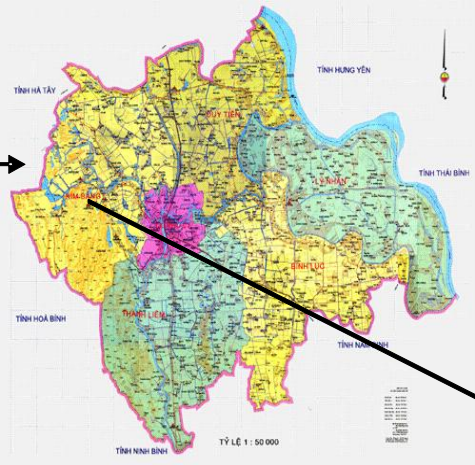
Case study in Northern Vietnam

- Issue of wastewater and excreta reuse in agriculture and aquaculture
- Health risk and environmental risk
- People's perception on waste reuse and health risk, economic assessment, **health economics of sanitation**

Case study in Vietnam



Ha Nam province



Study site: Nhat Tan and Hoang Tay communes, Kim Bang district, Hanam

Small livestock

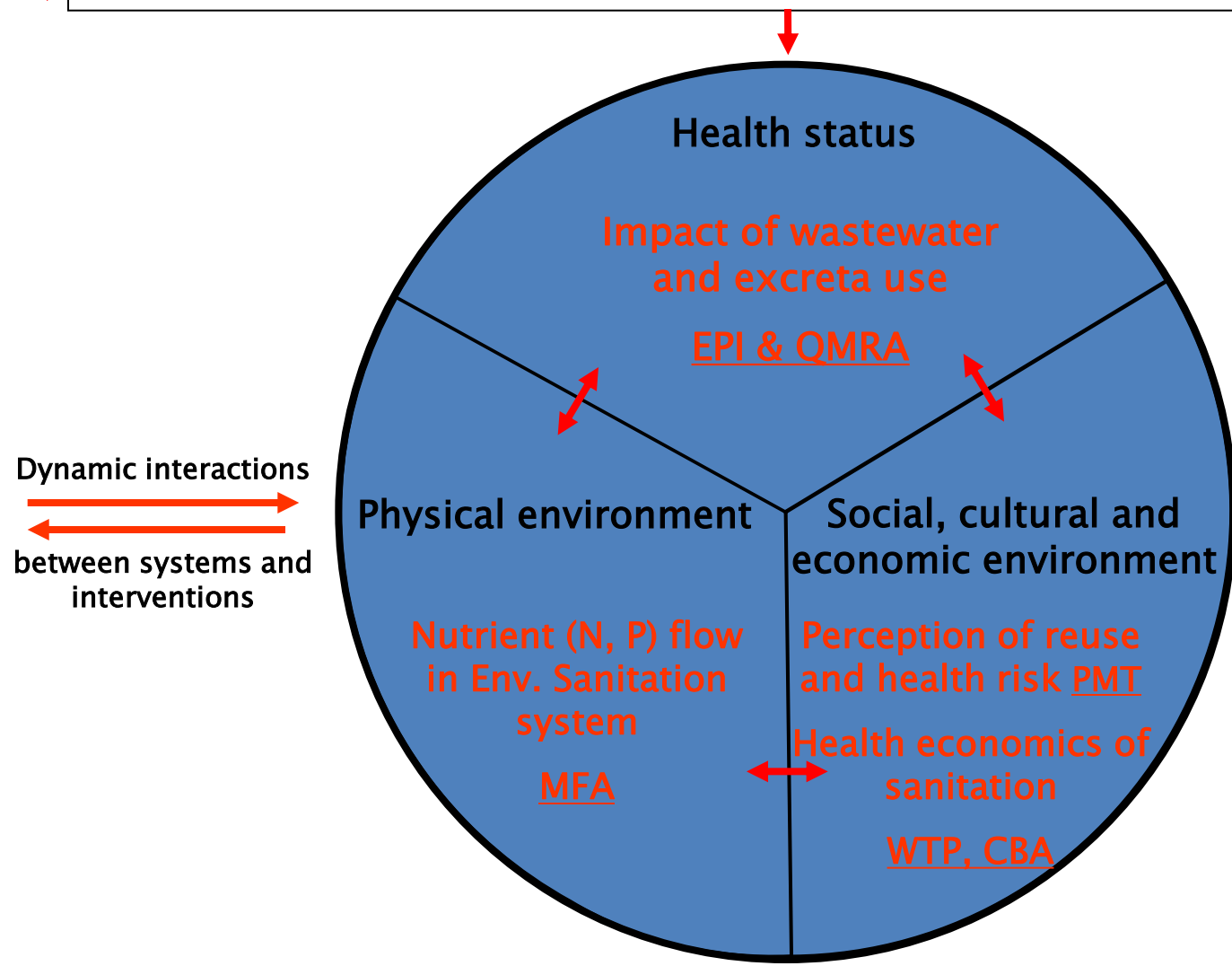


Rice paddy and Fish ponds





Analysis of interrelations between environmental sanitation systems, health status and well-being

