Multidisciplinary collaboration as an approach to finding new strategies for Japanese encephalitis management in Nepal

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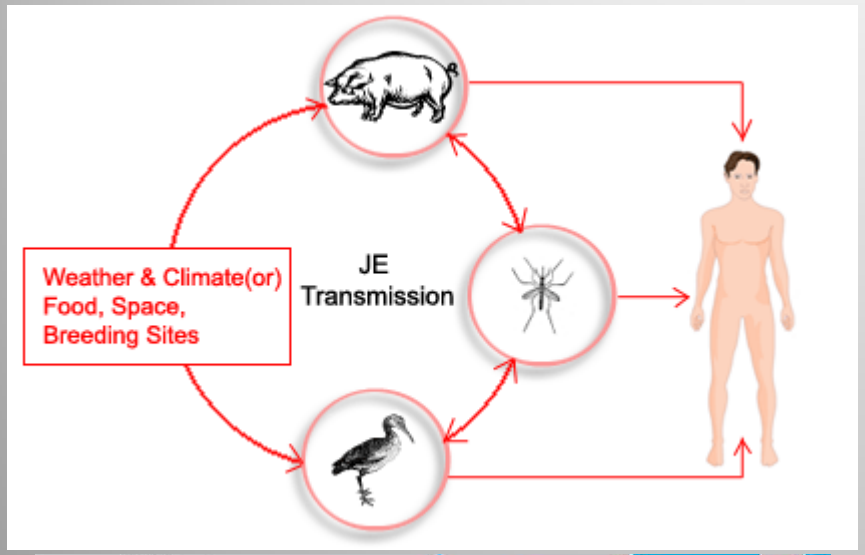
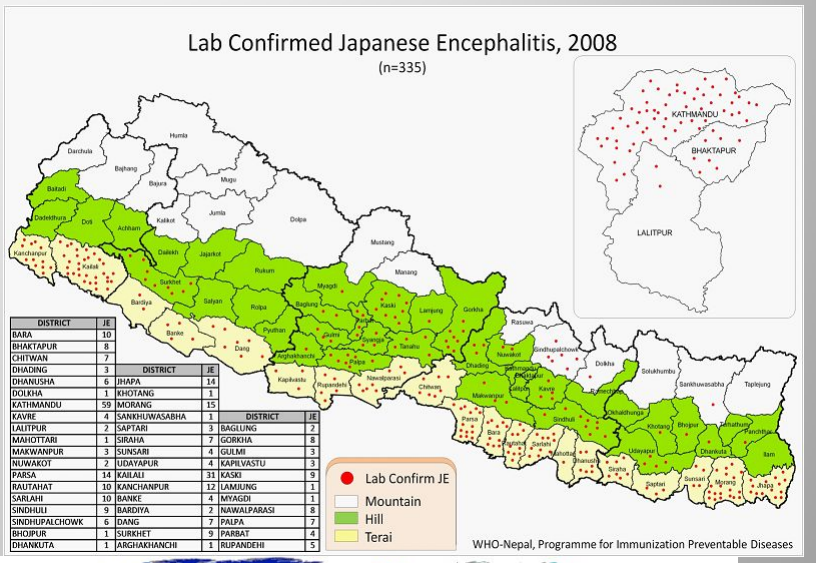
Overview of Japanese Encephalitis

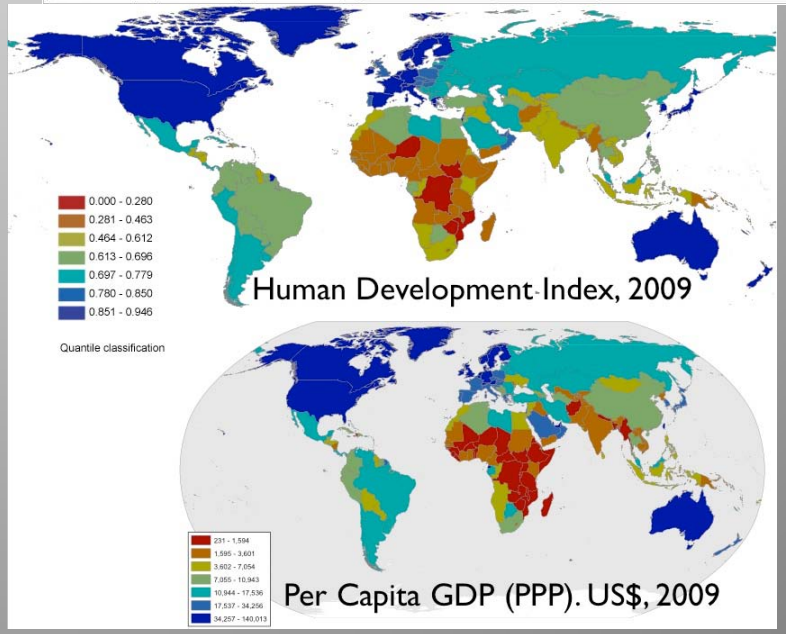




DISTRICT	JE
BARA	10
BHAKTAPUR	8
CHITWAN	7
DHADING	3
DHANUSHA	6
DOLKHA	1
KATHMANDU	59
KAVRE	4
LALITPUR	2
MAHOTTARI	1
MAKWANPUR	3
NUWAKOT	2
PARSA	14
RAUTAHAT	10
SARLAHI	10
SINDHULI	9
SINDHUPALCHOWK	6
BHOJPUR	1
DHANKUTA	1

DISTRICT	JE
JHAPA	14
KHOTANG	1
MORANG	15
SANKHUWASABHA	1
SAPTARI	3
SIRAHA	7
SUNSARI	4
UDAYAPUR	4
KAILALI	31
KANCHANPUR	12
BANKE	4
BARDIYA	2
DANG	7
SURKHET	9
ARGHAKHANCHI	1

DISTRICT	JE
BAGLUNG	2
GORKHA	8
GULMI	3
KAPILVASTU	3
KASKI	9
LAMJUNG	1
MYAGDI	1
NAWALPARASI	8
PALPA	7
PARBAT	4
RUPANDEHI	5



