Policy frameworks for increasing soil fertility in Africa: A very partial overview of the debate

Ian Scoones, September 18 2008

We have had some fantastic - and varied – contributions to the debate. Many thanks to everyone who contributed. This note aims to draw out some themes and emerging conclusions. It is not comprehensive, and I urge everyone to read through the contributions, as there are many rich examples and interesting ideas about ways forward.

So, what are some of the guiding principles that emerge? And what do these suggest for the design of policy and implementation? Here I identify six themes.

1. Context matters

There was a more-or-less universal plea to take contexts – social, economic and ecological – into account. Simple, blanket solutions do not work. They have been tried before and failed; and we should avoid making the same mistakes, no matter how urgent the situation is or who much money there is to be disbursed.

The argument against continent-wide (or even national) blueprint programmes has of course been long made. That is not new. But there were some interesting nuances to this, and some helpful specificity. Which contexts matter and what implications does this have for what should be done on the ground? This relates to the question posed, and examined by many contributors, about the merits of using inorganic fertilizers as the 'entry point' to an integrated soil fertility management approach (e.g. Vanlauwe). There were, as expected, contrasting views on this. But there may be more consensus if we get specific about context.

Figure 1 offers a very simple, rather crude matrix of contexts identified across the contributions. One axis focuses on agro-ecological contexts (from low to high responsive soils and available soil moisture). The other axis focuses on socio-economic contexts (from conditions where returns to inputs are high to those where they are low), emphasising, following Dorward, context-specific input profitability and affordability.

Figure 1: Contexts for soil fertility management

	Low responsive soils (low organic matter, low rainfall)	**High responsive soils**
Poor returns to inputs (profitability and affordability low)	*Low external input options make more sense – external support required*	*Efficient application (e.g. micro-dosing) critical – market assisted*
High returns	*Mixed strategy appropriate*	*Application of inorganics make sense – market based*

In situations where soils are highly responsive (to external inputs, such as inorganic fertilizers, and so have above-threshold levels of organic matter – see the diagram in Annex 1 of Vanlauwe's contribution), and where returns to inputs are significant (and are perhaps the major factor constraining production – i.e. land tenure, market and other production constraints are not so important), then programmes focused on inorganic fertiliser use appear to make a lot of sense.

This does not mean that these should be high-level, blanket recommendations – all sorts of efficiency measures (such as micro-dosing, see Twomlow, Giller) make sense. It equally doesn't mean that investing in the building up of organic material (through cover crops, green manuring, low/no-till etc., see Bunch, MacMillan and Kassam and others) is irrelevant. Far from it: the responsiveness of soils, and therefore the returns to inorganic fertiliser, is highly dependent on this being sustained.

But what about in situations where soils are less responsive (due to low organic matter, poor rainfall, or a combination of both), or where returns to inputs are low (due to high prices of the inputs, low prices of farm products and poor market and transport linkages)? Here the situation is conclusion is less obvious. Sanchez offers the case of a village in southern Malawi where a package of technologies, services and policies was applied with positive results, while Samuel Gebreselassie offers the case of national programme in Ethiopia where a massive push towards increasing fertiliser use has had rather more mixed results.

As a number of contributors observed (e.g. Mortimore – on drylands; Marenya – on poor market access), other contexts (outside the bottom-right hand box of Figure 1) are by far the most numerous in Africa, and are where most poor people live. Unfortunately most programmes, at least implicitly, seem to focus on the bottom right corner, as contexts are not considered as explicitly as they need to be.

2. Scale matters too

A consideration of context must occur at different scales. Figure 1 could be applied at regional, national, district, village, farm or field levels. The two axes can vary over very short distances, as both agroecologies and market conditions change.

Indeed, as Brouwer, Giller and Vanlauwe argue, the responsiveness of soils (and so the appropriateness of different fertility inputs) can vary dramatically within a farm and field, and farmers' own soil fertility management strategies are often geared to this micro-scale. As Twomlow shows, micro-dosing with inorganic fertilisers, complemented by organic fertiliser applications, can allow very fine-tuned approaches at these micro scales.

Thus larger-scale programmes must be able to respond to scale variations and be flexible in their design and approach. They equally need to be supported by both participatory, bottom-up design principles, as Stoop and Mortimore, among others, argue, but also by effective soil diagnostic, testing and mapping approaches, as Shepherd notes.

