



Agriculture Sector Council Seminar

Voucher Schemes for Enhanced Fertilizer Use: Lessons Learned and Policy Implications

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Presentation Transcript

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Steffen:

Let's start by talking about Malawi, a poor, densely-populated country in Southern Africa for which maize is the food staple crop. In the 2004-2005 crop marketing production year, maize production met only about half of the country's need, determined to do something about it. The next year, it started an agricultural input subsidy program for which a farmer with a voucher could buy 100 kilograms of fertilizer and 3 to 5 kilograms of improved seed at 35 percent off the marketed price. Well what happened? Over the next few years yields quadrupled, transforming Malawi, briefly, into a maize exporter. Whereas Malawi used to follow donor advice to adhere to market principles and reduce or eliminate subsidies, this time the use of subsidies appeared to be a great success and it prompted other African countries to look carefully at the Malawi model and some tried to replicate it.

Ignore the experts. "End Famine," trumpeted the *New York Times* about four years ago. Well how does a voucher work? Using a voucher, certificate or coupon is one way of transferring the fertilizer subsidy to a target group, such as poor farming households. Generally, someone with a voucher takes it to a participating dealer or authorized outlet, buys a fertilizer at a subsidized price. The dealer or outlet turns in the voucher and gets reimbursed for the cost of the subsidy. So what's the attraction of subsidies and why are voucher systems popular?

There is broad agreement that in Africa, anyway, fertilizer is underused, yet critical for improving agriculture productivity. Proving the supply and demand of fertilizer and its productive use will increase broad-based gains in social welfare. Fertilizer subsidies and voucher programs, moreover, are viewed as visible, popular and politically beneficial. In some cases, budgetary support from donor countries enables the financing of subsidies. But as you can imagine, controversies abound. One of the foremost controversies is whether a fertilizer voucher system will achieve its intended objectives. Is the objective to increase national production, reduce poverty or weave a social safety net? If we suggest that vouchers are a poor choice for reducing poverty, even in farming communities, what about some of the technical considerations? How should a fertilizer voucher program be linked to local production possibilities, soil conditions? Is it necessary to link a voucher program to complementary technical assistance from extension officers? Should improved seeds be part of the package? What's the role and division of responsibility between the public and private sectors? Is the private sector part of the mix? What's the evidence on the displacement of private sector sales by these subsidy programs?

What are the trade-offs between these subsidies and other options, such as general subsidies or cash transfers? How effective are the targeting methods? Can we contain corruption and leakages of benefits to non-targeted groups? And, of course, what about the costs on the national budget? Do these programs provide value for cost?

Over the years and perhaps since the Malawi example, some analysts may have softened their views on fertilizer subsidies and voucher programs. They do acknowledge that since fertilizer subsidies and voucher programs continue to be politically popular, donors and analysts can help by recommending technical improvements to the program implementation and targeting efficiencies. All in all, fertilizer voucher programs and choices, policy choices, must be based on systemic empirical evaluation of the private and social costs and benefits at both the national and local levels.

Today we have two distinguished experts with us, Ian Gregory of the International Fertilizer Development Center and David Rohrbach from the World Bank, who's joining us from Tanzania offline. They will review the evidence from the fertilizer voucher programs in Malawi, Tanzania and Zimbabwe and help us sort these issues out. Mr. Gregory will speak first.

He's an agribusiness market development specialist at the IFDC in Muscle Shoals, Alabama with more than four decades of experience. He's been extensively involved in designing, implementing and monitoring agro-input voucher systems in Eurasia and Sub-Saharan Africa. He's authored numerous publications and technical reports on agro-inputs marketing systems. Among his current responsibilities, he helps with project design and implementation and agribusiness technical assistance to IFDCs Eurasia Division Program. To you, Mr. Gregory.

