



Insect Hour

Deepa Senapathi: Land Management for Beneficial Insects & Smallholder Livelihoods

Q&A

Thank you so much Deepa for such an insightful and engaging talk, we'll now move on to the Q&A. If you have any questions please type them into the chat box, we'll get through as many as we can.

So there's a question in the chat from Fran to ask **if there is an opportunity for farmers to share their experiences peer-to-peer.**

Yes, there is.

So, in the region that we work, there are um places called village knowledge centres and they usually the farmers meet on a semi-regular basis usually because they have like cabbie run plant clinics where they discuss ways of pest control and extension workers help facilitate those conversations. So the village knowledge centres have been a really key pathway for us to kind of um we didn't have to do anything. The farmers just go and they have these conversations about what works and what doesn't work, and so that is how the these extra sort of 50 odd farmers have gotten involved in putting in these floral interventions.

We more questions in the chat box.

Do you want to kind of go through them?

Yeah, sure, so the second one is; **do you think there is a role for classical biological control or biology holders or should we concentrate on conservation bio control?**

That's a really insightful question and again I think there is a role for both and I think it depends on two things. one, it depends on the context and in some contexts that conservation bio control might be the farmers might be more receptive to that, but also I think it's a question of making sure that the scientific evidence and what we know works reaches them in an accessible format. Now like I don't know any of my small holder farmers who would have read any of the scientific papers that we publish on a regular basis about these aspects and so making sure that they have access to the most up to date information on what is most effective in their context I think would be key to determining whether classical biological control or conservation biological control is best suited for a particular context.

Thank you. We have another one: **How did you manage to recruit farmers and did you get them to help with gathering the data or did you have scientists doing that?**

So, we had an excellent partner organization, the M.S. Swaminathan Research Foundation (MSSRF) operates in India across multiple states and they've been working in the agricultural space more in terms of sort of gender development and development of farmers and they are a trusted source of information and expertise for the farmers. So by partnering with them, it was it was having an honest broker between us and the farmers. So the farmers were right you're partnering with MSSRF so we trust that the evidence that you are giving us



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is accurate, but we then also employed scientists so entomologists basically so entomologists who had studied at the Tamil Nadu agricultural university where the people who actually went and collected the data in the field identified the insects for us and sent the data across. Well the original plan was we were going to go out and work alongside them in the field but this was all done in the midst of COVID. So we got the funding and then COVID hit and so we had to sort of work out this relationship between the farmers, our partner organizations and ourselves.

So in terms of field protocols designing of data sheets um kind of having the project plan in place that was us the actual implementation was done by the MSSRF scientists and in alongside the farmers helping them.

Thank you, we have a question. They ask **if mosquitoes are pollinators or are use useful to an ecosystem in any way.**

You know, I don't know. I haven't come across any literature that that talk about mosquitoes as pollinators. So, I don't think so...? I know that there's always this debate about what use are wasps and wasps are brilliant pollinators. So, yay for wasps. Um, I I'm not a fan of mosquitoes and I hope they're not pollinators in any way, shape or form because they I find them really annoying!

And the next one: **If we spray less then automatically natural enemies increase in numbers then can they fully suppress the pest or we still need agrochemicals to keep the pest populations below it?**

I think we need more studies and more evidence before we can concretely say that, because as the evidence I showed you, we looked at one pest, right? And we had the results to say spray less.

There's natural enemies that can control that pest. But I do take into consideration that natural enemy pest interactions are complex. Crops have more than one pest, so I think we definitely need more evidence. I think spraying less absolutely, but not spraying at all particularly in a small holder context might not be financially viable.

So, we need to take that into consideration in in terms of again, you know, it might be that you stop spraying and you've lost your yield for that season over time. You know, where I showed that sort of 3 to 5 year dip in profits before you see the returns on investment. So, it long-term strategies. Yes, reducing to no agrochemical input is a long-term strategy. Whether it's financially viable in the short term for small holders is still an open question.

We have a question from Richard. He wants to know **if there are any particular next steps planned, for example that other countries are not already aware of the potential of this approach.**



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I think a lot of countries are, so I think co-cropping is a traditional method of cropping that somehow has been forgotten in this push towards agricultural intensification. So quite often when you speak to these farmers they're like oh but that's what my grandfather used to do.

So it's actually not that much of a stretch for them to start putting in co-flowering crops. Um and I know that there's been quite a lot of work in this regard in sort of Latin American countries and also some of the African states as well, but I think for us personally, next steps what we're trying to do is influence policy. So if the farmers could be incentivized to put floral interventions in place would go a long way.