Partners

National Zoonoses and Food Hygiene Research Centre

IDRC CRDI INTERNATIONAL DEVELOPMENT RESEARCH CENTRE

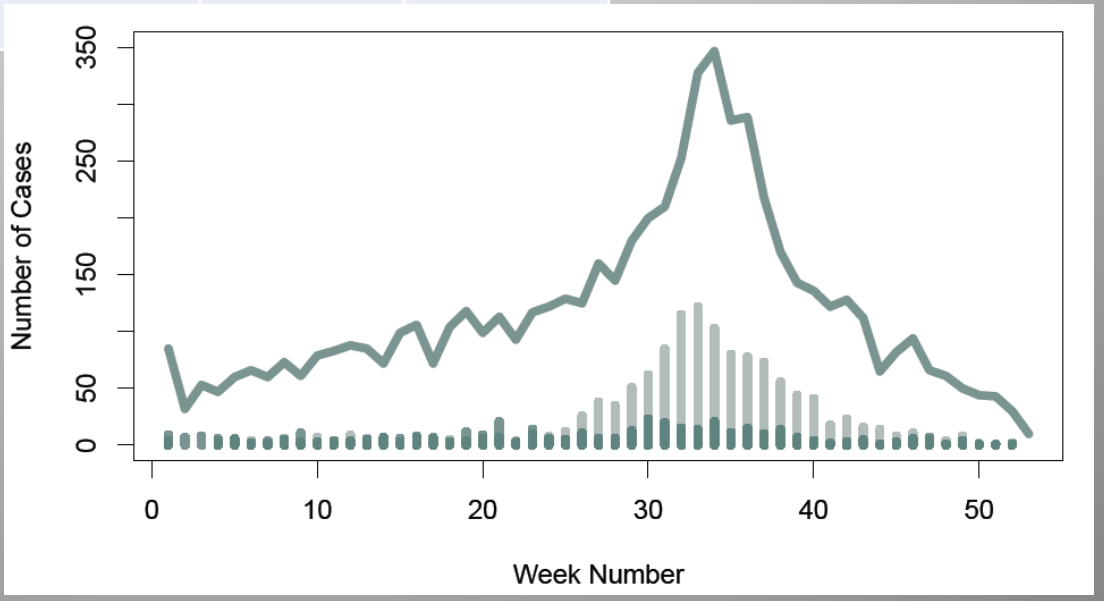
Centre for Coastal Health

	2007	2008	2009	2010	2011
JE	442	339	147	197	129
AES	1142	1548	1274	1305	966
UVE	73	101	97	112	121
Totals	1657	1988	1518	1614	1216

Seasonal
Southern
Children
But…….

Detection bias and access to care (15% AES surveillance = JE)

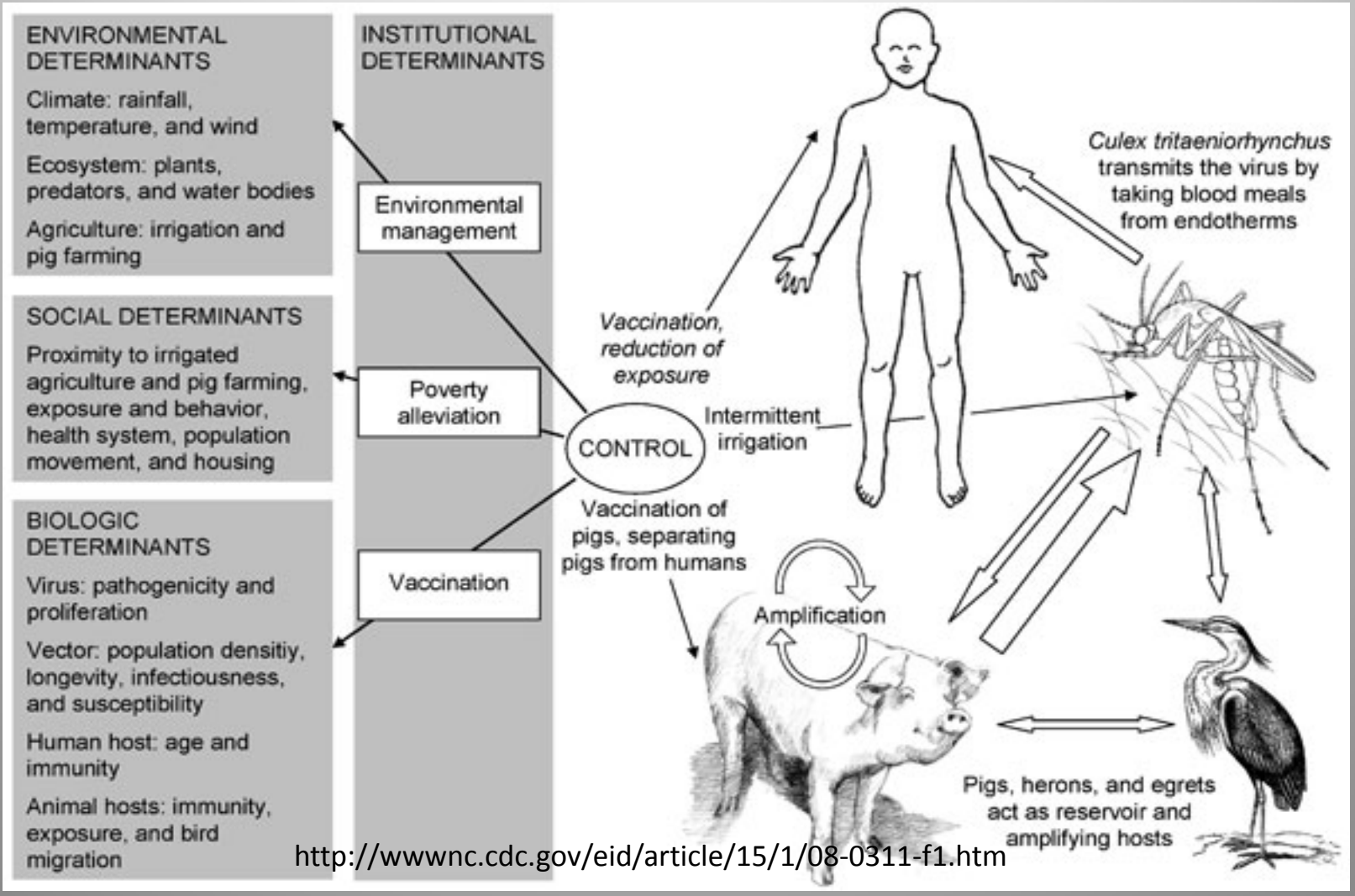
Moving (Climate change vs culture change vs surveillance effort)



