A photograph of a person in a small, narrow wooden boat on a river. The river is surrounded by a dense, lush green forest. The water is a murky, brownish-green color. The person is sitting in the boat, and the boat is positioned in the middle of the river. The text "The Edge of Enough" is overlaid on the image in a large, white, sans-serif font.

The Edge of Enough

Small Subsistence Farmers and the Protein Problem

ECHO Asia Conference
October 2011

Di Mathews, MD, MPH

The Protein Problem

- Counting light haired kids at the market



Other signs of protein energy malnutrition

**Skinny
arms
and
round
bellies**



**Flaky
dry
skin**

Why are the kids not getting enough protein?

Poor hygiene?

Frequent illness?

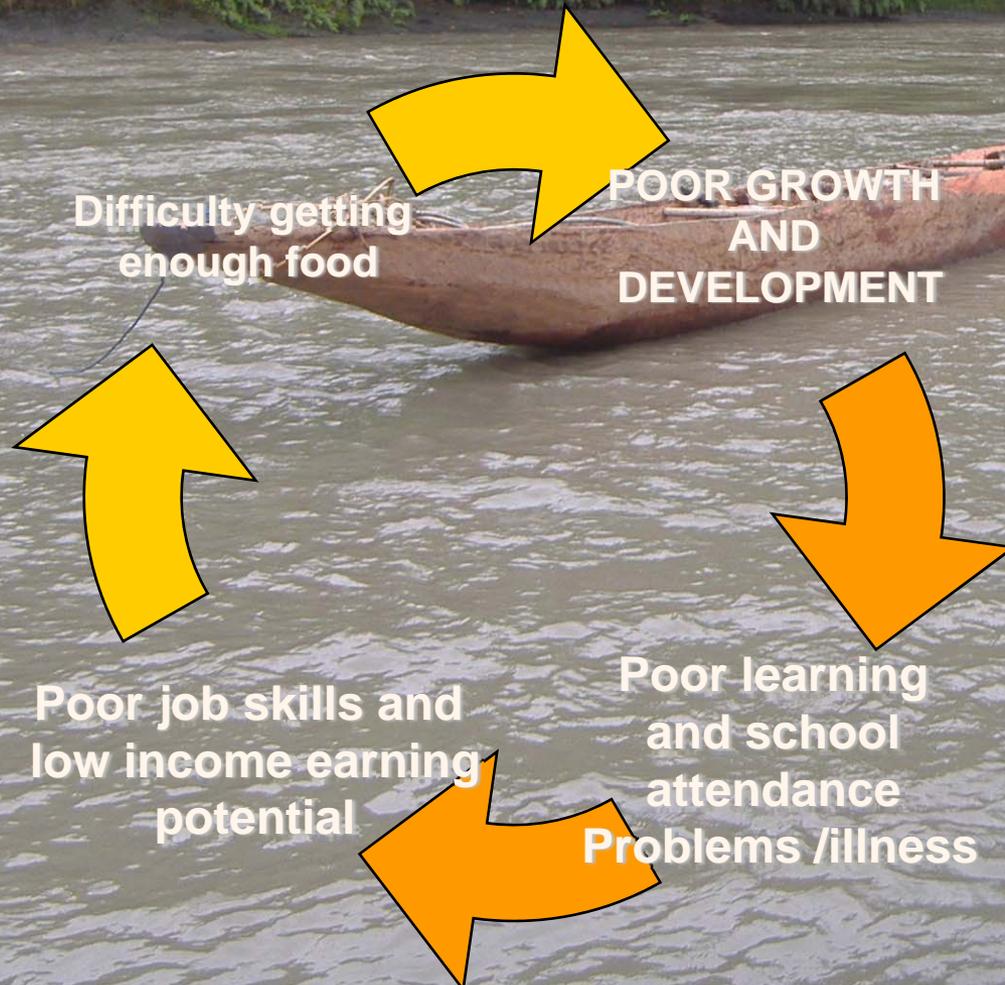




Loss of
or sick
mother?



