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TRANSFORMING LIVES AND LANDSCAPES

"Fertilizer Trees" and Malawi's New Food Security Initiative

A Policy Briefing on the Potential of "Fertilizer Trees"

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BACKGROUND

The first priority of the United Nation's Millennium Development Goals (MDG) is to eradicate extreme poverty and hunger by 2015. Malawi is one of Africa's chronic hunger hotspots. Over the past ten years, several agricultural reforms and food security initiatives have been undertaken by the government, including: liberalized market reform, food reserves during years of hunger, the targeted input programme (TIP), promotion of organic manure, small scale irrigation schemes, and currently, the Targeted Fertilizer Subsidy Programme (TFSP) is underway.

Despite efforts to combat food shortages and promote production, annual maize shortfalls over the past five years continue to range from 250,000 to 700,000 tonnes. According to the European Union's representative, Malawi has only had three "good harvests" over the past 15 years! (The Nation, 06 October 2004). The vital goal of food security becomes elusive, as farm size shrinks, soils become exhausted, and farmers' ability to purchase inputs decreases. As a result of difficult logistics and high escalating costs, most farmers utilize fertilizers at sub-optimal levels. N-fertilizer recommendations for optimum maize yields (hybrid) are 90 - 120 kg per hectare, with potential average maize yields calculated at 3 tonnes per hectare under favourable rainfall conditions.

Over the past five years, direct fertilizer 'handouts' were provided to farmers under the 'starter pack programme' (later known as Targeted Input Programme, TIP). Both programmes had significantly boosted crop yields and food security, and contributed about a quarter of the country's maize production in the first two years of its introduction. A comprehensive impact assessment showed that the starter pack also extended the availability of maize produced by farmers and had reduced the length of the hunger period from an average of 7.5 months to 5.5 months during the early years of its introduction. A recent field survey by ICRAF, also confirmed that 80 percent of smallholder farmers lack food during the months of November to February.

Often the logistics of making fertilizer available at the right time and place becomes a major challenge. A tonne of fertilizer costs US$90 in Europe, and US$120 by the time it reaches Mombassa in Tanzania or Beira in Mozambique, by the time it arrives in Lilongwe it costs US$770. This is due to the high logistic and transport costs.

Despite the TIP programme, most farmers who had access to fertilizers only applied at 20-30% of the recommended rate, which resulted in less than optimum yields. The latest impact assessment of the "starter pack" by Gough et al (2002), concluded that its distribution during the last five years had only increased maize yield minimally (less than 8%). Therefore, the technical feasibility of obtaining higher yields is only possible if farmers combine mineral fertilizers with organic sources, especially "fertilizer trees".

Relying entirely on mineral fertilizer negates any possibility of creating a sustainable technological solution that will improve the nation's soils and that is relevant to economic realities of the country. Alternative and sustainable technological options that are affordable to farmers are needed on a wide scale to improve food security and rural livelihoods.

RATIONALE FOR THIS POLICY BRIEF

It is indisputable that improvement in the availability of fertilizers - whether mineral or organic, at the right amount and time - remains the major pathway to sustainable food security and hunger reduction. We believe that for the short term, donors and the government must commit

to several years of investing in fertilizers as a food security net and not expect quick financial returns or a dramatic reduction in the use of chemical fertilizers by smallholder farmers.

Arguably, fertilizer intervention should continue to be seen as an acceptable - and even an inevitable option - for increasing food production in Malawi. However, this begs the question that, if fertilizer interventions alone were sufficient to ensure food security, then why do farmers continue to face intermittent food crises despite these costly interventions? In the long term, farmers need a way to break out of the cycle of dependence on food aid and fertilizer subsidies. One of the most feasible and profitable ways of building farmer's resilience against recurrent food crises, is the use of moderate levels of chemical fertilizer and "fertilizer trees" that can be produced directly by farmers.

The aim of this policy note is to inform the government about the potentials of using agroforestry science and practices to resolve these problems. Of particular note is a technology known as "fertilizer trees", that we believe can significantly reduce national fertilizer requirements by smallholder farmers, build long-term soil fertility capital, and enhance sustainable food production through intervention that emphasizes some synergy with Malawi's existing fertilizer subsidies programme.