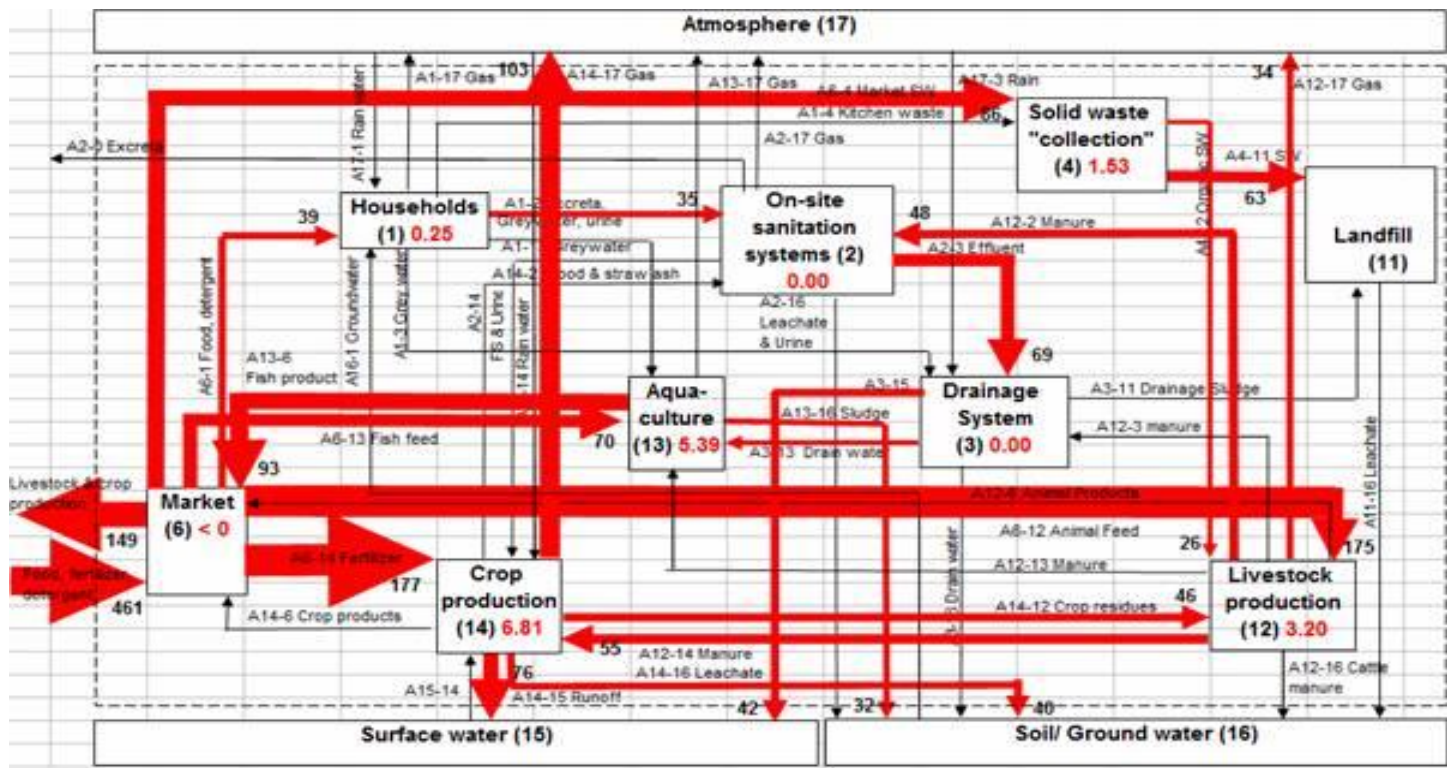


Critical control points: comprehensive biomedical, epidemiological, ecological, social, cultural and economic assessment

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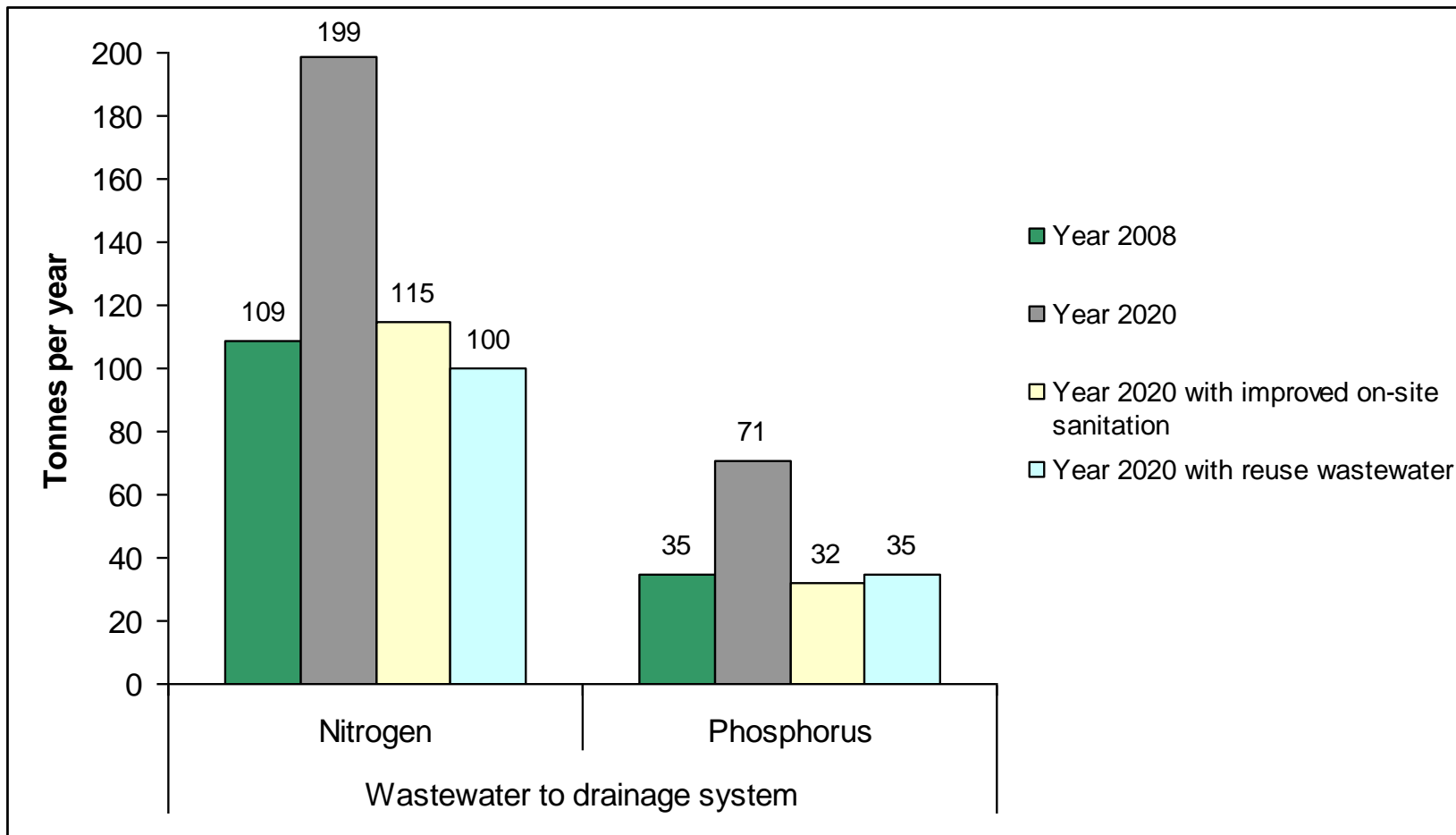
1) Physical environment: Material flow analysis

MFA has been used for analyzing environmental sanitation and agriculture systems with the emphasis on nutrient flow of nitrogen (N) and phosphorus (P)



Onsite sanitation and crop production discharge the largest flows of N into water bodies through drainage systems (CCPs)

Scenario development



Pollution scenario for the study site in the year 2020 (Unit: ton/y)

2) Health: Epidemiology

Cross-sectional survey

Prevalence and risk factors for helminth infections

- 1,834 individuals, 540 randomly selected households
 - Questionnaires on household & individual level
 - Stool examinations: Kato-Katz & FECT



Cohort study

Incidence rate of diarrhoea

- Subjects: 867 adults, both of sex, aged 16-65 years
 - Diarrhoea status was collected weekly

Nested case-control study

Risk factors for diarrhoea

- 232 cases were detected & selected by morbidity interview
- Controls were selected from all cohort subjects (ratio: 1:1)
 - History of exposure was defined as a previous week