So we just had a workshop with farmers but also um non-government organizations that can kind of feed into policy and said okay what are the biggest incentives and barriers and the farmers go give us free seeds or saplings to start us off in demonstration farms or farmer field schools so we know which co-crops go with what focal crops, so there are ways and so there is particularly in India there is a new national coalition for natural farming, and so far their focus has been on soil and water and carbon, but we're trying to kind of push the biodiversity, beneficial insects, agrobiodiversity angle with them so we can put together some policy briefs and try and influence state, regional, and national policy.

The next question is: **is there an opportunity for farmers to share their experiences peer-to-peer?**

I think that was the first one I answered and yes, village knowledge centres. Yes, absolutely, and the other one what sort of co-flowering crops are best for enhancing natural enemies?

Good question. Again, I would go back to kind of that co-design element with the farmers because whatever we had a long list of crops um that would work, but it needs to work in that context. So, marold we surprisingly what we found was it wasn't so much attracting natural enemies, but marold does give off some pheromones to repel pests. So, it attracts pollinators and repels pests. So it was kind of a dual function there.

But in the rice buns for instance, the reason we use cow pee and black gram are because they are low flowering crops and a protein source as well because the one thing the farmers were really worried about in the rice buns was they didn't want any tall crops because they would invite snakes coming in. So, I think you can work out the sort of insect-plant interactions and work out which ones will attract the ladybirds, the spiders, the beetles, but at the same time it needs to work in that particular farm or landscape context.

The next one is **do you find that farmers don't want to share successful interventions because they want to give themselves the edge over the other farmers the competitors?**

Actually no, I think the small holder farmers that I worked with, they were they're amongst the most generous people I have ever come across both in terms of their practice but just

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their everyday lives I because they're small holder farmers, there is this sense of 'we're all in this together'. So, so if something works really well for my farm, but my neighbour is not benefiting from it, then you know the pests from the neighbour's farm could quite easily invade your farm.

So, I don't know if it's if it's completely altruistic, but they are very happy to share best practice. they they're quite vocal about what doesn't work as well, but they are really happy to share something that they're like, "Oh, I tried this and look, this is the benefit I got out of it and I'll run around and tell my entire village about it." So, I think it's there there's a generosity of spirit there that I've really loved kind of observing.

Okay, the final question **wants to know if you have done any semiochemicals for pollinators.**

I haven't. I'm not really, I don't work on the chemical side at all. I work with biopollinators and I kind of look at climate and land use change impact. So this is an area that I have zero expertise in.

There was a graph where you compared the high input with low input fields with intervention. So what could be the reason of uh low ill in high input field with intervention?

That's a that's a good question actually. I think I mean we haven't delved too much into it but basically you do take a little bit of land which could have had rice to put these interventions in. So there is a little bit of that element of you know it's the same with wildflower strips in the UK and on the side of arable fields. So you are taking a small piece of land out of production. So your yield per hectare or yield per acre just reduces by a small amount, and while it is a reduction, it wasn't a significant difference, a statistically significant difference.

Thanks great presentation. Thank you.

I wondered plants with flowers also have leaves. So there must be other insects which are not necessarily beneficial which also require flowers for pollination and will be promoted in the same way as your beneficials.

Some of those might be disadvantageous. So I mean it's a double-edged sword. It can be double-edged sword in many ways, the same things you're achieving for beneficials, you'll be achieving for herbivorous insects also.

I completely agree with you. I think we did not focus on the non-beneficials and that might be a sort of knowledge gap in the study, if we ever got to do this again definitely. So, one of the things that we focused very much on the focal crop whether it was moringa or mango or rice and we didn't actually quantify all of the insects that we found in the interventions.



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And so what you say is very true that the interventions might have attracted beneficials but might have also attracted pests or non-beneficials and that would be the next step in sort of quantifying not just what visits the focal crop but also what visits the interventions as well.

Thank you. We have one more question before we wrap up: **are British farmers considering this approach?**

The co-flowering crops, not to my knowledge because I think I think because we have these agri-environmental schemes that already incentivize farmers to put floral interventions not so much.

However, I think agroforestry for instance is gaining traction; there's a there's a lot more agroforestry type farms now than there were 10 years ago. And that is a form of mixed cropping, isn't it? It's a form of sort of fruit and cereals, so I think that sort of mixed farming approach is coming into existence, but it's probably done for reasons other than beneficial insects. I think it's more looked at from a sort of soil carbon sequestration perspective than beneficial insects perspective, but yes I mean that sort of mixed cropping is gaining traction particularly in the sort of agroforestry space.

So that's all we had time for today - So professor Deepa thank you once again for such an inspiring talk and for taking time to answer our questions today and thank you to everyone who joined us this afternoon.

We hope you enjoyed today's insect hour. Have a wonderful afternoon. Thank you. Thanks everyone and thanks for your very kind comments as well. Thank you.