3. Socio-economic differentiation is important

Different soil fertility management strategies make sense to different farmers, depending on their own socio-economic context. In other words, in relation to Figure 1, the vertical axis varies across households (and even within households, say between men and women) depending on patterns of socio-economic differentiation.

This is clearly important for targeting and the design of programmes, as several contributions highlighted. Marenya, for example, differentiates between households with different levels of market access. Designing input support schemes will require a detailed understanding of such socio-economic variation, as Marenya argues. In some areas and for some households simple market mechanisms, perhaps supporting the growth of agro-dealer networks, may work well. In other areas, focused 'smart subsidies' may allow a positive spiral to develop, where more farm output leads to more investment in soil fertility inputs. In other areas for other households a more broad-based support will be needed, focused on providing a social safety net. Dorward, for example, looks at the contrasting experience of Kenya and Malawi which have followed very different policy pathways: the former focused on market-based approaches, the latter state intervention and coordination.

Past experience, and much current practice, avoids such differentiation, opting instead for a bureaucratically easier and more politically-saleable blanket approach. As a number of contributors said, this is dangerous, generating distortions, disincentives and inefficiencies.

4. Don't forget longer-term dynamic trends

As discussed, contexts matter, but they are not fixed. They vary across space and across socio-economic group. They also change over time. A number of longer-term dynamic trends are mentioned across the contributions, each of which can dramatically affect the configuration of the axes in Figure 1.

Climate change, and with this changing rainfall and temperature patterns, was mentioned frequently. A drying climate, with more variable rainfall and hotter temperatures (as predicted for significant areas of Africa) may make the application of inorganic fertilisers less like a good bet, as the contexts shift (to the left in Figure 1). In some areas, of course, the opposite may happen. This deep uncertainty about the long-term dynamics of climate must affect planning for soil fertility programmes. Adaptation measures which improve resilience will have to be part of these – and this, as Barron, Yost and Jonsson point out – means thinking about water, sanitation systems and soils at the same time. Basic soil and water conservation measures can go a long way, as can low/no till approaches, mulching and cover crops (see Bunch). Integrating cropping with livestock production, as Richards and Tarawali point out, has many spin-off benefits for soil fertility management.

Another trend – and in the last period a dramatic shift – is the price of inorganic fertiliser. This was mentioned by many contributors as a key factor in shifting the profitability and affordability – and the relative balance of different options (cf. Dorward, Morris). With inorganic fertiliser prices (of N and P) having increased by many fold, this clearly has shifted contexts too (to the top of Figure 1). Many questions arise: Is this going to be a long-term trend or a blip? What will drive long-term change? How will fertiliser manufacturing and packaging investment in Africa make a difference? There were no answers to these in the contributions, not surprisingly. But, as Smaling suggests, such questions need addressing in any future designs of policy and programmes, with measures to protect against future shocks and long term trends. Past interventions have often been disastrous, undermining the capacity of the African agricultural sector to respond. As Smaling notes: “The abolition of fertiliser subsidies and the virtual ban on parastatals in the 1980s/1990s was a big mistake”. As with the technical responses on the ground, diversity and flexibility in design are the key words, if long-term resilience and sustainable development pathways are the aim.

A number of contributors pointed to the wider frame: the future viability of small-scale farming in Africa as an occupation, along with the longer-term directions for rural economies (see Stoop, Place, Tripp, Marenya, Smaling, MacMillan and Kassam). Some argued that a narrow focus on soils may miss the point, if people are moving out of farming. Part-time farmers, straddling different livelihoods, may see the economics of soil fertility management in a very different way to their full-time counterparts. Designing programmes on the assumption of full-time farming is increasingly problematic, and serious attention needs to be paid to the soil fertility management needs of ‘future farmers’; potentially with quite different scenarios playing out in different places for different people.