Gregory:

Thank *[dropout]*. I'm not sure whether it's such a pleasure to talk about such a controversial subject. What I would like to do this morning is compare three of the so-called voucher programs. One in Malawi, one in – two _____, two in Malawi and one in _____. Now _____ first of all *[dropout]* this we – is that going? Okay. Traditionally, universal subsidies were applied as part of the police package of the green revolution, overcoming market failures, creating a demand pool for fertilizers and the greatest impact was found to be when you had got the impact on staple grain production. As time wore on, many, many pitfalls became obvious and some of those are listed there. The excessive fiscal costs were the main point that when structural readjustment was recommended to governments, the excessive fiscal cost was the biggest point of

the lot. But there were things like late delivery. Governments – the whole systems were inefficient, for the most part, there was rent seeking on political economy and patronage and finally, there was rationing because you were trying to control the fiscal cost. There was a lack of equity, which these subsidies were supposed to promote because most of the benefits derived through the larger farmers, rather than the small farmers and finally, there was displacement of the private sector and by the 1980s, the universal subsidies went out of fashion.

In terms of rethinking fertilizer subsidies, this first started in 2002, when IFDC launched a voucher program in Afghanistan which was an emergency program funded by USAID and it was continued for two years. It targeted 200,000 farmers and there is a description of that in one of the papers that I have logged on onto the website. IFDC again used a voucher program in Malawi in 2003 and 2004 as an alternative to the government's targeted inputs program, the TIPS program, which was a free giveaway of small packets of fertilizer and seed to small-holder farmers. We introduced some pilot programs in Nigeria in 2004. There are still pilot programs continuing in Nigeria and whether they are accepted by the federal government, and more importantly by the state governments, is yet to be seen.

By 2006 the World Bank dubbed these voucher programs as smart subsidies because they were targeted to specific groups of farmers or they were supposed to be. In 2008, we had, as you all know, a huge spike in international fertilizer prices and also in commodity prices. As a result, several Sub-Saharan African countries introduced so-called voucher schemes to – because they were frightened of the lack of fertilizer use and a reduction in food production and food insecurity. By 2010, the literature is beginning to ask questions, "Are these smart subsidies really as smart as they're supposed to be?"

Let's talk about the essential requirements. I've listed seven there. We must have clear objectives. Are we trying to improve the lot of the poorest of the poor farmers who are just looking for self-sufficiency in food production – and Malawi is a case and example – or are we looking for national food security and getting a huge increase in staple grain production? Whatever the objectives are – and another objective may be to improve the development of the supply system through the private sector. Whatever those objectives are, they are going to determine which group of farmers you are targeting with the subsidized inputs. They should be seen as part of an holistic development program, where all aspects of fertilizer supply, agricultural production and the marketing of output is considered and this is going to include access to finance. It's going to include agricultural research. It's going to include the whole myriad of aspects impacted by a holistic program.

I put there a minimum life of three years. Why? Because we're trying to change people's behavior. People who are not market participants, who are not using fertilizer, who are not using improved seed. We're trying to change them and help them to become market participants and you can't do that in one year. You can't do it in two years and we've got some evidence from Malawi about this. A maximum life of five years, why? This is my idea but if I am an implementer or I put myself in the shoes of a donor, if you haven't achieved your objectives within five years, something is wrong. Cut the thing off. But you're going to have to cut it off anyway, so rather than have a shock cut off, phase it out and have an exit plan right from the very beginning and have it transparent that there will be an exit plan. That this cannot continue forever.

Have the next slide? The system is very easy, really and fairly simple. You need an implementing organization, whether this be public or an NGO international NGO implementing organization. Two, coordinate all of the activities within the program. You need to set the – and they need to set the objectives and be transparent and get political support for the objectives and you use either the Minister of Agriculture and more importantly, local community organizations, whether these be village development councils, voucher development councils, assurers we used, which are the local village committees in Afghanistan. The community organization must be involved in making the final selection of which farmers should be the beneficiaries to meet the objectives of this program. You need private sector fertilizer dealers for the overall sustainable development of the sector.

We've got examples where the government has just completely taken over the whole system and the private sector has been excluded. It's not sustainable because if the government withdraws, as we saw in the 1980s when subsidies were withdrawn and it was thrown open to the private sector, the private sector is not going to respond. You need the farmers. You need an independent whoops, sorry. You need an independent organization. It may be an NGO, a local NGO, to distribute the vouchers to the farmers, independently of the distribution of fertilizer which had come from the private sector. You need to separate those two.