2) Health: Epidemiology: Intestinal helminth infections

1. Prevalence: any helminths (47%), *A. lumbricoides* (24%), *T. trichiura* (40%), hookworm (2%).

2. Risk factors	Any helminths		<i>A. lumbricoides</i>		<i>T. trichiura</i>	
	OR	95% CI	OR	95% CI	OR	95% CI
Household use of tap water						
Yes versus No	0.6	0.4-0.9	N.A.	-	0.6	0.4-0.9
Use of human excreta for application in field						
Yes versus No	1.3	0.9-2.0	1.3	0.8-2.0	1.5	1.0-2.3
Direct contact with Nhue River during field work ^a						
Yes versus No	1.5	1.1-2.2	2.1	1.4-3.2	1.1	0.8-1.5
Washing hands with soap after field work ^a						
Yes versus No	N.A.	-	1.3	0.9-2.0	0.8	0.6-1.1
Use protective measures at work ^a						
Yes versus No	0.9	0.5-1.5	1.0	0.6-1.7	N.A.	-

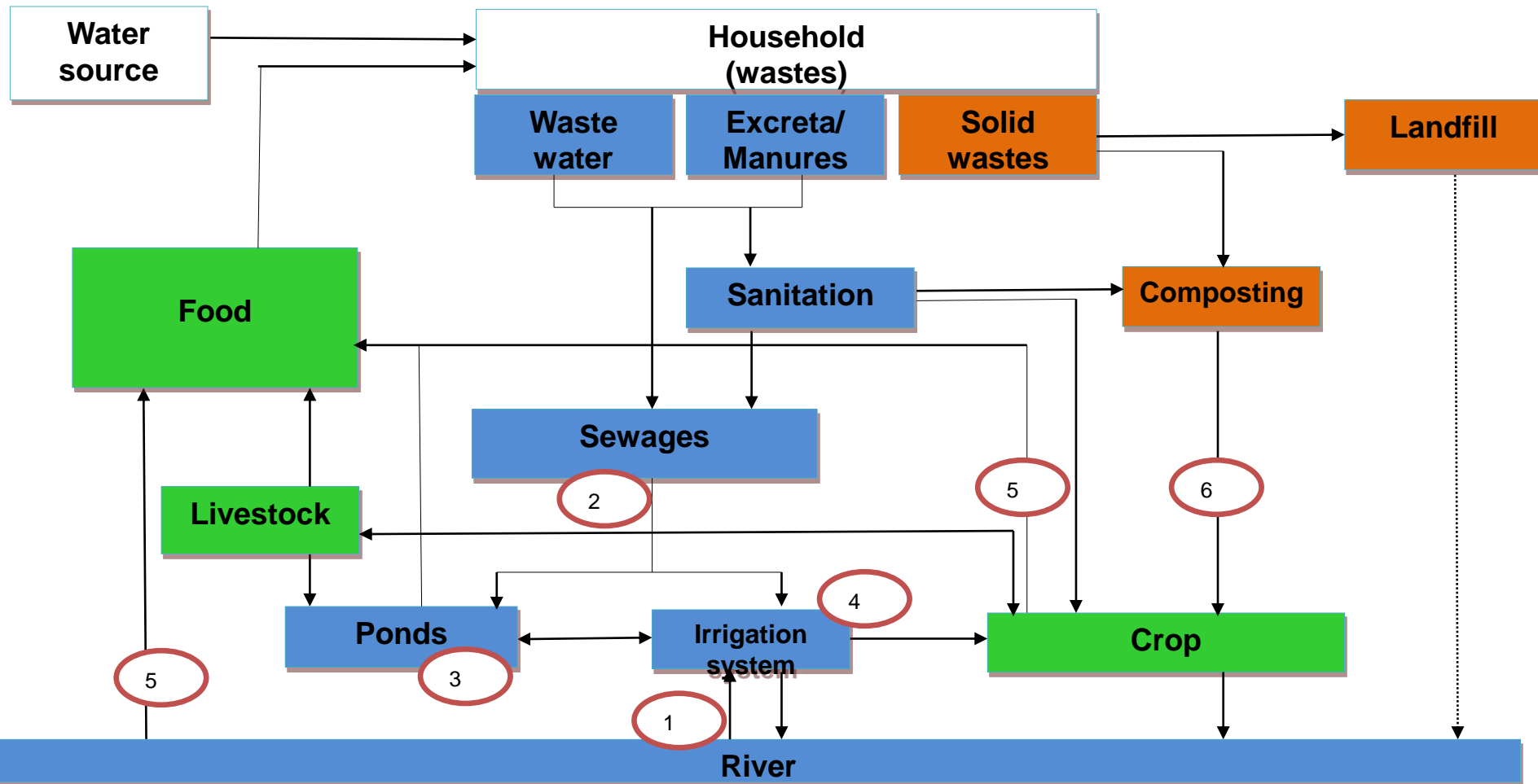
Notes: OR: odds ratio, CI: confidential interval, N.A. not applicable

2) Health: Epidemiology: Risk factors for diarrhoea in adults

Risk factors	OR	95% CI	fraction	controls
1. Exposure to excreta				
Composting of human excreta (≤ 3 <i>versus</i> > 3 months)	2.5	1.4-4.3	0.51	72
Handling human excreta in field work (Yes <i>versus</i> No)	5.4	1.4-21.1	0.07	2
Handling animal excreta in field work (Yes <i>versus</i> No)	3.3	1.8-6.0	0.36	25
2. Exposure to water from Nhue River and local pond				
Direct contact with Nhue River water during fieldwork (Yes <i>versus</i> No)	2.4	1.2-4.7	0.27	26
Close contact with local pond water (Yes <i>versus</i> No)	2.3	1.2-4.3	0.14	13
3. Personal hygiene practices				
Not use of protective measures at work (Yes <i>versus</i> No)	6.9	3.5-13.9	0.78	61
Close contact with people having diarrhoea (Yes <i>versus</i> No)	3.7	1.4-10.3	0.08	3
Washing hands with soap in general (Sometime <i>versus</i> frequently)	2.5	1.3-4.9	0.27	25
Washing hands with soap in general (Never or rarely <i>versus</i> frequently)	3.3	1.8-6.3	0.51	45
4. Food and water consumption				
Eating raw vegetables the day before (Yes <i>versus</i> No)	2.4	1.2-4.6	0.12	10
Water source for drinking (Rainwater <i>versus</i> tap water)	5.4	2.4-12.1	0.77	78