Project Goal

- Use a socio-ecological lens to identify public health strategies for JE prevention and control within the reality of Nepal

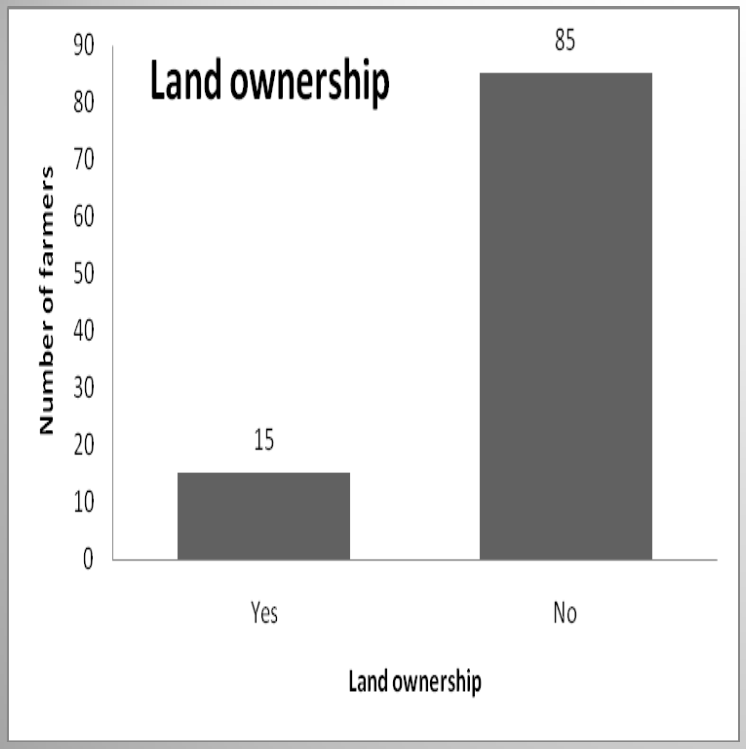
Japanese encephalitis control – create barriers

