

Dr Melaku Worede is an Ethiopian plant geneticist who has been a pioneer in shifting perceptions and attitudes globally towards recognising the vital importance of on-farm diversity as a strategy to increase and conserve biodiversity. He has always been one of that rare breed: a scientist who puts the farmer first. He is admired by friend and foe alike for his integrity, his deep knowledge, his vision and his humility.



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“As is already happening in my country, farmers and national gene banks in developing countries can work together to preserve and expand crop genetic diversity on behalf of all humanity.” You said this around the time you won the Right Livelihood Award, and this type of collaboration is something you managed to put into practice in Ethiopia, defying the status quo at the time. Where do you think this kind of collaboration is today and where is it going?

I set up the Ethiopian Seeds of Survival (SOS) programme with the support of USC Canada, and it still continues in a few countries. Importantly, it is not a stand-alone programme, but incorporates many issues, including agro-biodiversity. In Ethiopia, the Ethio Organic Seed Action (EOSA) has incorporated the SOS programme, and has also developed community seed banks. The SOS Ethiopia work on farmers’ varieties also involved collaboration with the plant breeding programme at the Debre Zeit Research Station. The SOS work continues, in other places too – such as Mali, south-east Asia – but it is happening at a very slow pace.

It’s a pity that gene banks almost always ignore this approach of working with farmers. They fail to link *ex situ* with *in situ* conservation. Particularly in areas with great diversity, there are few initiatives where this collaboration is happening.

From a global perspective, the single focus of gene banks seems to be on collecting and preserving

whatever samples they can find, and they call that conservation. We, on the other hand, believe in conservation through use, in keeping diversity alive as you use it, without compromising the diversity already built up over centuries by farmers. But this approach is taken in far too few cases.

Why is this? It seems so obvious that this type of conservation should be a complementary approach?

There are two major reasons. In the first place, you at GRAIN, Pat Mooney at ETC, myself and others discussed this issue at international forums many years ago. But already strong arguments were being made against working with farmers. Many scientists were arguing that “land races”, as they called them, had no place in breeding, no more potential than already “improved” varieties. They argued that *in situ* conservation was of no use for cultivated species, but only for wild relatives of the cultivated species.

Since then, we have done the work in the field in Ethiopia, and this has helped to push our view forward. We could show that it was possible to work with farmers and to keep that diversity alive in collaboration with them. We also showed that we could do this by using farmers’ criteria. It was clear from our work that *in situ* conservation is best undertaken in collaboration with farmers, as this ensures there is almost no loss of diversity.

The second argument that continued to constrain this approach of working with farmers was the issue of yield. We were told that if you want to



feed people you have to follow a model that can increase yields. It was argued that you only could take good characteristics from farmers' varieties and incorporate them into improved varieties. But of course that meant high-input farming.

In our experience yield was not the most important criterion for farmers; they had a wide range of requirements, such as diversity in seasons, topography, and so on. For them the first criterion was sustainability. But it was important to prove that we could raise productivity without compromising diversity. And this is what we did through the work we did on farmers' varieties.

What we did as scientists was to ask the farmers to select. Farmers know what they want and they always select for diversity. Then as a scientist you look for varieties that are promising in yield, but you maintain diversity within that population. In this way you complement what the farmers have already selected. You are pushing a little bit, but the qualities are already there in the varieties. Yield is complex, and determined by a number of factors, so you can combine yield with the farmers' criteria. This approach enhances diversity in the field, rather than reducing it.

We need diversity for food security because uniformity is not secure. Imagine if you reduced all seed to one type – we will lose everything. One of the most important strategies that farmers have developed over centuries is to spread the risk between three factors: season, location, and diversity. So their varieties will have enough plasticity to allow them to grow in diverse conditions. Diversity within the population is as important as between different crops.

Recently we have seen an intensifying, systematic approach of putting seeds away in gene banks, with the seed vault in Svalbard, Norway being a high profile example. What do you think is driving this and how do you view this trend?

If the intention is to build Noah's Ark, to capture everything and thus save the the world, it will not work. What will work is on-farm conservation and conservation through use, working with farmers. A gene bank that is described as doing conservation, but which does not incorporate collaboration with farmers, is only doing preservation, not conservation.