Poverty cycle



The family
is left with
a load
trying to
negotiate
the edge of
enough.



Cultural aspects

- What do we eat?
- Where do we get our food?
- How hard is it to get food?
- What does it cost?
Time, money, labor
- Is our supply secure?
- How much do we have?
- Who eats first?
- Food taboos
- Do we eat every day?
- Who is responsible for providing food?
- What if the provider is sick?

“My kids don’t cry any more...”



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Are there simple ways to improve food (protein) security?

- Gardens
- Sustaining Soil Fertility
- Small animals
- Skills training
- Basic money management
- Value added products





Complete Protein

Not all proteins are created equal

- Nitrogen balance
- Growth
- Essential Amino Acids
- Not made by our bodies
- Digestibility
- Can our bodies use it?

- http://www.solae.com/~media/Files/Solae_Soy_Protein_Science_Series.pdf

Essential Amino Acids

Table 23
Summary of the Adult indispensable Amino Acid Requirements
Amino Acid Protein (b)

	Present estimates		1985 FAO/WHO/UNU	
	mg/kg per day	mg/g Protein (b)	mg/kg per day	mg/g Protein (b)
Histidine	10		15 8–12	15
Isoleucine	20		30	10
Leucine	39		59	14
Lysine	30		45	12
Methionine + Cysteine	15		22	13
Methionine	10		16 –	–
Cysteine	4		6 –	–
Phenylalanine + Tyrosine	25		38	14
Threonine	15		23	7
Tryptophan	4		6	3.5
Valine	26		39	10
Total Indispensable Amir	184		277	93.5

a From Reference 1

b Mean nitrogen requirements of 105 mg nitrogen / kg per day (0.66 g protein/ kg per day)

http://whqlibdoc.who.int/trs/WHO_TRS_935_eng.pdf



Non meat protein?

Which of these are 'complete'?

- Moringa
- Beans, peas, pulses
- SOY/ Tofu
- Sprouts
- Grains
- Milk
- Cheese and dairy products
- Eggs
- Fish (I guess that's meat)



The PROBLEMs with animals

Unless people are used to caring for them it takes a lot of training



Animals that forage for themselves are easier to manage



If the animal's food is the same
as people food you'll impact food
security



The Living Bank



The image is a collage of three photographs. The top-left photo shows a wide, muddy river with a dense forest of green trees on the banks. The top-right photo shows a group of people, including men and children, gathered outdoors, some with white body paint. The bottom-left photo shows a wedding feast with people sitting on a patterned rug around a table with food and drinks. The bottom-right photo shows a funeral with a group of people gathered around a person lying on a stretcher.

Wedding Feast

Funeral

Inbreeding

It takes intentional cooperation of small farmers that understand the problem to overcome this issue.