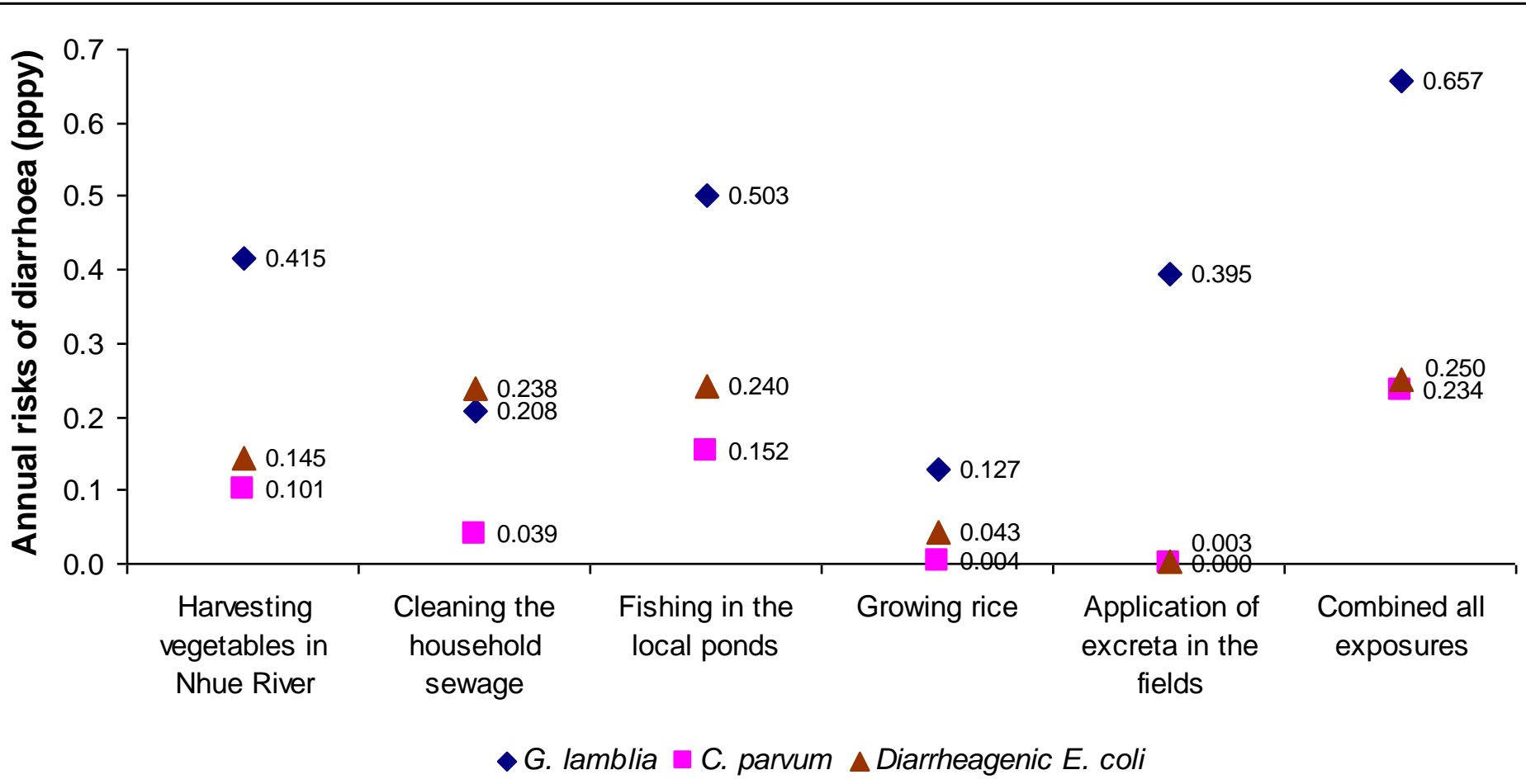
2) Health: Quantitative microbial risk assessment

Objective: assess diarrhea risk of contact with wastewater and excreta in agriculture using QMRA.





Estimated annual risks of diarrhoea



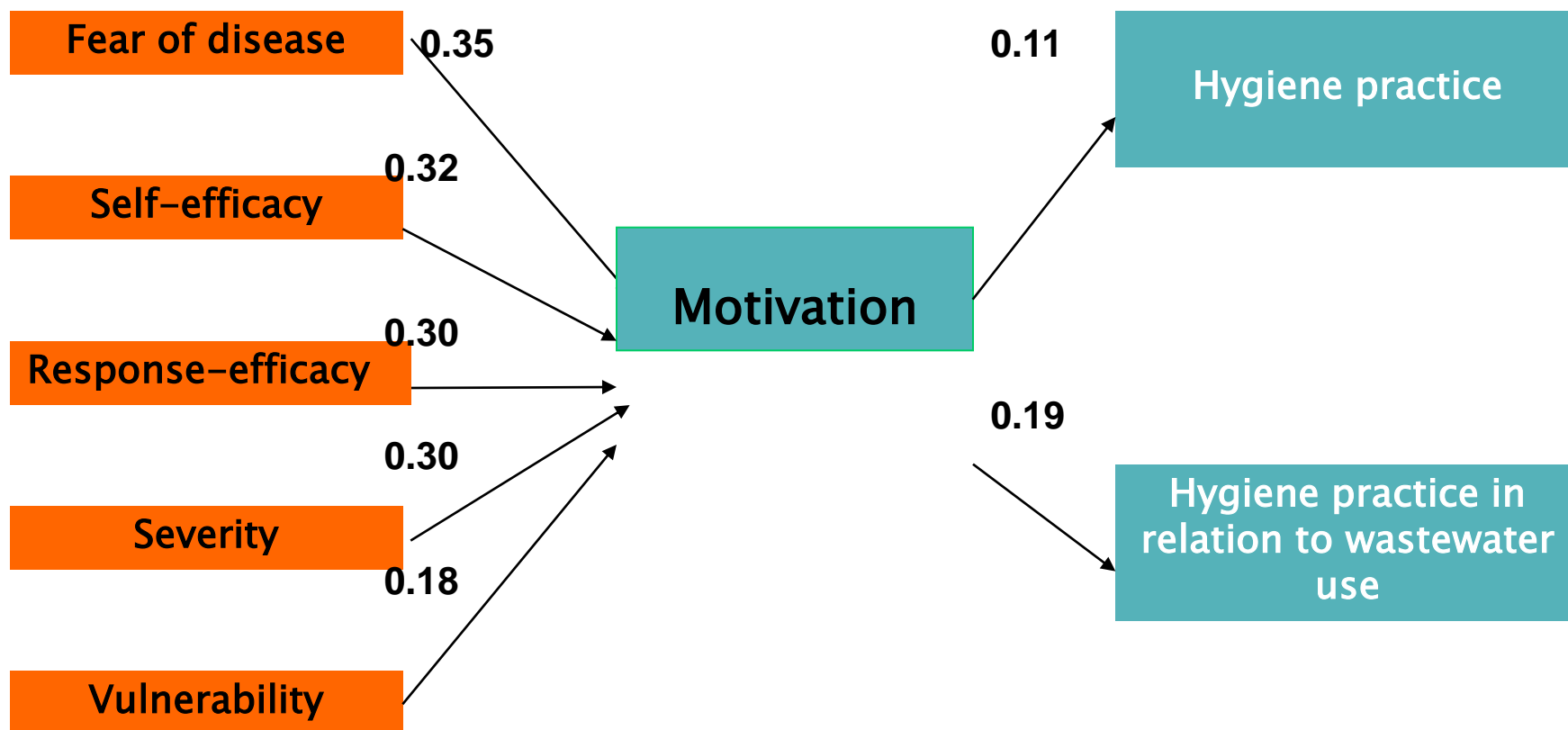


3) Social and economic research of sanitation

- Study the perception and behavior related to the use of wastewater and human excreta, health risk, coping appraisal and intention to act based on Protection Motivation Theory (PMT)
- Cost-benefit (CBA) of sanitation
- Willingness to pay (WTP) for improved sanitation