5. Cultural dimensions of soil fertility management need to be central

Several contributors highlighted the dangers of a ‘technical fix’ mode to solving soil fertility problems, asking how do farmers frame the problem themselves? Kolawole, drawing on experience from Nigeria, and Taylor, drawing on southern African cases, show how farmers often don’t see things the way some soil scientists do. Their understandings of soils are more holistic, centred on a perspective that looks at the wider ‘health’ of the soil-plant system. The solution is not necessarily to apply some ‘medicine’ (or fertiliser), but to deal with the problem systemically. Indeed, in some contexts, as Kolawole shows, inorganic fertilisers are viewed with suspicion, being seen as foreign contaminants of soils. This holistic perspective is more akin to the agro-ecological approaches advocated by Bunch, Rupela, MacMillan and Kassam, and Kassam, Shaxson and Friedrich, where a more integrative view of soil systems is required.

As several contributors argue, a shift in perspective on the part of science and policy may be needed if the slogans of ‘soil health’ for Africa are to have purchase. The indigenous, cultural understandings of soils and their management need to be taken on board, and seen as central to the design of programmes and policies (Mortimore, Stoop and others).

6. Rethink policy and implementation approaches

A number of themes recurred repeatedly, some of which have already been mentioned. These include:

- Be clear what the policy question and objective is (Shaxson, Simmons)

- Avoid blueprints, big plans and programmes (Bonte Friedheim, Twomlow); perhaps focus on regional initiatives (Smaling).

- Encourage diversity and flexibility and multiple solutions to complex problems (Stoop)

- Start with farmers' own needs and understandings (Kolawole, Taylor)

- Work in a bottom-up, collaborative and participatory way (Smith, Stoop, Kassam et al)

- Use the best scientific information, presented in user-friendly ways (Shepherd, Giller, Place)

- A focus on precision (intra-field variation), efficiency (e.g. micro-dosing) and complementary approaches (soils-water, organics-inorganics) are important (Brouwer, Giller, Richards, Smaling, Twomlow)

- Embed an experimental and learning approach in support institutions (Smith, Twomlow)

- Long-term support to research-extension systems is needed (Stoop, Bonte Friedheim)

- Understanding that complex forces (led by human activity) historically cause dramatic environmental change and that solutions cannot rely on individual interventions (Lui)

Across these themes, Mortimore identifies in particular the challenge of integrating knowledge in management. Three types of knowledge interact, he argues:

- "Science-based knowledge, drawing on soil science and related natural science disciplines, which has enjoyed dominance since the beginning of the colonial period and has therefore led policy makers to search for technology-driven solutions

- Policy-makers' and donors' perceptions, linked to that of field professionals, which has been marked by top-down and generalist tendencies that result from attitudes obtained from educational institutions, the influence of influential stakeholder groups, and donors' home constituencies

- Local peoples' knowledge, which consists not merely in picturesque representations of the properties and potentials of local soils, inherited from the past ('indigenous' knowledge) but also in experiential and adaptive knowledge from project successes or failures as found relevant to their livelihood circumstances" (Mortimore – debate contribution)

Along with others (e.g. Stoop, Kolawole), Mortimore identifies a massive gulf between local people's knowledge and other forms of knowledge. Yet it is only local understandings that really get to grips with the complexities and dynamics of complex systems, he argues. A variety of professional, institutional and other biases often prevents scientific analysis and policy-making from engaging with this. This remains a massive challenge, especially for the implementation of large programmes focused on soil fertility, and suggests a substantial capacity development focus for the future.

Fortunately, in the work of the NUANCE programme at Wageningen (Giller), the work by ICRISAT in southern Africa (Twomlow), the work of SoilFertNet and others attempts are being made to link scientific understandings to questions that relate to farmers' own concerns. There is clearly much more to be done and 'conventional' soil science and agronomy still dominates. And, even where such shifts have occurred in the scientific framing of questions, the resonance in policy debates remains very weak.

In policy, a large-scale, top-down model still dominates, it seems, despite the dutiful acknowledgement of farmer participation and knowledge. So how to go beyond the "diagnostic-prescriptive framework for designing intervention and promoting change" described by Mortimore? Or the "special initiatives" or "Africa-wide programmes" imposed from outside critiqued by Tripp and Bonte Friedheim. Drawing on work by Pender, Birner and others from IFPRI, Giller offers a clue. He argues we must go from an obsession with ideal designs, or even 'best bet' technologies or 'best practice' management, to a 'best fit' approach, that takes context – and so agro-ecological and socioeconomic contexts – as the starting point. Just a thought: maybe some version of Figure 1 might offer a heuristic to help in 'best fit' design of soil fertility interventions?