AGROFORESTRY RESEARCH AND DEVELOPMENT IN MALAWI

Since 1987, the World Agroforestry Centre (also known as International Centre for Research in Agroforestry, ICRAF), and partners in Malawi have developed and disseminated several Agroforestry options for soil fertility replenishment based on the use of four related *fertilizer tree options*, based on four related improved tree fallow systems. These include:

1. Sequential fallow rotation of Nitrogen-fixing trees with maize, planting *Sesbania sesban* (jere jere), *Tephrosia vogelii*, and other leguminous shrubs such as pigeon pea;
2. *Gliricidia sepium*/maize intercropping managed as coppiced fallows;
3. Annual relay fallow intercropping of shrubs with maize, using Sesbania, Tephrosia and pigeon peas, and;
4. Biomass Transfer using Gliricidia or Tithonia leaves for vegetable crop production in the wetlands (dambos), and maize production in uplands.

Through long-term research, ICRAF has selected superior species of these shrubs that are capable of producing large quantities of nitrogen-rich biomass on farmer's fields.

Picture showing an improved fallow with Tephrosia candida.

DESCRIPTIONS OF IMPROVED FALLOW SYSTEMS

I: Sequential Fallow Rotation

This type of fertilizer tree system is a practice whereby a parcel of land is planted and devoted to fallows of nitrogen-fixing trees such as *Sesbania sesban, Tephrosia vogelii* and schrubs for one or two growing seasons. Crops can be grown with the trees during the tree establishment year, but no crop is planted in the second year. In the third season, the trees are felled and all the leaves and litter are incorporated into the soil during land preparation/ridging and used as a fertilizer source.

A two-year improved fallow with Sesbania, is capable of producing 100–250 kg nitrogen per ha in the leaf biomass, which can result in the doubling or tripling of maize yields, even without use of inorganic fertilizers under smallholder farmer conditions where continuous maize cropping is practiced.

As shown in Table 1 below, maize grain yields of 3 to 5 tonnes per ha can be obtained after two-year fallows of Tephrosia and Sesbania, respectively, but such high yields rely heavily on good rainfall, use of improved maize varieties that respond well to nitrogen fertilizer, and good management. Unfertilised maize without trees produced only one tonne of grain. (Kwesiga et al, 1999)

***Table 1:** Maize grain yield for the two seasons following one-, and two-years of improved fallow system (Kwesiga et al, 1999).*

Shrub	Fallow length	Grain yield (tonne/ha)	
		Year 1	Year 2
Sesbania	1 yr. fallow	3.4	2.3
Sesbania	2 yr. fallow	5.4	3.3
Tephrosia	1 yr. fallow	3.8	2.0
Tephrosia	2 yr. fallow	3.2	2.3
Unfertilized maize, no tree		1.1	1.2
Fertilized maize (full doze)		4.0	3.6

Box 1: Farmer testimonies (Mrs. Banda)

Mrs. Banda from Kasungu in Central Malawi, has practiced improved fallow with Sesbania since she became a widow four years ago. After experiencing severe hunger, and having no money to buy chemical fertilizers she decided to establish Sesbania in her maize gardens using family labour.

She has been able to prove to her community members that "fertilizer trees" can increase maize yield the same way as chemical fertilizers. Mrs. Banda has expanded her "fertilizer tree" gardens each year with Sesbania and Tephrosia.

Last year, Mrs. Banda had such an impressive maize yield that many experts considered it to be one of the best maize crops seen in Malawi in many years. The UN Millennium Hunger Task Force that paid a courtesy call to the President of Malawi last year, visited her field and was amazed at the potency of fertilizer trees on the farmer's field. Mrs. Banda is now considered to be food secure and sells wood and poles from her Sesbania trees to her neighbours. Part of her wood harvest from trees is used for firewood and the remaining wood was sold to neighbours to cure tobacco (one large stem = 5 kwacha).

She recently explained that: "*I have enough maize, and I do not expect any hunger anymore in my family, and I will be able to take my children to school, as well as meet other household requirements*".