Okay, whoops, I'm sorry. We've gone – here are some examples of vouchers. The two on the left-hand side are from Afghanistan, written in Pashtun. One from Malawi from the SPLIFA Program and one here from a seeds voucher program conducted last year in Kyrgyzstan. People often say, "Well, won't people make fraudulent copies of these?" I can tell you here, quite plainly, we have never had one example of fraud being perpetrated with the vouchers. We're asked the question; can you use smarter vouchers using information technology than just the paper voucher? Yes you can, we tried to use bar codes

in Rwanda. We got into all sorts of problems and had to abandon it. They're expensive to start off with and if you can imagine farmers coming to a dealer and the dealer has got a computer there and he's trying to produce a bar code certificate for the farmer, and the electricity goes out. He has to tell the farmer to come back next day or when the electricity's back on. All sorts of problems. You must have the infrastructure behind you to support smart cards, smart vouchers. It's okay for smart cards to be used by cooperative members in India where you've got a whole IT infrastructure behind them and you've got a lifetime membership of the cooperatives. But on a short-term program, our experience is that paper vouchers are, with certain safeguards, are fair enough.

Okay. The three voucher program comparisons that I want to make are SPLIFA, Sustaining Productive Livelihoods Through Inputs For Assets. It's a rather long and clumsy title but it's got a great acronym, there. And because this program was funded by DFID, you could just imagine them saying, "Here's SPLIFA. SPLIFing project." Anyway. That was aimed at poverty reduction. It was targeted to the poorest of the poor. It was implemented by IFDC and an NGO consortium. The agricultural input support program in Malawi continued on from this in 2005, hopefully from our perspective it would've incorporated some of the SLIFA Project aspects. It didn't and David is going to talk about that later. It was aimed at, oh, sorry. It was aimed at food security and it was funded by the government of Malawi through various donor contributions to budgetary support.

In 2008, Ghana introd- well, frightened by the fertilizer spike, 2000 fertilizer retailers in Ghana and they thought, "Well at these prices, farmers are not going to be able to afford fertilizer. We're going to have to do something," and they introduced a voucher program which was really just a plain-old fertilizer subsidy program.

Let's have a look at the SPLIFA program. Forty thousand farmers in the first year; 60,000 in the second year of which 20,000 repeated from the first year. It started in 2003. It continued in 2004 and was supposed to go into 2005 and the donors cut off the funding after two years. Because they had a change, DFID particularly wanted to provide budgetary support to the Malawian government. The objectives were multiple. Inputs for assets – we were trying to build up the assets of the very poorest of the poor farmers. So it was family food security and we also involved private sector development. There were only about 150 fertilizer retailers in Malawi at that time. They were concentrated in the cash crop areas and the staple food maize producing areas were devoid of any access to fertilizers. And we promoted and selected 200 private sector retailers for this program. And we targeted those small holders in eight districts who had at least two or three month hungry period where they were completely dependent

on food aid. Some of them, that period was five months or more. We're now talking about the poorest of the poor and what could we do for them.

Because they didn't have any resources, we gave them work for up to two months on feeder road programs and they, at an average daily wage in rural Malawi at the time, they earned the actual cost of the input voucher, which they were going to get. And that consisted of only 1 50-kilogram bag of urea and a ten kilogram hybrid maize seed. The reason why we didn't have a basal fertilizer in there is that the donors would not come forward with the additional cost of that. The procurement was made by IFDC and the private sector; we just negotiated with the private sector and distributed the fertilizer and seed to the retailers, to these 200 retailers. Pricing was at market level. There was a single voucher for the input package and a technical brochure which the retailers handed to the farmer at the time of voucher redemption and supposedly we had planned to have dealers also put in farm – supervise farmer demonstrations and very, very few of those were done. It was a little bit of wishful thinking on our part because we're talking about retailers who were just shopkeepers in the villages prior to this program. The cost was 2.1 million a year. It represented very little of the annual national budget. It represented under ten percent of the fertilizer budget. There was some holistic development in terms of we were trying to develop a fertilizer supply system to these areas and we did originally have an exit strategy. We did reduce the hungry period, on average, between one and three months. The maize production per farm increased from 200 or 300 kilograms per farm to 450 kilograms; 1 or 2 farms up to 600 kilograms. Not much – I'm talking about the poorest of the poor. The drought impacted the second year results and this is a problem when you have a program which is devoted at one crop only. The two-year participants benefitted far more than the one-year participants. As I said at the beginning, we're trying to change people's behavior and you can't do it one year and I believe that you need at least three years. It would've been very beneficial to have gone on for the three years and then monitored how many of these participants continued to purchase fertilizer – that they became market participants. Generally the recipients said that they preferred inputs to cash or food as a handout. One of the unforeseen aspects was that intercropping was reduced and so crop diversification was reduced and diet diversification and that's something that needs to be studied a little further.