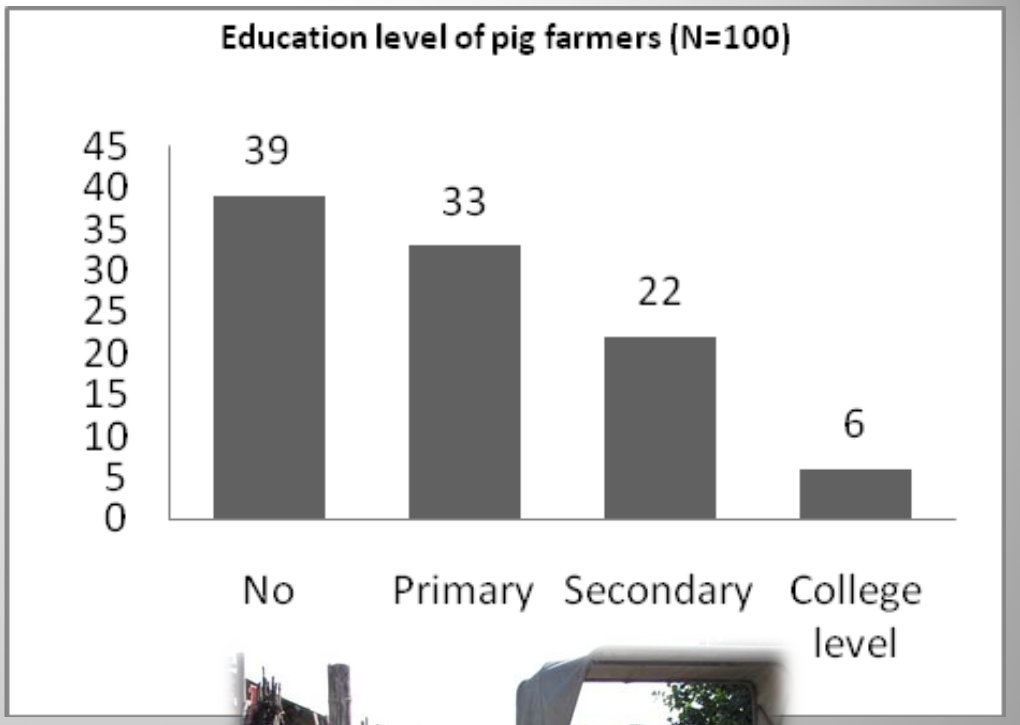


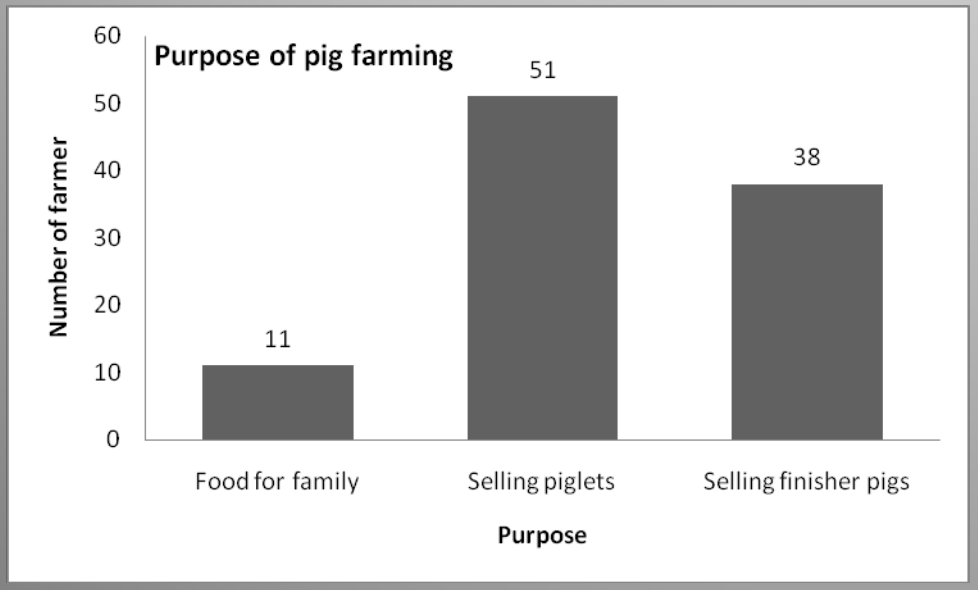
http://wwwnc.cdc.gov/eid/article/15/1/08-0311-f1.htm

Pig farming as a high risk occupation

Parameters	Response				
	< 20 m	20-100 m	100-500 m	500-1000 m	>1 Km
Human dwelling to pig shed (N=100) Mean = 7 mtr	100	-	-	-	-
Human dwelling to nearest rice field (N=100) Mean = 372 mtr	13 (13)	22 (22)	45 (45)	15 (15)	5 (5)
Human dwelling to nearest large stagnant water source (N=100) Mean = 161 mtr	43 (43)	36 (36)	24 (24)	2 (2)	1 (1)


Land ownership
Number of farmers
90
80
70
60
50
40
30
20
10
0
85
15
Yes
No
Land ownership


Education level of pig farmers (N=100)
45
40
35
30
25
20
15
10
5
0
39
33
22
6
No
Primary
Secondary
College level

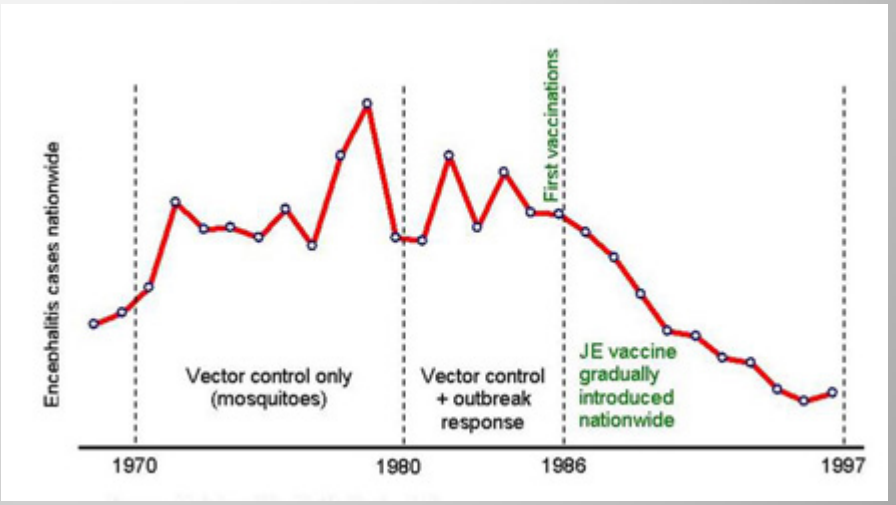

Purpose of pig farming
Number of farmer
60
50
40
30
20
10
0
11
51
38
Food for family
Selling piglets
Selling finisher pigs
Purpose

What is the farmers perspective?

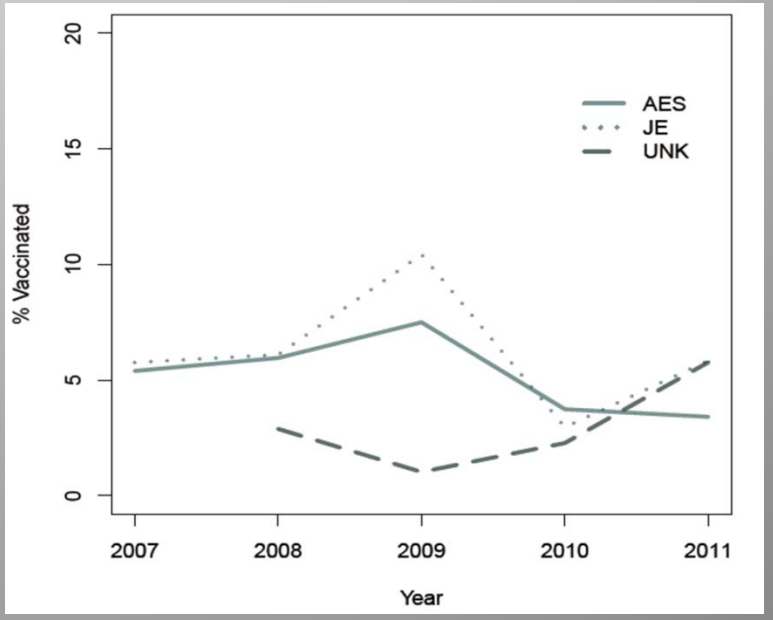
- Pigs are good
  - Smallholder, scrap fed, sources of disposable income
  - Shifting cultural perspective
- No knowledge of JE as a pig problem
  - Lack of diagnostic services
- Limited awareness that pigs can be sources of human illness
- Only 1/400 families immunized for JE (0 pigs)