Measuring awareness and perceptions of of farmers and the practical aspects of wastewater reuseusing Protection Motivation Theory framework

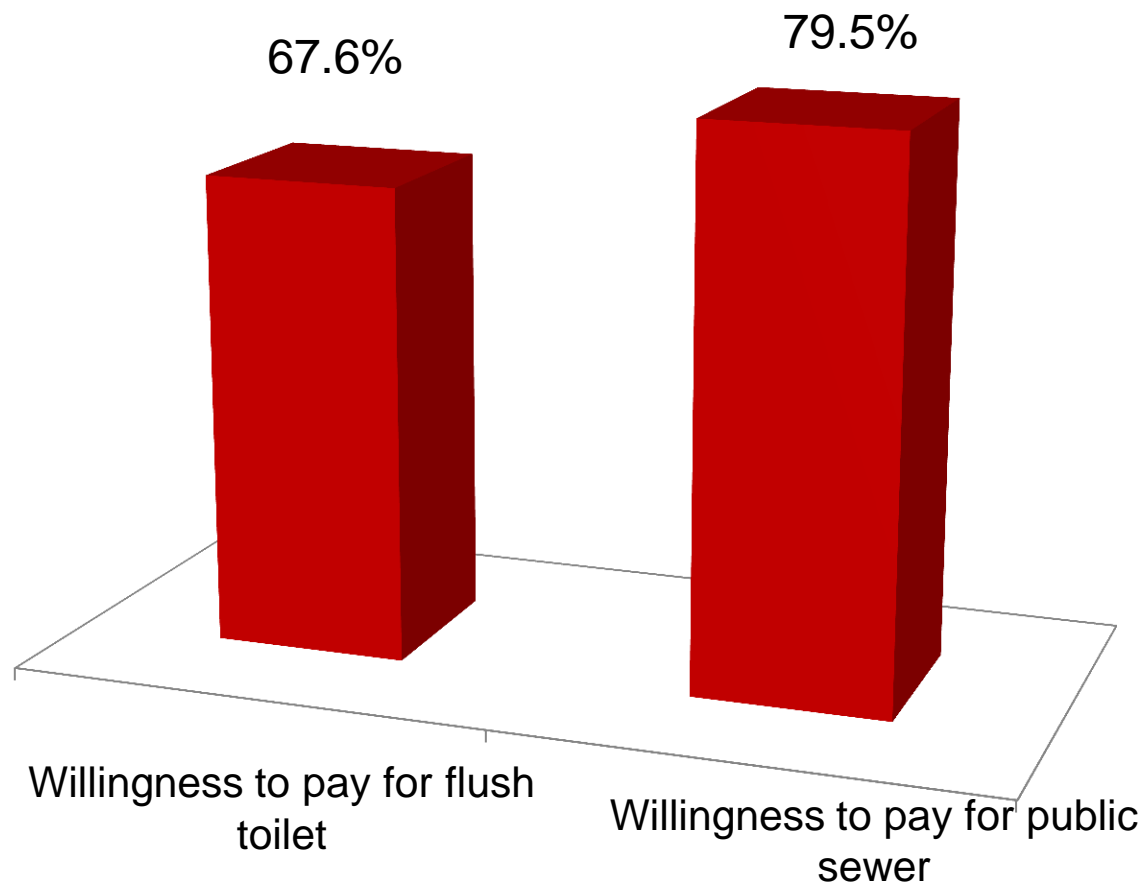


Economic benefits associated with diarrhea cases prevented as a result of improvement in access to clean water and hygienic sanitation in Nhat Tan commune, Kim Bang, Ha Nam

Using the service	(%)	Unit Cost (VND)	Total cost (VND)
Self-treatment	8%	31,294	157,723
Health Station	26%	101,246	1,658,416
District Hospital	24%	868,878	13,137,439
Provincial Hospital	19%	1,334,612	15,975,302
Central Hospital	6%	2,102,244	7,946,481
Pharmacies	10%	31,294	197,154
Private Health	7%	688,476	3,036,177
Total cost (VND) avoided/year			42,108,693