Conservation is about keeping diversity in a dynamic state. Gene banks like the SADC gene bank, the Svalbard gene bank, and many others, focus only on collecting and preserving. How can you think you are conserving diversity when the

very source upon which the seeds depend is not included? You can capture only so much, and in 100 years it will be useless because the planet will have changed. Perhaps you will be able to incorporate some genetic material into varieties and release them, but who is going to benefit from that? That is the big question.

Big companies can benefit, because they have all kinds of novel techniques to extract specific genes, incorporate genes. Farmers want what they can sustain in the future. If we focus only on gene banks, we will all be at risk. It is like clapping with one hand.

The priority is to start with diversity in the field. Farmers have been the custodians of biodiversity, and they need support. It is high time there was much more funding for this work. We lose everything if we lose diversity in the field.

With gene banks, if there is no connection with the farms, which are keeping everything alive, there is no point, it makes no sense to me. I am not saying that they should not happen at all, but they are out of place if they do not include farmers from the word go.

In the 1980's, farmers' rights were put on to the international agenda at the FAO under your leadership, as a strategy to counter intellectual property rights (IPRs) and support on-farm seed saving. Now, 20 years later, the FAO Treaty has incorporated Farmers' Rights, but also accepts IPRs. How did we end up in this situation?

We are always in the woods – lots of committees but no action. The important thing about farmers' rights is to ask ourselves what we are referring to. Unless it translates into action that works on the land there is no point to it. I have not seen many examples of initiatives where farmers are encouraged and supported to organise themselves, to be independent of external sources of seeds as well as having their own production materials.

At the same time, the giant companies are pushing communities and even governments to follow their model. They present to them the miracle of yield, a lot of food production. It is most important to be empowering communities so that they can use their knowledge, and this can be done in synergy with science to allow better progress. These are the issues we have to focus on.

Huge amounts of money are now being devoted to the development of African agriculture, including seed systems, with the Bill and Melinda Gates Foundation pumping money into a new Green

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“Mixing diversity”

“In Zambia, I came across farmers in one place where they complained about a health problem. I asked them what they had grown in the past. And they said sorghum, of course. So, I said that this could be the reason for their health problem, as sorghum is high in iron compared to maize. They said, yes, we know we have to go back to our sorghum. We still grow it, as we do not want to lose it, but on a smaller scale.

So, where a crop has been officially displaced – you may still find something.

Then in Malawi, we saw something very interesting. Farmers were already dependent on hybrids, but they were unable to afford new seeds each year. They grew second-generation seeds because they had no choice. They were also mixing the hybrids with local seeds. There will always be some knowledge that will come up that is good. Scientists call this process introgression – the farmers’ variety and the hybrid seed intercrossing. The farmers select what they want and what will grow well in their area, and some of the good genes are incorporated into the local variety. Their selection was biased in favour of the local type, but gradually they came up with a new population. Farmers always find a way to combine new with old, this is nothing new – they mix and select what suits them.”

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Revolution for Africa. Do you think they will succeed in their objectives? What is the likely impact of this programme?

Frankly, this is not what we need. How participatory is this going to be if it is a regional programme? Even for national programmes this is a problem, as many of us who have been following the conventional breeding system have seen. At best a conventional national programme can look for indigenous material, and come up with varieties that will then still demand a lot of input from farmers to be able to grow them. But an initiative of such geographical scope will not be farmer-led, and the basis of the knowledge lies with the farmers. Those behind these programmes are behaving as the CGIAR used to, believing they know everything and just incorporating some genes from farmers’ varieties.

GRAIN recently published a critique of Nerica rice [see Briefing]. It would be good to hear your take on Nerica, as it is seen by many as a participatory breeding process that will benefit African farmers.

Nerica is interesting, very tempting, and has some merit. The problem that I see is whether it is going to be a stand-alone variety? If we end up using only that, we are in big trouble. It has a place, but not to replace others. It is again a question of keeping things in balance, not relying on one variety only.

From what I can see, even though Nerica has a gene complex that has more adaptive potential than other modern varieties, we are not sure about its plasticity, its ability to grow in different environments. You should select more towards the local type while retaining the characteristics that

allow for adaptive potential in populations and species. Then you can come up with a superior type, on plasticity, yield, and so on.