The immunization challenge

- Effective when used adequately but….
  - Incomplete coverage
    - Pig = 0 (awareness)
      - Give other vaccines
    - One dose only
    - Select areas only
    - Farmers = rare
- Why did 1 farm family receive vaccine?
  - Child death from JE
  - Other vaccines given to children



http://www.path.org/projects/je-impact.php



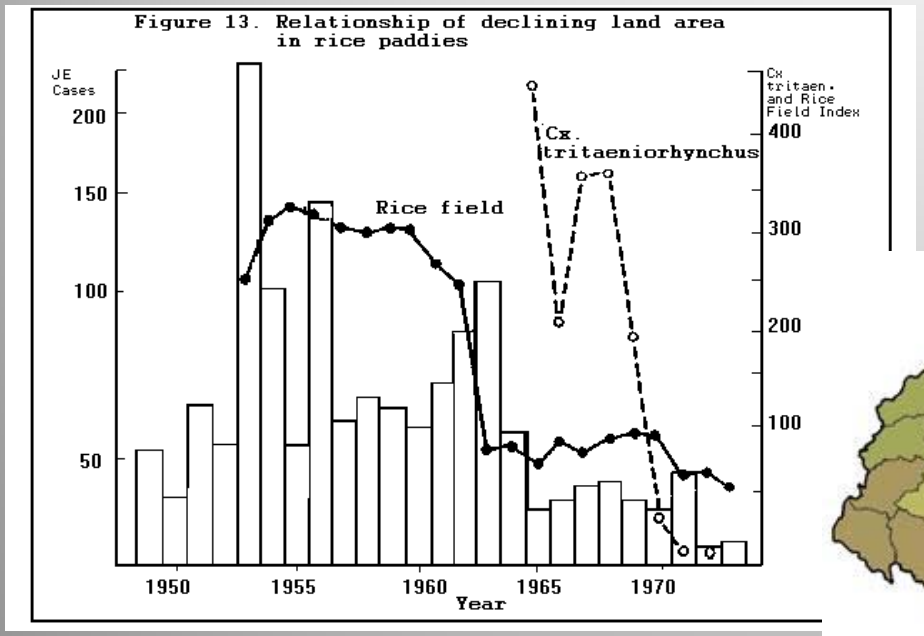
Vaccination hypotheses to be confirmed

- Awareness
  - Gender and regional differences in access to media
- Access to health care
  - Varies regionally
- Land ownership
  - Willingness to present to the government
- Trust
  - “Nepal receives the leftovers”
  - Problems with other government campaigns

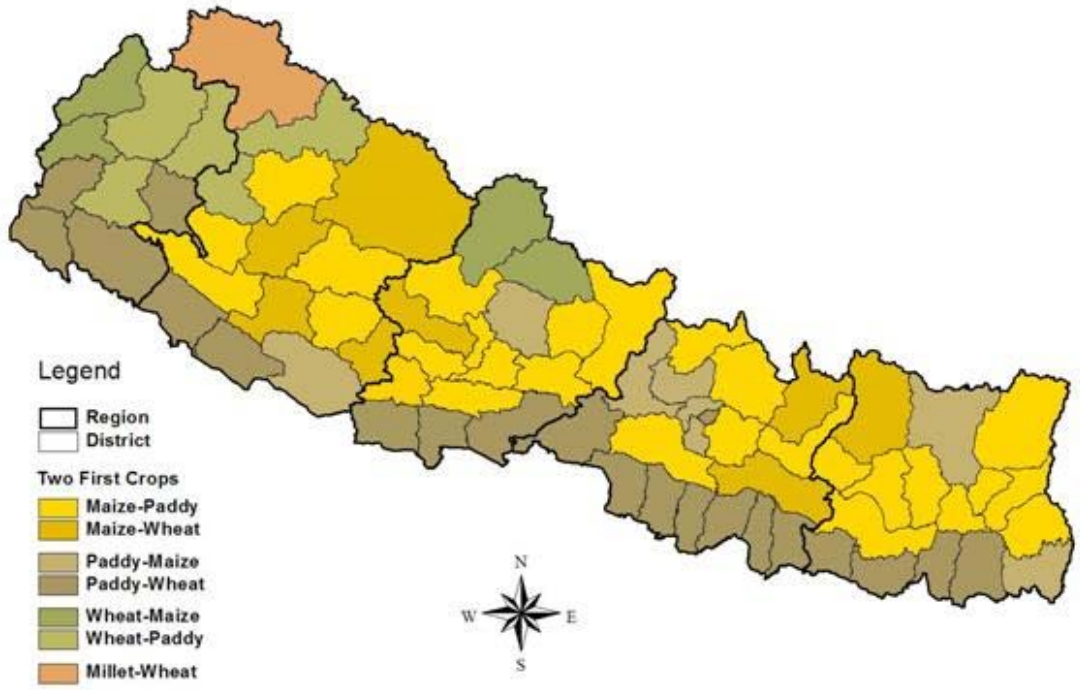
Avoiding risk – personal protection from mosquitoes

- Awareness of mosquito borne disease
  - 95% did at least 1 thing
    - 30% had heard of JE
    - 17% knew mosquitoes spread JE
- Literacy was a determinant of “proper use”; income was not
  - Many techniques only used partially