Farmer 1

Farmer 2

Best male

Best male

Best male

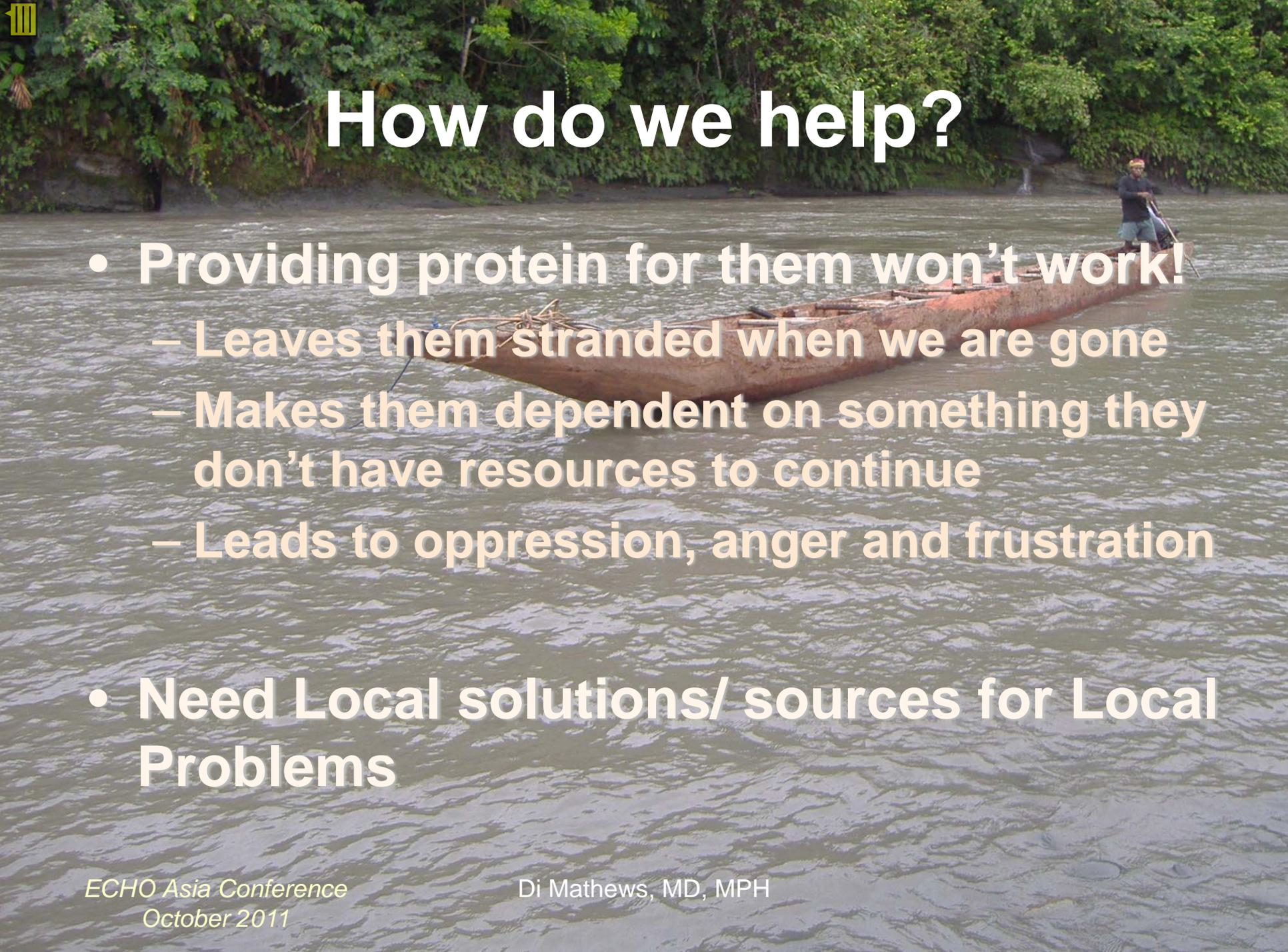
Farmer 3

Predators can be a real problem



Introducing a new animal may not appeal to folk



A photograph of a person in a small, narrow wooden boat on a river. The boat is made of dark wood and has a person sitting in the back, holding a long pole. The river is surrounded by dense green foliage and trees. The water is a murky, brownish-green color. The overall scene suggests a rural or developing area.

How do we help?

- **Providing protein for them won't work!**
 - Leaves them stranded when we are gone
 - Makes them dependent on something they don't have resources to continue
 - Leads to oppression, anger and frustration
- **Need Local solutions/ sources for Local Problems**

Validate their dreams

- Listen, Observe, Learn, Encourage
- Be a resource of ideas and information
- Help them think through their root causes and locally available solutions.
- Encourage small scale experimentation



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TRAIN WOMEN!

- Women stay home
- They train tomorrow's leaders
- They need extra protein for pregnancy and lactation!



LEARN TOGETHER

- Train as well as teach
- Let them 'fix' your mistakes
- Celebrate any success together!



A photograph of a person in a traditional wooden boat on a river. The boat is long and narrow, with a reddish-brown interior. The person is standing at the stern, holding a long pole. The river is wide and has a slightly rippled surface. The background is a dense forest of green trees and foliage.

Thank You!

Any Questions?