The effect of sequential fallow rotation on soil fertility usually lasts 2 to 3 cropping seasons, after which the trees need to be re-established using different tree species.

Maize growing with Gliricidia sepium

II: Gliricidia/maize Intercropping managed as Coppicing Fallow

In this system, nitrogen-fixing tree that can tolerate continuous coppicing, such as *Gliricidia sepium*, are planted in a regular pattern and grown with crops in the field - two rows of maize are sown between tree rows. The trees are planted at the spacing of 1m x 1.5m on the furrows. The Gliricidia leaves and twigs (prunings) are cut twice during each season and all the leaves, plus green tender twigs, are incorporated in the soil on the ridges where maize is planted.

This is a permanent fertilizer factory on farms, from regular coppicing or cutting of tree fallows. The Gliricidia/maize intercropping fits well under smallholder conditions in the densely populated areas in Malawi.

The major advantage with this technology is that once farmers plant the trees, they can be continuously managed to supply "green fertilizer" for a period exceeding 15 years without biomass decline.

Maize yield in Gliricidia only ($G_1N_0P_0$), Maize with neither Gliricidia nor fertilizer ($G_0N_0P_0$), Gliricidia + fertilizer ($G_1N_1P_1$), Full fertilizer only ($G_0N_1P_1$).

Photograph showing a permanent Gliricidia "fertilizer bank". The green maize stand (right) was grown with only "fertilizer trees" compared to the yellow maize, (plot without trees, left). None of these has received any chemical fertilizer in the last 10 years.

When properly managed, Gliricidia intercropping could double or even triple maize yields obtained in unfertilised fields, and compares well, if not better than applying 50kg of inorganic nitrogen fertilizer (half N recommendation). The fertilizer value of Gliricidia per hectare is equivalent to four bags of urea.

Result from ten-years of continuous cultivation shows that the use of Gliricidia alone without fertilizer yielded more than 5 tonnes of maize grain in favourable years, averaging 3.7 tonnes per hectare. Maize grain yield in plots with neither mineral fertilizer nor Gliricidia produced an average of one tonne or less throughout the ten-year period (Table 2).

This implies that even if Gliricidia serves as a substitute for 75% of all fertilizers, farmers can obtain about 4 tonnes of maize, or over 5 tonnes when Gliricidia substitutes 50% of the fertilizer requirement. Without fertilizer, yields of 3 tonnes per hectare can still be obtained with good field management and rainfall.

Table 2: *Annual maize grain production for 10-years using the fertilizer tree system in Makoka. (ICRAF, 2004)*

Farming Type	**Grain yield (tonnes)**		
	No Fertilizer	**25% doze**	**50% doze**
Maize only	1.16	2.72	3.36
Maize + Gliricidia	3.71	4.83	5.57

Box 2: Mr. Marko Majoni, Magomero village

Mr. Majoni and his wife Hilda are among the early adopters of "fertilizer trees" in Malawi. A retiree from the prison department, he resorted to farming. After spending most of his retirement benefits on purchasing chemical fertilizer in the mid-1990s, Mr. Majoni was introduced to agroforestry as one of the early testers in on-farm trials. Initially, his neighbours mocked him for his "crazy" idea of planting trees as source of fertilizer! Two seasons later, he realized that by using "fertilizer trees" (Gliricidia, Sesbania and Tephrosia), he no longer needed to purchase fertilizer. His garden with fertilizer trees gave him nearly the same crop yield as with full dose of mineral fertilizer.

According to Mr. Majoni, *"My maize cobs used to be very small and few. Since I planted these trees, my maize cob has been bigger each year. Now they are very big, and often there are two big cobs on same stem! I don't use any purchased fertilizer now, just the fertilizer trees, and my income has increased. Our gains are not just from the maize but also from sale of fuel wood and stakes and we used it to cook for months. People from neighbouring villages now come to visit my garden and ask for lessons".*