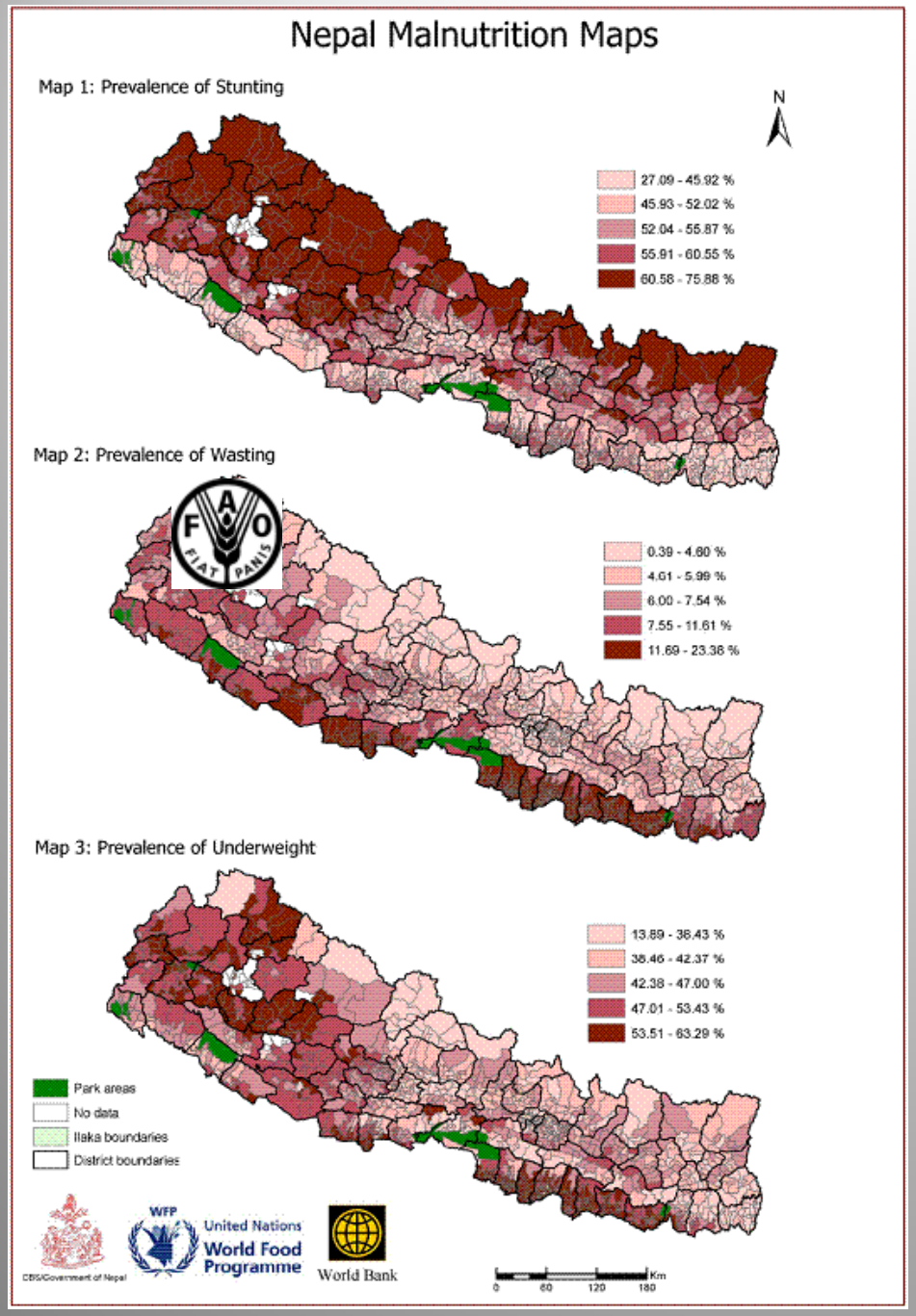
Remove mosquito habitat = remove food production



http://wonder.cdc.gov/wonder/prevguid/p0000008/p0000008.



http://www.fao.org/docrep/010/ah869e/ah869e00.HTM



NEP/99/023: SPPD REPORT

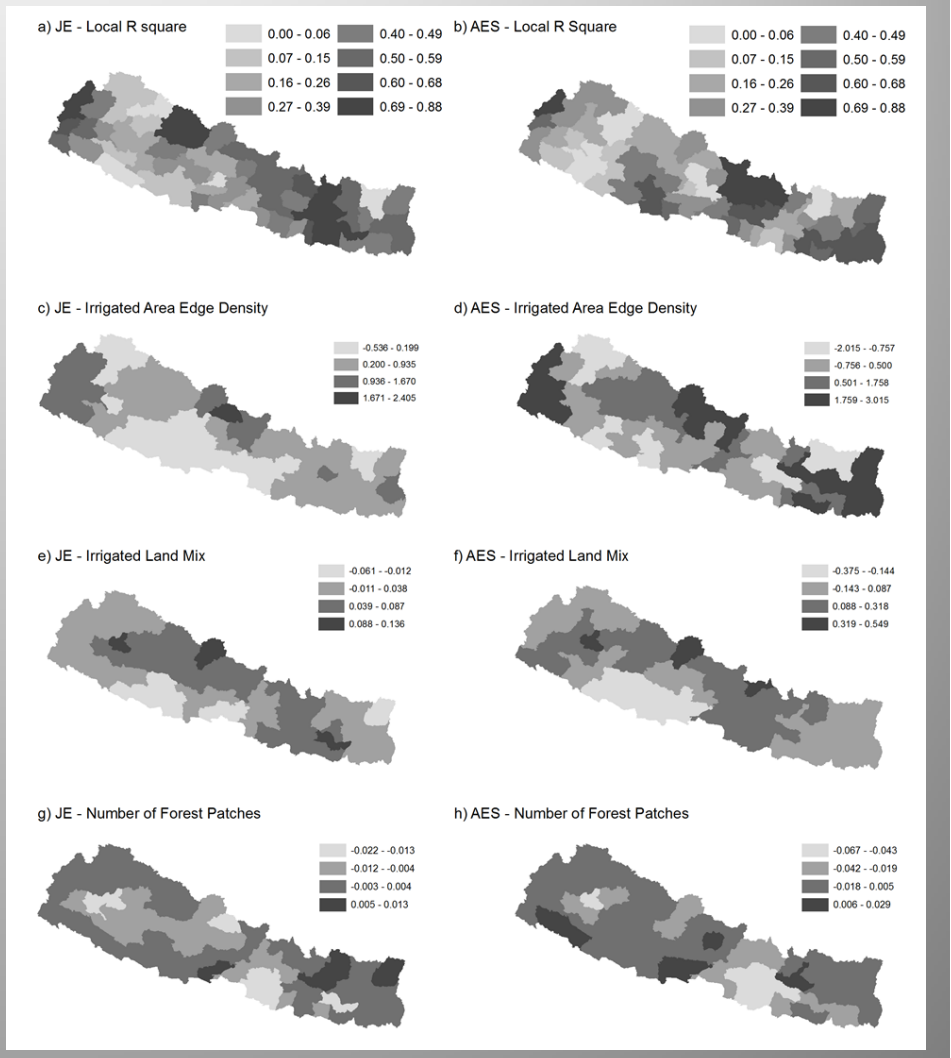
NEPAL AGRICULTURAL POLICY AND STRATEGIES FOR POVERTY ALLEVIATION AND FOOD SECURITY