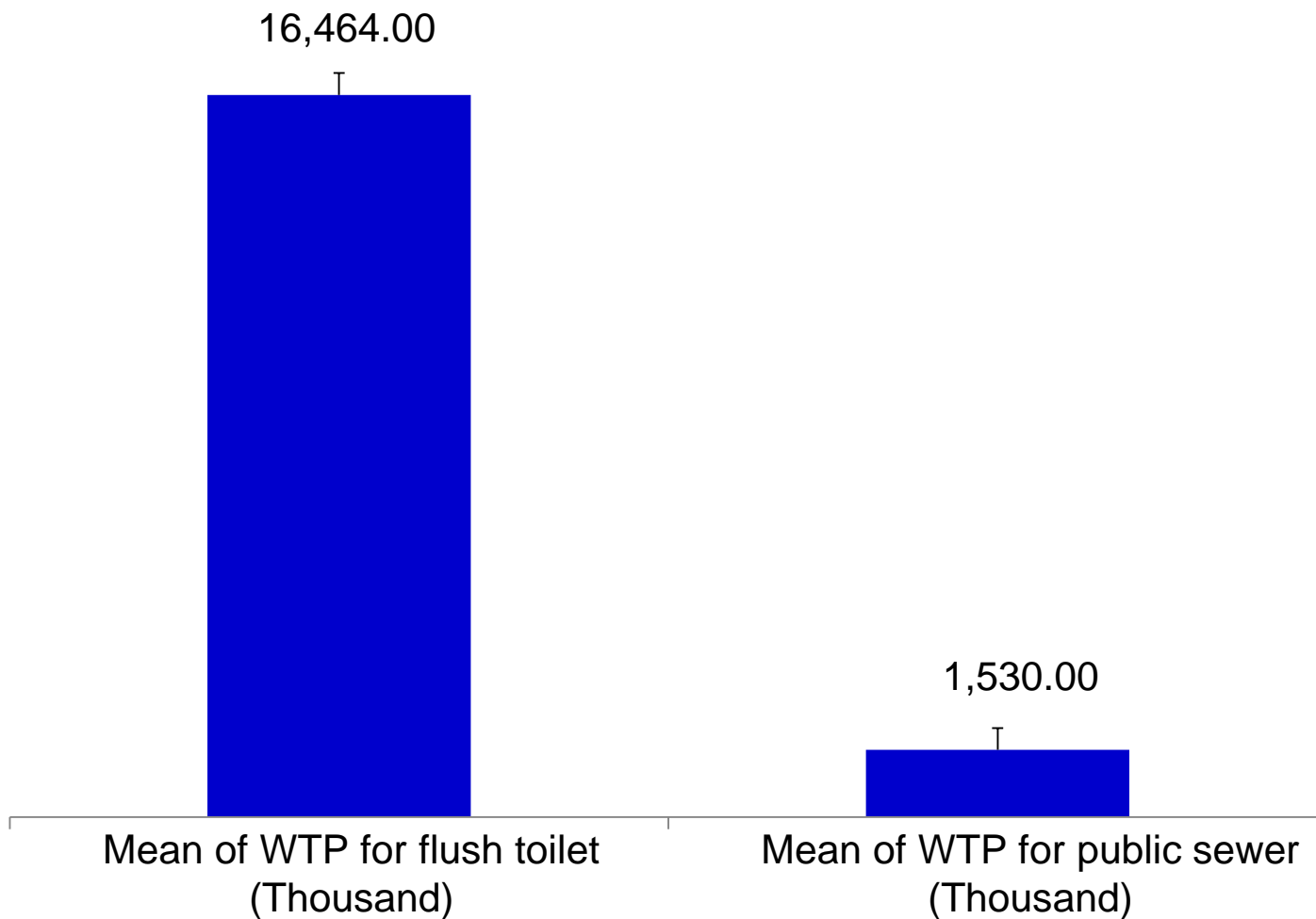


Willingness to pay in Kim Bang district, Ha Nam

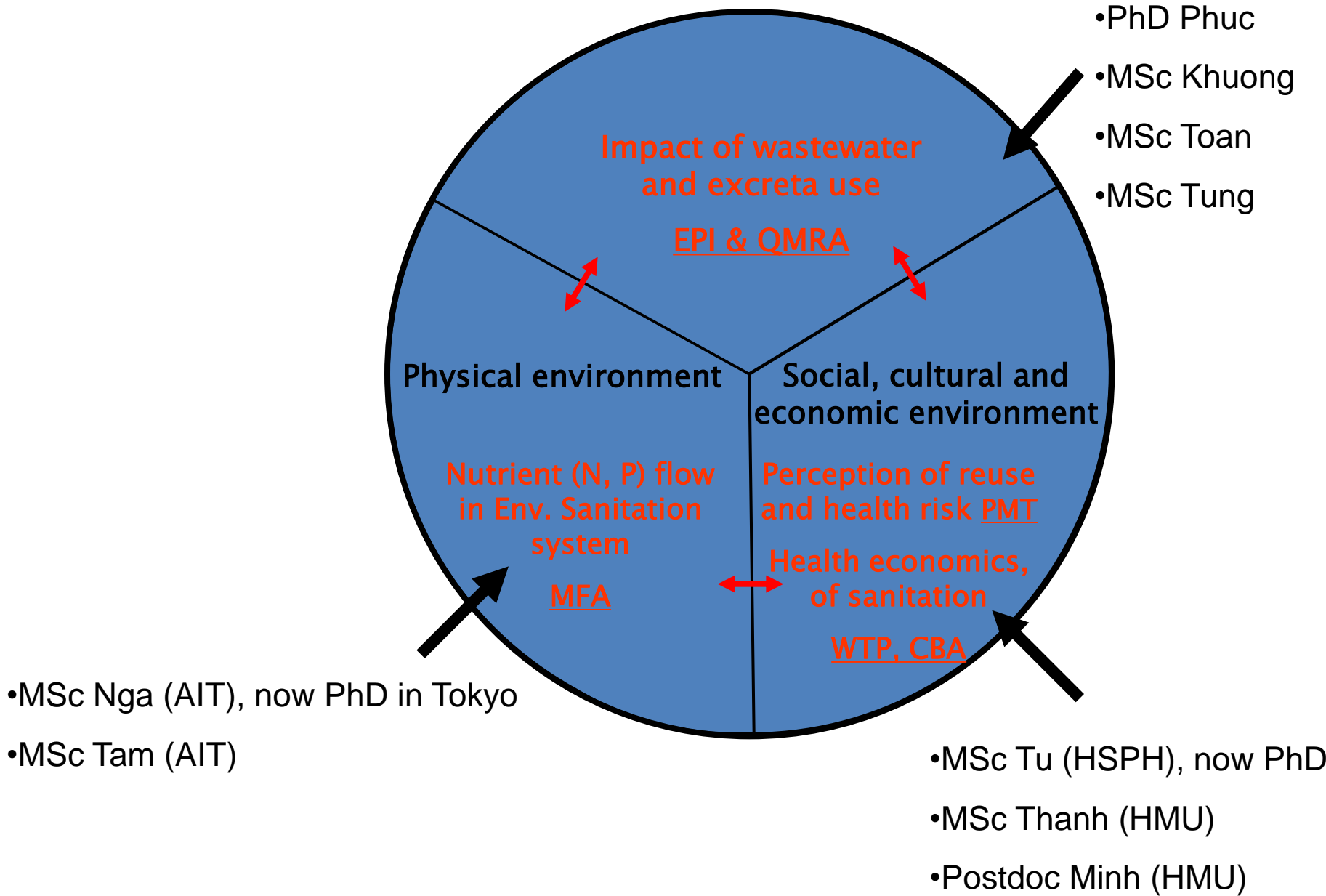




Willingness to pay for in Kim Bang district, Ha Nam



Training students within research project

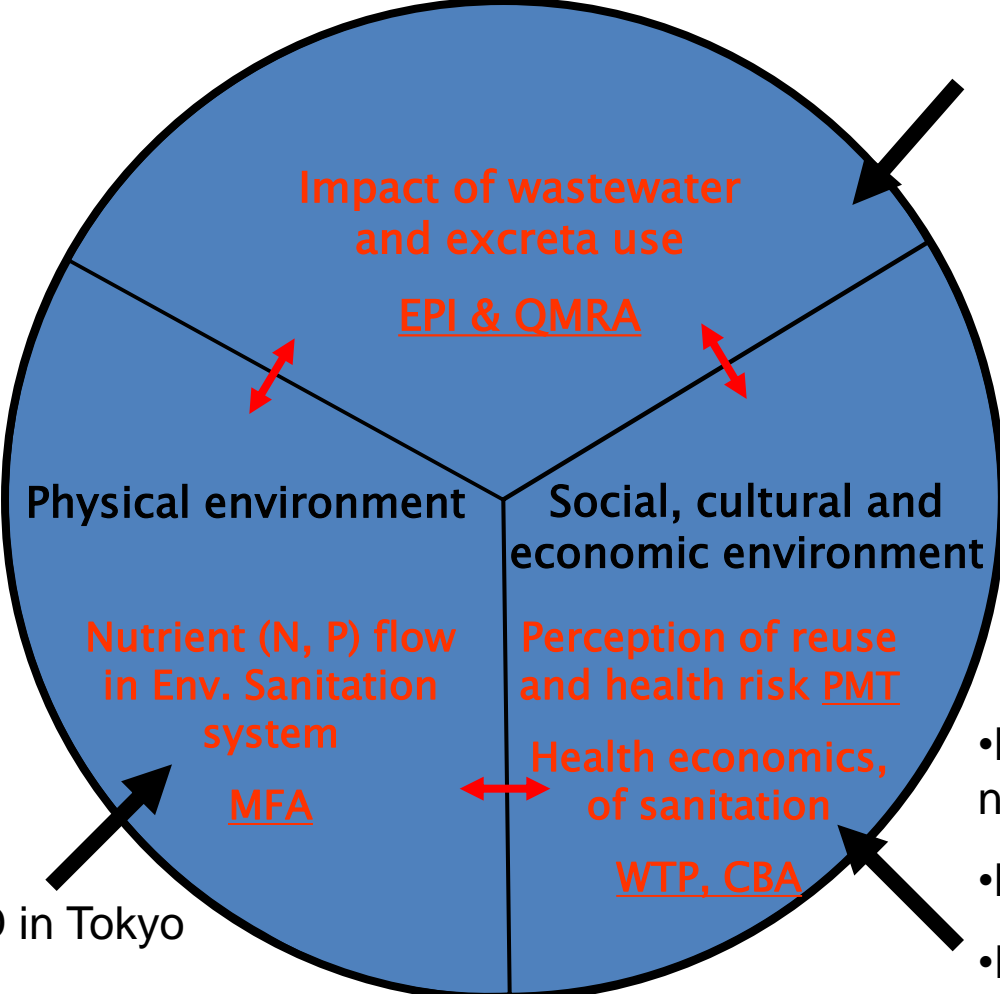




Training students within research project

- Close links with graduate school and schedule for students
- Commitment of students: risk
- Administrative barriers (registration, finance...)
- Investment for coaching, supervision with moto
- Training vs. Project purposes

Combined assessment and future intervention...



- PhD Phuc (Basel & NIHE)
- MSc Khuong (HSPH)
- MSc Toan (HSPH)
- MSc Tung (HSPH)

- MSc Tu (HSPH), now PhD
- MSc Thanh (HMU)
- Postdoc Minh (HMU)

- MSc Nga (AIT), now PhD in Tokyo
- MSc Tam (AIT)

Critical control points: Health (specific exposure and health impact), Environmental (on-site sanitation, crop), Socio - economic (PMT, WTP, CBA)

Interventions (treatment at household level, behavioral, hygiene practice):
Efficacy, effectiveness and equity studies measured in relation to risks



Communication strategy and policy impact

- Publication in both international and national
- International peer-reviewed papers
- National publication on Vietnam Journal of Public Health: special issue on Health and Sanitation

outcome HIGHLIGHTS

Đánh giá nguy cơ vi sinh vật
Liên quan đến nước, vệ sinh môi trường và an toàn vệ sinh thực phẩm tại Việt Nam: từ chương trình tập huấn từ chính sách

Tóm tắt

- Dự án này xây dựng một khóa học về đánh giá nguy cơ vi sinh vật tại Việt Nam
- Khóa học đánh giá nguy cơ vi sinh vật dựa trên các nghiên cứu thực địa về an toàn thực phẩm, công nghệ xử lý nước uống và các vấn đề liên quan đến nước, vệ sinh và an toàn thực phẩm, công nghệ xử lý nước uống và các vấn đề liên quan đến nước, vệ sinh và an toàn thực phẩm
- Dự án này là bước khởi đầu cho các nghiên cứu và đào tạo tiếp theo về đánh giá nguy cơ vi sinh vật tại Việt Nam. Các nghiên cứu tiếp theo sẽ tập trung vào đánh giá nguy cơ vi sinh vật trong nước uống, nước sinh hoạt và nước thải.

Nhu cầu về đánh giá nguy cơ
Đánh giá nguy cơ sức khỏe môi trường nói chung và đánh giá nguy cơ vi sinh vật trong nước và thực phẩm nói riêng vẫn còn khá mới mẻ tại Việt Nam. Trường Đại học Y tế Công cộng năm 2007 đã thực hiện một khóa bồi dưỡng ngắn hạn về đánh giá nguy cơ sức khỏe môi trường nói chung và đánh giá nguy cơ nói riêng của các căn bệnh liên quan đến môi trường, y tế dự phòng, y tế công