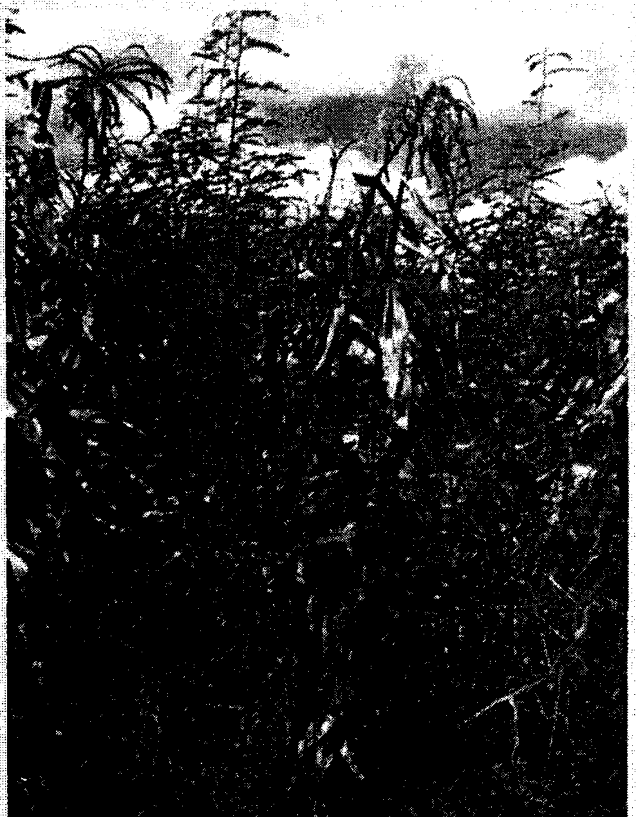
As success often brings criticism, Mr. Majoni and his wife were accused of practising witchcraft because their maize garden always look green and vigorous; they never experienced crop failures when other fields are suffered from drought or shortages of fertilizer. According to Mr. Majoni, his neighbours had initially threatened to take him and his wife to the village chief for withholding all the rains and directing them to their gardens only. This forced him to start explaining the real *secret* of his success to as many people as would listen - now with much joy of accomplishment and full ownership of his innovations.

In 2004, Mr. Majoni graduated from food insecurity and is moving to become a prosperous, income-secure farmer. He recently said, *"This season, I have harvested so much maize, I sent a truck load to my son in the town who is a policeman. I still have a lot of maize at home".* He has started to see farming as a business. Now Mr. Majoni has started to integrate various fruit tree crops into his homesteads, and plans to integrate more livestock as a means of diversifying.

III: Annual relay fallow intercropping

Annual relay intercropping is a practice whereby fast-growing shrubs are planted at the same time during the growing season of an annual crop (usually 2 weeks after maize emergence), and the trees continue to grow after the crop harvest through the off-season. The recommended trees are Sesbania, Tephrosia and pigeon peas.

The advantage of this system is that farmers do not need to wait for the fallow phase of two years in the case of sequential system, or initial period of tree establishment for coppicing fallows. It fits well to extremely small landholding sizes, and benefit of trees can be seen after only one season. However, the trees need to be replanted every year and yield increase may not be as dramatic as in the first two options described above.



Photograph shows a relay fallow with Sesbania sesban on farmer's field at maize maturity. Sesbania will continue to grow and provide groundcover after maize harvest.

IV: Biomass transfer

In this system, nitrogen fixing trees or shrubs are planted on a separate plot and the leaves are regularly cut and used to fertilize neighbouring field plots in a cut-and-carry way, especially in the dambos. It simply involves transferring of leaves and twigs of fertilizer trees from one part of the farm to another.

Some farmers harvest trees planted at the upland to fertilize vegetables cultivated in the dambos during the dry-season and use the coppices to fertilize their maize during the main season, thereby having two full crops in a year.

For the purpose of space, details of biomass transfer option will not be discussed in this policy note.

Cabbage grown using 8 t/ha of Gliricidia sepium

Cabbage grown without Gliricidia sepium.

SCALING UP THE USE OF FERTILIZER TREES

Since 1996 ICRAF and its partners have been disseminating agroforestry options, based on fertilizer trees, to tens of thousands of farmers in Malawi. Currently, more than 100,000 smallholder farmers are benefiting from these technologies in Malawi. In addition, more than 300,000 farmers are currently practicing the "fertilizer trees" technology in five SADC countries (Malawi, Mozambique, Tanzania, Zambia and Zimbabwe), and efforts to scale up in those other countries are being stepped up.