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
UNITED NATIONS DEVELOPMENT PROGRAMME
Kathmandu, Nepal

Avoiding risk – keep away from the birds

Avoiding risks by land use planning

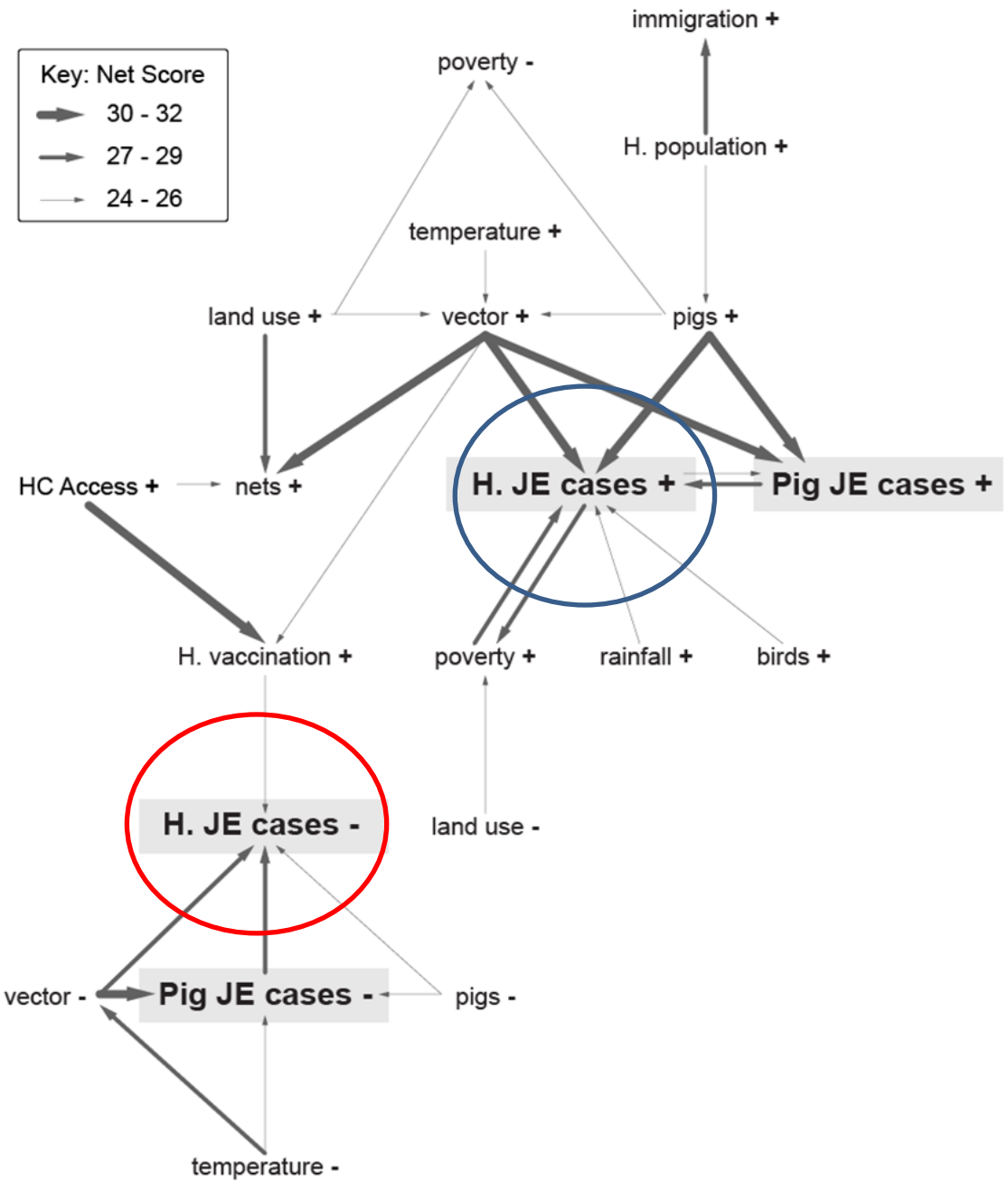
- JE clustered around
  - Peri-urban agriculture
  - High density of paddy fields
  - Small scale agriculture mixed with other land uses like forest reserves
- Public health and other land uses not coordinated



Creating Species Barriers

- Social barriers prevent building species barriers
  - JE is “easy “ to prevent
    - Keep pigs, birds, mosquitoes and people apart
  - Separation is not consistent with:
    - National food security and poverty reduction plans
    - Capacity and histories of farmers
    - Land use patterns
    - Ability for people to choose where they farm
  - Institutional barriers impede action to achieve primordial and primary prevention (see next slide)