Some lessons from this. Food security status is a very good means for targeting; a very good modality for targeting. The inputs package was underfunded. We had no basal fertilizer; we could have got better yield responses with the basal fertilizer. You need to have a very good technical package to farmers and the delivery system for it. And the programs need to be fully funded. We didn't do

any benefit cost ratios on this because we were cut off, just like that, at the end of two years. Now, in 2005, the Malawi government said, "Okay, we'll make a change to our TIPS program," and they introduced The Agricultural Inputs Support program. Originally, for between 2.3 and 2.6 million farmers – it's now down to about 1.6 million. It started in 2005; it continues today. When the price spike came in 2007-2008, the cost in 2008-2009 was \$285 million. Farmers were contributing only about 14 percent to the cost of the inputs that were supplied. We had multiple vouchers. That cost represented 16.2 percent of the national budget and more than the total Ministry of Agriculture budget on all other activities and you had got the private [dropout].

Well let's go on to the next slide. It did work. Maize production increased by 66 percent; nearly all from yields, which went up 65 percent on average. This is taking the average from 2005 to 2010, compared to the previous years 2000 to 2004. There's only a two percent increase in maize area. Very poor targeting of the vulnerable poor and David is going to say some more about that. The private sector was virtually crowded out. In the first year, no private sector distribution at all; the government did it through _____, Admark and the Small Holder Revolving Fund. The private sector complained. They were procuring fertilizer for the government and the government conceded, "Yeah, okay," and they allowed them in 2010, something like 14 percent of the total distribution went to the private sector companies. Small retailers that we established disappeared from the fertilizer sector, altogether. It had an unsustainable cost; this note exit strategy; there's no holistic approach to market developments; and there was no development of output markets, except that the extra grain that was produced was exported and David is going to say a few words about that as well as to the value of that.

Now in Ghana, as I said earlier, this program was introduced because of the price spikes and the field by the government that the reduced use of fertilizer would impact on food security and food production. So what did they do? They looked at the products which were being used by small holder farmers to grow food crops, whether it be maize or rice or whatever and they targeted those products only, so it is a product subsidy used as a means of targeting. The farmers still contributed 50 percent of the fertilizer. The procurement – there are 4 major importers in Ghana who account for about 90 percent of the fertilizer imports – two of them account for about 60 percent, between the two of them. The governments negotiated with them and import price and the two companies that one just distributed to subsidize fertilizer through their own retail networks and so there was no national conference, which was the intention. So the program was soon changed to allow all private sector retailers to come into the market and then in 2010, because it was realized they had a

very complex system of voucher redemption – first of all voucher distribution and voucher redemption where farmers had to go to the extension offices and then get the counter signature from the district officer and if the district officer wasn't then, they had to come back the next day and so on and so forth. And the subsidy was passed back through the, from the retailer to the distributor to the importer. The importers accumulated the full cost of that subsidy scheme before the government paid and in fact the government changed its budget year two and able to be able to pay on time as the vouchers were redeemed all the way back through the supply chain.

So in 2010, the program was changed to a waybill scheme, where all of the costs from import right through to retailing were absorbed by the governments. Every receipt had to be kept and passed back down the line and finally the government would reimburse on that. I still don't see that as being a very efficient system. So let's think about it – this was a straight fertilizer subsidy. It had a limited targeting, even large farmers could join in and get the subsidized product after 2009 and 2010. It was dominated by the private sector interests of the importers; complicated, inconvenient voucher redemption, late payment to importers and they changed. Did it work? Well, maize production increased by 38 percent again on a national basis comparing the post-2008 period to the five years before. Yields only increased 17 percent.