Many farmers and partners have variously described the trees as a "well of fertilizer", and "anti-hunger" trees. Many innovative farmers have not only become experimenters, but are articulate and effective agents of change in their communities.

Impact assessment in the countries have shown that farmers using these fertilizer trees are better off, and they can be food secure with little or no chemical fertilizer.

Box 3: Estimated economic benefits of "fertilizer trees"

Assuming that 100,000 ha of "fertilizer trees" are planted by half a million farmers, each cultivating 0.2 ha, the nitrogen fixation by "fertilizer trees" would equal 200 kg Nitrogen per ha annually. Total nitrogen fixed by "fertilizer trees" would equal 20,000 tonnes of biomass nitrogen fertilizer. This is equivalent to 29,000 tonnes of urea fertilizer (assuming 0.67 N-substitution value in fertilizer trees). At US$200 per tonne, the value of the nitrogen fertilizer fixed by trees would amount to some 626 million Malawi Kwacha (or US$5.8 million per year). This implies a huge potential reduction in the expenses of the government on the inorganic fertilizer.

It is suggested that if a US$ 2 million investment is annually committed to fertilizer trees, along side with inorganic fertilizer and other initiatives over five years, fertilizer use can be reduced by 75% during subsequent years (Figure 1).

Economic analysis showed a higher break-even point for farmers using Tephrosia and Sesbania as other fallow options. Farmers cultivating unfertilised maize operated at a loss, considering labour, seeds and other inputs invested.

The economic benefit of fertilizer trees actually is beyond monetary value of maize and the savings on chemical fertilizer. The sustainability of food supply and income are quite substantial.

ADDITIONAL BENEFITS

1. Soil fertility capital: The soil humus and nutrients are and physical properties improved.

2. Source of firewood and stakes: Wood from fertilizer trees serves as important sources of firewood, construction and staking materials. In Kasungu farmers sell Sesbania stakes for 3 to 5 Kwacha each, mainly for tobacco curing.

3. Quality fodder for livestock: As legumes, the leaves from certain fertilizer trees, e.g. Gliricidia, Sesbania and pigeon pea can supply protein-rich fodder for livestock.

4. Weed suppression: The tree fallows suppress the noxious parasitic witch weed (*Striga spp.*).

5. Sale of tree seeds: Many farmers sell tree seeds as additional source of income. When fertilizer trees are grown country wide, export of tree seeds constitutes an important source foreign exchange earning.

6. Bio-pesticide: Tephrosia is known by farmers to be a natural pesticide (bio-pesticide) to several field pests, including termites.

Box 4: Mr. Abeck Chinkota - Potani Village (Kutambala)

The landscape at Potani village, Kutambala area is very hilly and unusually rocky. Severe soil erosion problems greatly limit food production in the area as shown in the photograph below. Many farmers have been unable to harvest more than one tonne of maize, and if no measures are taken to control the soil conservation many households cannot produce enough maize, even with application of chemical fertilizers.

Together with the extension department, trainings were provided to farmer groups in the area. They combined both the soil conservation marker ridges across the slopes, and establishment of fertilizer trees, including Gliricidia, Tephrosia and Sesbania. A few years after these trainings and tree seeds were provided, several farmers have been benefiting from sustainable food production, increased yields without or with chemical fertilizers; and soil fertility capital have been considerably built on farms as environmental assets - so many members of the community are practising agroforestry.

Mr. Chinkota was among the first farmers to combine soil conservation and fertilizer trees technologies on his fields. In 1998 he started constructing the marker ridges, planting *Gliricidia sepium* and making compost manure. Ever since, he has extended the portion of his land under trees and continued to experiment with different trees and crops. He has reclaimed several gullies and the soil in his garden has changed from rocky-sandy-exhausted, to a dark,

A view of the Kutambala area.

moist-loose and fertile soil. Next season he wants to plant trees as well as make proper contour ridges in the garden of his mother-in-law.