If we all hang on to one string, the string will break. There are now lots of new stresses, including changes in climate, and even indigenous seeds will have trouble adapting to these changes. In the past the pace of co-evolution was ok. But now changes are happening so fast that it is not so easy to adapt. If you grow only Nerica, you will lose the farmers’ varieties and also the wild relatives of the cultivated ones. You will destroy continuity, sources of genes, and the capacity to have something in reserve.

The second question about Nerica is how much dependency there is on suppliers. Are farmers saving their own seed? From what I understand, farmers are all lining up to get the seed, which is in high demand. But farmers should be able to save their own seed.

People got very excited about Nerica, because it is a bridge between modern and indigenous varieties, as it combines both. But we cannot get carried away with the notion that we have now struck a balance between improved and indigenous varieties. If we use Nerica to undermine other local rice varieties, it is just as bad as replacing the farmers’ varieties with other improved varieties.

We see a lot of change, and it is happening fast. The question remains: can Nerica withstand that kind of change? It may become vulnerable within five or ten years. Relying on this one variety, no matter how meritorious, is risky. You hang from one string, which you are not sure of. The best





policy is to diversify your source of seed and not to become dependent on one variety.

You have already touched on our next question: one of the big challenges facing farmers in Africa now is the climate crisis. Can you already see the impact and do you think farmers and farmers' seed will be able to adapt in time?

I have my worries here, because these things are relative. Farmers' varieties are relatively much more sustainable, better adapted, and have more plasticity to be grown in different locations. If drought strikes here, you grow it over there. But now the changes may be beyond the capability of farmers to predict and adapt.

I see a crisis, and we have to be proactive because we know that sooner or later the farmers' varieties will not be able to evolve at the same pace as external change. The crisis is combined with food insecurity – population growth, land fragmentation, and many other global crises. Production is being jeopardised to a great extent. Nobody has actually measured what is happening on the farms in developing countries. The trend is very scary. In the case of climate change, the farmers' varieties on their own need to be reinforced to meet these challenges, and we have to start now.

We also have to look to the various wild plant species growing in the surroundings and within the field, as they are hardier than those that are cultivated. We must not lose this source of genes, but create systems to keep them alive. These are the crops of the future and we may want to speed up that work. We must develop programmes to enhance farmers' varieties, to make the promotion and conservation of diversity a priority, and to catch up while we still can. If we do it later in a reactive way, it will be too late.

How do you see the role of seed exchange networks? For example, farmers surviving in dry areas – do they have a role to play in exchanging seeds with other farmers?

This is something we must all promote. Farmers' varieties go beyond boundaries; farmers were connected in the first place and they exchange anyway, but we can support them.

This flow of genes and seed material has been jeopardised quite badly, especially in southern Africa, where there is very little surviving diversity and a crisis is looming. A lot of seed is gone. But it is not hopeless; it can be restored from other regions. You can reintroduce through exchange, in a mutually supported and beneficial way.

It is very important to have a farmers' seed-exchange network, supported by advocacy, because we need policies to support it. Community seed banks can address many problems as long as they are connected to each other, so that they can knowingly cross-fertilise each other in terms of seeds and knowledge and protect each other against activities that that will harm them. This can work as long as they are not just storage places, but make up a complex system, with farmers in control.

We need a flow of materials that farmers know about. Without their knowledge, we can forget about it.

Can you explain a bit more how this would work?


If you look at a variety you can trace it back to various locations where farmers are growing it. It follows a continuum. For example, in Ejere you can have a farmers' variety of wheat. You start from that and follow the line where this variety is grown till where it stops. You may end up in Wollo. Here you may see small changes in the types that dominate, but essentially it is the same variety. There are all kinds of scientific explanations, but the important thing is that you can follow a line of farmers who have these varieties.

It is about pinpointing the plasticity, showing how far the farmers' variety can be found from its place of origin. Take sorghum, for example: some types grow only in one place, others can grow in different locations, but not in exactly the same way.

My worry is that if you go to the SADC region, these contours are broken everywhere, because the big farms have taken over and there is discontinuity. But you may find fragments, and you can reintroduce varieties from elsewhere. A baseline study is very important to find out what farmers were growing and to use that as a basis to promote this approach.

Government institutions cannot do this on their own; global funding is needed to help this process along. But it is important to take regional measures; we should encourage governments to add that to their agenda. NGOs and others should also play a role catalysing such a process.

Where diversity exists, make sure you promote it and not lose it.

Where diversity is eroded, make sure you reintroduce it and enhance it. 

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