cộng, nhân sự cho thấy các cán bộ làm trong ngành Y tế tại 17 tỉnh thành trên cả nước có kiến thức để nhận biết về đánh giá nguy cơ và hầu như không được đào tạo chính thức về vấn đề này. Do các nguồn lực về tài trợ để phát triển chương trình đào tạo, phát triển kỹ năng cơ bản về đánh giá nguy cơ vi sinh vật trong nước, thực phẩm và môi trường là rất hạn chế, Trường Đại học Y tế Công cộng đã thực hiện một khóa bồi dưỡng ngắn hạn về đánh giá nguy cơ vi sinh vật trong nước, thực phẩm và môi trường.

Việt Nam research

Parasites & Vectors

VPHA

north-south dialogue

Glossary of Terms in Water Supply and Sanitation

Các thuật ngữ dùng trong lĩnh vực cung cấp nước và vệ sinh môi trường

Nguyễn Việt Hùng, Hoàng Văn Minh, Vương Tuấn Anh, Trần Thị Tuyết Hạnh, Vũ Văn Tú, Phạm Đức Phúc, Nguyễn Hồng Nhung, Nguyễn Thị Bích Thảo

NCCR North-South Dialogue, no. 37
2011

dialogue

Pham Duc et al. *Parasites & Vectors* 2011, 4:102
<http://www.parasitesandvectors.com/content/4/1/102>



RESEARCH **Open Access**

Risk factors for *Entamoeba histolytica* infection in an agricultural community in Hanam province, Vietnam

Phuc Pham Duc^{1,2,3,5*}, Hung Nguyen-Viet^{1,2,4,5}, Jan Hattendorf^{1,2}, Jakob Zinsstag^{1,2}, Phung Duc Cam³ and Peter Odermatt^{1,2}

Abstract

Background: *Entamoeba histolytica* is an important protozoan intestinal infection in resource-poor settings, including Vietnam. The study objective was to assess risk factors of *E. histolytica* infection in a community in

Assessing nutrient fluxes in a Vietnamese rural area despite limited and high uncertain data

Nga Do-Thu^{a,b,*}, Antoine Morel^d, Hung Nguyen-Viet^{c,d,e}, Phuc Pham-Duc^c, Kei Nishida^a, Thammarat Kootattep^b

^a Interdisciplinary Graduate School of Medicine and Engineering, University of Yamanashi, Japan
^b School of Environment, Resources and Management (SERM), Asian Institute of Technology, Thailand
^c Swiss Tropical and Public Health Institute, University of Basel, Basel, Switzerland
^d Swiss Federal Institute of Aquatic Science and Technology (EAWAG), Sandec - Department of Water and Sanitation in Developing Countries, Dübendorf, Switzerland
^e Hanoi School of Public Health, Hanoi, Viet Nam

Tạp chí
Y Tế Công Cộng
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ISSN: 1859 - 1132 Tháng 11.2011, Số 22 (22)

Quản lý, sử dụng phân người và sức khỏe cộng đồng ở Việt Nam [4]
Ths. Vũ Văn Tú, Ths. Lê Thị Thanh Hương, CN. Nguyễn Bích Thảo, TS. Nguyễn Việt Hùng, BS. Ths. Phạm Đức Phúc