Some fellow villagers found it difficult to believe Mr. Chinkota – and some even thought he must have been applying fertilizers to his fields at night! But he never gets tired of explaining what fertilizer trees and the soil conservation structures can do to worthless lands.

Even with the poor rains of last year, his fields were looking much better than those of farmers using chemical fertilizer around – clear proof that the trees are able to retain moisture in the soil. Mr. Chinkota says that with the "fertilizer trees" the community members have learnt to feed themselves, which according to him, is more important than any other kind of assistance anyone can offer them.

This of one of the situations where fertilizer trees and soil conservation practices have demonstrated positive synergies, and impacted on livelihoods on people living under such extremely difficult situations.

IMPLICATIONS AND RECOMMENDATIONS

The main challenge of scaling up agroforestry "fertilizer trees" in the current "Targeted Fertilizer Subsidy or TIP" programmes is the logistics of implementation, funding and political will to effectively mainstream the technology in the country's PRSP and its national extension system. The renewed interest has opened a new window of opportunities to proactively implement the "fertilizer trees" strategy.

The projected investment requirement for implementing the "fertilizer trees" strategy alongside with the planned fertilizer subsidy programme is illustrated in the figure 1 below:

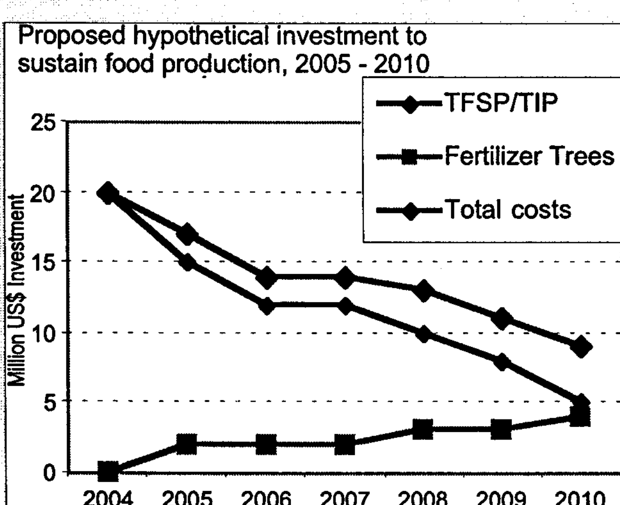


Figure 1: *Long-term financial investment to sustainable food security based on Targeted Fertilizer Subsidy Programme (TFSP) and "Fertilizer Trees".*

The following implementation strategies are suggested:

1. To help farmers escape from perpetual hunger, the government could carefully consider subsidizing inorganic fertilizers in the newly introduced Fertilizer Subsidy Programme for Malawi along with seeds of improved crop varieties, as well as "fertilizer tree" seeds, and investments in small-scale water management scheme (e.g. treadle pumps).

2. As a matter of urgency, a "policy seminar" needs to be organized at the top policy level. Its purpose would be to brief policy makers and stakeholders, especially, representatives from the Office of the President, Minister of Agriculture, Food Security and Irrigation Services, Minister of Poverty and Disaster, Minister of Environment, Minister of Forestry, Parliamentarians, Permanent Secretaries, Directors and top officials of the Ministry of Agriculture, and Department of Extension. Other target audiences could include key investors and donors e.g. representatives of EU, CIDA, World Bank, USAID, DFID, Rockefeller Foundation, as well as NGO executives and members of the private sector. At the seminar ICRAF and selected speakers could be invited to present the research and development achievements in the use of "fertilizer trees".

3. Mainstreaming agroforestry practice is urgently needed, especially the inclusion of "fertilizer trees" in national agricultural extension, and related awareness programs. This could be facilitated through the formation of a special "fertilizer trees" task force. Already there exists a National Agroforestry Steering Committee (NASCO). In addition, NASCO has a secretariat at the Chitedze Agricultural Research Station, which needs support and strengthening.

4. A quick follow-up national round table meeting could be called by the Permanent Secretary of Agriculture to develop a detailed national soil fertility management strategy for sustainable food security, based on inorganic fertilizer, organic manures, "fertilizer trees" (agroforestry), and improved crop varieties. This would include determining the impact areas, working out the logistic, defining roles and responsibilities of key stakeholders (e.g. policy makers, ICRAF, FRIM, Land Resources, MoAIFS, Extension, NGOs, IFDC, agrodealers, investors and other key players).