Perceptions of the origins versus Perceptions of control

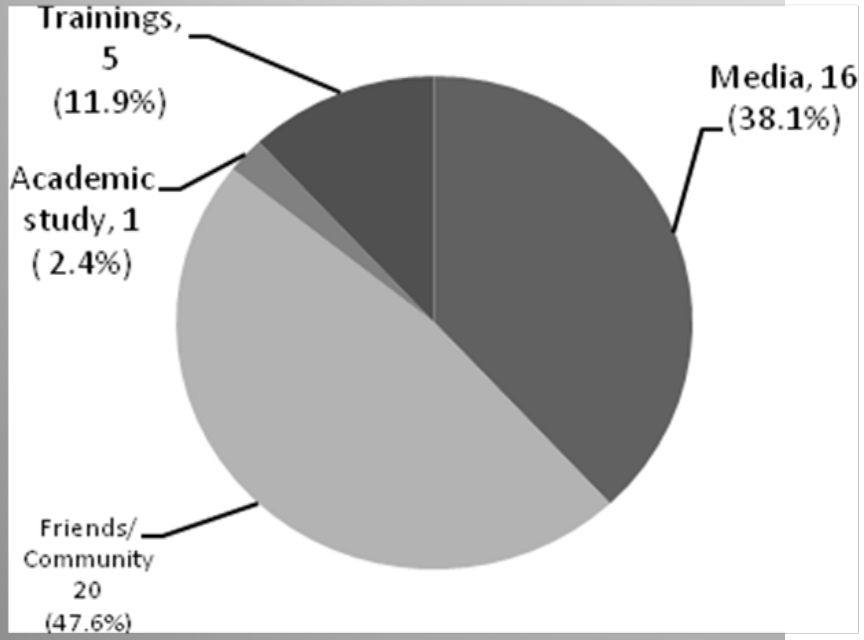


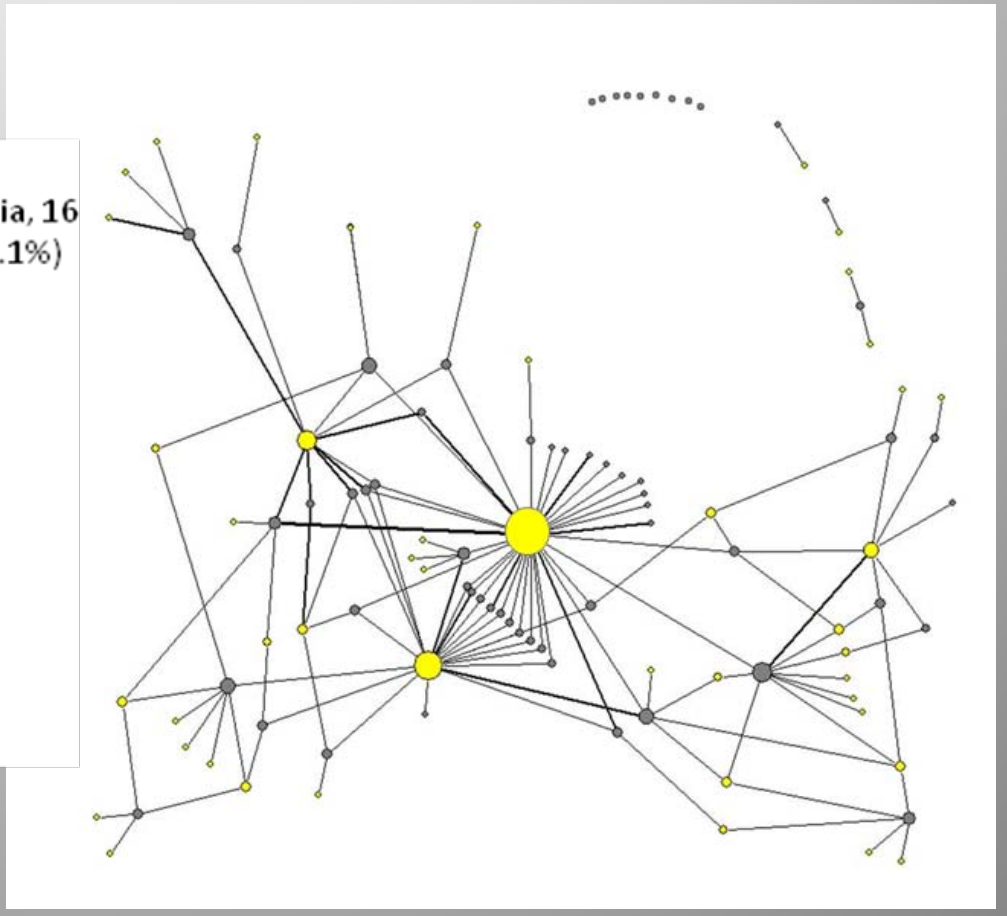
EIDs are wicked problems

- They are the result of human behaviour
  - Veterinary world pays inadequate attention
  - Investment in EIDs has been biased to detect and respond (biotech) not prevent and cope (health promotion)
- Next phase in Nepal – applied behaviour change

Farmer social networks for local change

Gender and regional differences





Cross-sectoral/cross-cultural professional training

- JE researchers and trainees in Nepal
  - Year 1
    - Perceptive ability to be agents of change were limited to discipline and position
  - Year 2
    - “Imagined” means to effects change in their discipline via actions in others
      - Ex. Pigs reduce poverty which increases capacity to learn
      - Ex. Increase compliance in JE prevention by better understanding the views of stakeholders

Unintended consequences of barriers

- Negative - Barriers to virus creates barriers to benefits
  - Get rid of pigs or put them indoors
    - Removing income source for highly economically vulnerable urban migrants and rural families with small land base
    - Indoor tropical farming and secondary animal health problems that reduce productivity
- Positive – Functional barriers that look at the system as opposed to physical barriers targeting a pathogen
  - On farm biosecurity leads as integrated health
    - Reduced zoonoses, improved food safety, improved household income
    - Enhanced awareness of JE personal protection

Remove barriers to planning

- Post-conflict GDP growth declined – largely due to poor agricultural performance
  - Public health actions need to protect production to enable poverty reduction
- Agriculture is rapidly changing in Asia
  - Climate change adaptation, rapid urbanization, cultural change
    - Agriculture policy needs to anticipate public health implications

Key lessons

- Understanding mechanisms of JE cross-species transmission is ‘easy’
  - Motivating changes that reduce the EID risk while protecting food supplies, income and biodiversity is hard
- The socio-ecological lens helped to inspire people to explore multiple entry points for prevention and control programs
  - Priming and enabling alternative thinking

Key lessons

- Barriers vs Enablers – balancing the EID agenda
  - Barriers to spread– biology, epidemiology, microbiology
  - Enablers of action for primary and primordial prevention– values, priorities, behaviour

- Achievement of animal, environmental and human health by separate science, policies and actions is impossible

Overall conclusion

- The intellectual tools for a collaborative, integrated approach that manages the co-dependence of human, animal and environmental health with an eye to sustaining health into the future are few, poorly validated and inadequately used.

- Two ‘myths” that need validating
  - Ottawa Charter for Health promotion and “reciprocal care of human and environmental health”
  - Socio-ecological approaches are possible and better

Thank-you
(P.S. – can you find the pig)