Đánh giá nguy cơ sức khỏe do vi sinh vật khí tiếp xúc với phân và nước thải sử dụng trong nông nghiệp tại tỉnh Hà Nam [14]
Ths. BS. Nguyễn Công Khương, TS. Trần Hữu Hùng, BS. Ths. Phạm Đức Phúc, TS. Nguyễn Việt Hùng

Nguy cơ ảnh hưởng đến sức khỏe từ việc sử dụng nước thải trong nông nghiệp ở một số vùng ven đô tại Việt Nam [21]
Ths. Đỗ Thủy Tiên, TS. Bùi Thị Thu Hương, GS.TS. Phạm Đức Cam, GS.TS. Kare Mohak, TS. Wim van der Hoek, GS.TS. Anders Dalsgaard

Ô nhiễm đơn bào gây bệnh đường ruột và *Colliform* chịu nhiệt trong rau thủy sinh ở vùng nước thải từ ruộng đến chợ tại Hà Nội [29]
Ths. Nguyễn Thủy Tiên, TS. BS. Vương Tuấn Anh, GS.TS. Phạm Đức Cam, TS. Lưu Văn Khoa, GS. TS. Anders Dalsgaard

Sự lan truyền vi sinh kháng sinh của *Escherichia coli* trong nước thải ở Hà Nam [37]
Ths. Lisa Damm, TS. Nguyễn Việt Hùng, GS. TS. Phạm Đức Cam, GS. TS. Roland Mollay

Nghiên cứu mối liên quan giữa thành hình ổ đau, bệnh tật từ khai báo với điều kiện nước sạch và vệ sinh môi trường tại xã Hoàng Tây và Nhật Tân, huyện Kim Bảng, tỉnh Hà Nam [46]
CN. Nguyễn Hoàng Thanh, TS. Hoàng Văn Minh, TS. Nguyễn Việt Hùng



Safe use of wastewater in agriculture and aquaculture in Vietnam

Policy message
Wastewater is a valuable and sustainable resource in agriculture and aquaculture. But pathogens and chemicals in the water may harm farmers, and may contaminate vegetables and fish produced using it.

Increasing water scarcity
More than 2.8 billion people worldwide will face water stress or scarcity conditions by 2025. Forty of the 48 countries with this difficulty are in Asia and Africa, and by 2050, the number of countries could almost double.

Wastewater: a valuable nutrient source for food production
Wastewater includes domestic sewage and the proportion of people who suffer from hunger by 2015).

A lack of knowledge about these health risks constrains



Communication strategy and policy impact

- National Workshop for dissemination
- Workshop with communities

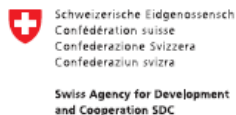




Partnership



Swiss TPH



Science and Policy
Platform of the Swiss Academy of Sciences
KFPE – Commission for Research Partnerships
with Developing Countries



Conclusions 1

- A conceptual framework was developed and case studies launched.
- *Physical environment*: onsite sanitation and crop production contribute large part of N and P discharge to water bodies through drainage systems (CCPs).
Options for mitigating environmental impact
- *Health risk* (helminth infection and diarrhea diseases) are related to the use of wastewater and excreta use in agriculture. Specific exposure activities identified
- *Socio-economic assessment*: Perception, behavior of health risk and ability of people to prevent risk caused by wastewater and excreta reuse.
- Method development for health combined assessment by EPI and QMRA
- Detailed research on health impact (exposure, pathogens...) and social research (software) of health and sanitation + Intervention
- Training students and partnership: linkage with graduate school, multi-institution and interdisciplinary, investment for supervision and admin.
Barriers



Is it really an Ecohealth research?

- What are people actually doing when they say they are doing ecohealth?
- Identify enablers and impediments of project approach and to assess conformity of practice with concepts

MSc thesis of Vi Nguyen, University of Guelph, Canada, 2010



Our Proposal

- Proposal was based on conceptual framework
- Investigation of ecohealth by asking questions about the pillars of ecohealth as defined by CoPEH-Can, IDRC
 - Transdisciplinarity
 - Equity
 - Participation
 - Sustainability
- Challenges: research in-progress, language

Vi Nguyen (2010)



Approach

- Case study
 - Identification of case/boundaries, sources of information, context
- Bottom-up approach: nature of interactions, how knowledge was shared
- Definition of a “stakeholder”, “involvement”

Vi Nguyen (2010)



Methods – Selection Process

- Identifying the system
 - NCCR project, project documents, project team
- Entry into project site
 - Jan-May 2010, Hanoi School of Public Health, sampling visits, interaction with community
- Selection and recruitment of participants
 - snowball/chain sampling, perspectives: NCCR team, health station staff, research participants

Vi Nguyen (2010)



Study Design – Data Collection

Gathering and analysis of data

- Data collection
 - interviews/focus groups
 - English/Vietnamese
 - questions: stakeholder roles, research process, type of participation, opinions on approach

Vi Nguyen (2010)



Study Design - Analysis

- Translation & transcription
 - Questions, responses, validation
- Data analysis
 - Analysis Method Framework
 - Management: Atlas.ti



Results of interview and focus groups

- Identified over a 100 themes including several enablers and impediments
- Reported on 18 themes (groundedness of 20+)
- Themes grouped into 5 categories according to commonalities



Results: Themes from Interviews and Focus Groups

3 of the 18 themes:

- “integration not clear”
- “don’t understand”
- “limits participation”

Some enablers and impediments:

- enablers: networks, evidence (if used)
- impediments: “not comfortable”, “they just ask, no results”

Vi Nguyen (2010)



Assessment of ecohealth in practice

Ecohealth
components:

- Participation
- Complexity

Source

- Interview themes:
“collected data”,
“limited
participation”
- project documents

Vi Nguyen (2010)



Major Findings

- Reporting on those aspects of ecohealth practice: not just technical results but process results (networks)
- Interview and focus group insights → ecohealth reporting guidelines → inform reporting, designing, evaluating

Vi Nguyen (2010)



Conclusions 2: is it an ecohealth study?

- Our research emphasized the importance of negotiating indicators for success of the research, within a participatory approach, since they may differ among different stakeholder groups. Furthermore, ecohealth practice involves collection of data from multiple scales and sectors. The challenge of how to integrate these must be considered at the design stage and throughout the research.
- We recommend that ecohealth research teams include a self-investigation of their process in order to facilitate a comparison of theory-to-practice. This may serve as a best practice for ecohealth research and may also offer insights into how to evaluate the process.



General conclusions: Lessons learned from ecohealth application

- Many levels of being ecohealth – integrative research
- Having a systematic thinking when designing and implementing, involvement of stakeholders and communication with them are important.
- Really try to have intervention, even small. Avoid NATO...
- Student involvement and support by seniors and donors are important for capacity building in ecohealth
- Challenges ahead ... but future is bright



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Thank you for your attention!