

Hi everybody,

I was impressed with the talks today. Thanks for the hard work. Below are some thoughts I have to share... but first:

***In the question of whether one should prioritize equity or respect the local culture***, there was a proposal: "if needs are met, will compassion prevail?" I'm not sure I think so. We can look at countries with great wealth and infrastructure, such as Saudi Arabia that has great inequality between men and women. I think it is a cultural thing. In any case, certainly it is something we will cross... and do cross all the time, or choose not to cross. Change is resisted, and often resisted by those who would benefit from it the most. I really like the idea that if needs are met then people would become more compassionate. However, to leave it at that and move on from the question appears to me as a denial or a cop out... which I'm not accusing anyone of doing. And again, this is just as it appears to me. I look forward to hearing what you think.

### **Solar Ice**

I think that there will be limited interest in industrialized countries because electricity is so cheap here. If you can please spend some time developing a model of how it would work in Ghana or some other poor community.

How is it that you came upon the number of \$50 for ice? Is this possible? Do you have a business model in mind?

I had a hard time understanding the graphs. Maybe you make the relevance of this information clearer.

Can you investigate how people get ice in poor countries now? What is the present business model? What are the technologies that seem relevant?

### **Drip Irrigation**

I found your background of the country very well done. I liked the diagram of the relationships of the network that's grown up around the challenge. Did you do any calculations about how much power you need, What the pressure is, what the technology is that they are developing at Brown, or what seems like a good idea?

### **Solar Cooker**

Please show a map of the general village and a map of Mexico to give the general location. I think it'd be nice to have a little background about the area. I really like how you got right down to what the real issues were with how people live and how these life styles raise challenges to possible acceptance of the ISEC (Insulated Solar Electric Cooking). This is something the design team can consider. I don't think I agree with some of the conclusions you've drawn, but the observations are important, and I look forward to challenging some of your challenges, that we might learn more.

You want to know who brought the stoves to the village. I think it'd be great to find out. Find out what they know and what their intentions are. What about possible collaboration with them?

Challenges to the ISEC – What if all the ISEC did was keep food warm? I think a considerable amount of wood and emissions comes from keeping things warm. I think simply introducing a “hot box” with good insulation may be helpful. With an electric heater, it would work better, no?

Thanks for sharing the internal conflict of broaching things with your family.

### **Aquaponics**

Plants also clean the nitrogen out of the water... that’s part of the mutualism.

I think there needs to be more time and effort given to the drawbacks/challenges of aquaponics. Your enthusiastic expression of the value of aquaponics was great, but all alone, it comes off as an advertisement, and the downsides are very important for us to consider in order to develop an effective implementation. There must be a reason that it isn’t done all over the place:

Cost and time – you talked about how very little money, water, and labor is used in farming aquaponics... but you have to build it first. Think of the size of the farms that presently bring us food. What would it be like to make a corresponding aquaponics facility?

Redundancy is necessary... the fish died twice at the SEF... all of them. Once, the bubbler went out, and once someone put fertilizer in the water to help the plants – but it was about 100 times that which the fish could handle. Then this summer, I found the water level low and many dead fish. There is a delicate balance to be struck and the population density of the fish is way beyond that which can naturally sustain itself. What about disease?

I like the idea of doing this at prisons – horticulture therapy is the study of how raising plants is calming and pleasing. I recommend that you ask Ryan Alaniz in anthropology about this.

When you talk about getting permits and civil engineers, I think, “wow, you’re talking big technology and money and concrete, is this *appropriate* technology” ... How about low cost aquaponics. Is that possible?

Constant electricity? I don’t think this is realistic. The electricity almost always goes out periodically... even here (one of the times the fish died. In poor countries, electricity is very unreliable. You just have to design around that.... Speaking of which, I need to go out and get that battery operated pump for my aquaponics tank.