Through a consultative approach, funding requirement, logistics, and implementation strategies could be detailed in a business plan by a special task force. The members of the task force could come from the following organizations: Forest Research Institute of Malawi; Land Resources and Husbandry Department, MOAIFS, Extension Department, IFDC, ICRAF, NASFAM, Maize Commodity Task Force, Fertilizer Subsidy Task Force, National Agroforestry Steering Committee, and potential donors (DFID, CIDA, EU, WB, USAID, RF).

FORESEEABLE CONSTRAINTS

It also fits well under the small landholding system in southern Malawi. The logistics of using fertilizer trees on wide scale need to be worked out in more detail.

Tree Seeds: A major constraint for wider use of the "fertilizer tree" technology is the logistic of making seeds availability to farmers. Seeds such as Sesbania, Tephrosia and pigeon pea can be met within the short term and sourced from farmers. However, demand for Gliricidia seeds cannot be met in the short-term. This is because Gliricidia takes about 4 years before producing seeds. Since it is managed by cutting back the shoot, seed production is not feasible on cultivated plots. FRIM, ICRAF, and Land Resource Centre have some capacity for producing tree seeds, but at a cost. Logistics and costs need to be worked out by an appropriate task force.

HIV/AIDS pandemic on labour: Rural labour supply may be affected by shortages due to sickness, deaths and funeral activities. Success of the "fertilizer trees" technology depends on timeliness and proper field management.

Drought: Promotion of small irrigation schemes such as the use of treadle pumps, bore holes, and water harvesting would help reduce the negative impact of poor and erratic rainfall on temporary tree/nursery establishment by farmers.

Targeting: Not all leguminous trees will work the same way at all sites, so blanket recommendation must be discouraged. In respect to boundary conditions, Gliricidia does not perform well on seasonally waterlogged soils such as in or near dambo areas. Well-drained soils are recommended. For wetter areas or dambos, *Sesbania sesban* is recommended. ICRAF has mapped, using GIS tools, areas where each species can work and where it is not recommended.

Incentive for tree planting: To ensure that farmers establish trees, under the current fertilizer subsidy, tree seeds could be included in the fertilizer subsidy vouchers and be made a condition for qualification for subsidy the following year. Recent results from analysis of voucher systems and starter pack by Glough et al (2002) needs to be revisited.

Training: Farmers require training and extension materials for successful implementation. Training of trainers, farmers of the future, and farmer-to-farmer exchange, are among the approaches that could be adopted. There is demonstrated capacity by ICRAF and partners that these approaches can work.

Awareness: The success of a "fertilizer trees" initiative depends on the launching of a massive awareness campaign by the government.

Research backup: ICRAF has capacity and is willing to perform both facilitating and advisory roles by providing training and research backup on new opportunities and constraints arising from the initiative.

CONCLUDING REMARKS

Using purchased fertilizers alone can only be an interim option as quick fix answers can lead to perpetual and worsening soil fertility problems. Options that farmers can afford both in time and money are needed as a viable exit strategy.

The technical feasibility of "fertilizer trees" options has been demonstrated in this policy note. Fertilizer innovations developed by the World Agroforestry Centre, have potential to turn the country's food security problem around if adopted at a large enough scale.

Suffice it to say that, the fertilizer trees are not a panacea for solving the food security problem, but if strategically and proactively implemented, in combination with the new fertilizer subsidy and other existing initiatives (such as irrigation schemes, improved seeds, etc), it could make a difference between perpetual food aid dependency and sustainable food production in Malawi.

The "fertilizer trees" technological solutions need to be up-scaled to reach as many farmers as possible. We must ensure that this opportunity does not slip out of our fingers.

Finally, I suffice it to say that the cost of inaction could be prohibitive and even irreversible. The cost of solution is both calculable and affordable, and within reach. The currency most urgently needed is not just Kwacha or dollars, but strong commitment and consistent political will.

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