Those are three examples. Here is a list of voucher programs that I'm aware of; there have been some pilot programs in Mozambique as well, but those are the main ones. The two at the bottom operated in Kyrgyzstan and Tajikistan. The Kyrgyzstan one was done last year and I was fully involved in that and that was a seed distribution voucher program. Tajikistan is quite different in terms of when looking at that you programs on a small scale, 50 or 60 farmers, within defined value chains. What are the lessons learned?

Did they work for poverty reduction? Yes. But yes if they are targeted to vulnerable potentially viable farmers and they're maintained for three to five years. If the farmers are so small that they can't be viable, don't even think about it. For improving food security, guess, but at a huge cost and with leakage. You get crowding out of the private sector and they are mainly crop specific. As a short term fix for price spikes, maybe, but you're distorting the markets and that source subsidy, where you subsidize the products at the import level where the factory level, that's a much more efficient scheme in our experience. They are not a panacea for every situation. They are not a replacement for holistic market development. You have to target the vulnerable but viable small farmers and these are what I call the potentially productive core. Targeting is pretty easy to do but it's difficult to implement. You have to be market friendly and not distort markets; you have to encourage

and not disrupt the private sector. One thing I haven't mentioned is thinking beneficiaries to savings programs. If you are trying to make nonparticipant market participants become market participants, you need to change their behavior so that they save any surplus profits that they make and you encouraged them to save so that the following year they can then invest in inputs are increased production.

You need to have exit strategies but they are still difficult to implement because of the political clout that these programs have and you have to contain administrative costs. Those can get completely out of hand. How do you implement? You analyze the final situation, the value chains, the institutional capacity of both the government and the private sector and the fertilizer responses that can be obtained with the crops being grown. You select the objectives and the targeting modality; to estimate the time frame to achieve the objectives; you design market friendly interventions; you incorporate intensive training into the program – training farmers, training of dealers and training of government representatives as well.

You monitor and evaluate the impact on all stakeholders and this has been one of the glaring omissions from all of these programs by the Kyrgyzstan seed program. We can only analyze the programs at the national level, even though not all of the farmers in the nation have been involved, so there needs to be far more monitoring to about proper evaluation of the impact. And finally, that is just one tool in holistic market development but they can be useful for adding to the security. _____ with that rather rushed but I think that will lead to some questions and discussion. Thank you.

[Applause]

Steffen:

Thank you very much, Ian. Our next presenter is David Rohrbach, speaking to us from Dar es Salaam in Tanzania. Dr. Rohrbach is a Senior Agricultural Economies for the World Bank, currently based in Tanzania. In the last five years, he's managed parts of the bank's ag portfolio in Tanzania, Malawi and Zimbabwe, including support for fertilizer voucher programs in all of those countries. Before joining the bank in 2006, he worked in various CG centers, including Semmet, IFPRI and ICRISAT He's lived and worked in Southern Africa for the past 25, 26 years, mostly on issues of agricultural technology change, crop improvement, market development and commodity risk management. David, it's yours.

Female:

Hey, David? Are you with us? We're ready for you to present.

Rohrbach: All right. Sorry. I – can you hear me now? Can you hear me? Can you hear me?

Female: Yes, David, we can hear you.

Rohrbach: Okay. So let me start over my presentation. It's a very large topic and is a lot to cover in a very short period of time. What I'm going to do is talk about some of the lessons which have been derived from what is really an evolving and broadening experience with voucher programs. Ian has done a nice job of giving an overview and talking about a few of the programs; I'm going to talk a little bit more practical terms about some of the lessons that were seen in the field which then affect the design decisions that are being made by governments but also the design decisions which are collaterally made by those of us who are supporting these programs, including the World Bank.

So I'm going to – next slide. Let's test the system. Can you still hear me? Okay. So I'm going to talk very briefly about several models from, in this case, Zimbabwe, Malawi, Tanzania, just as examples of these sorts of voucher programs. I'm not going to say so much about Malawi because Ian has covered it to some degree. I'm going to concentrate on discussing some of the lessons, many of them a bit unexpected but in retrospect as we look at difficulties of implementation, they shouldn't be, and then a brief comment on next steps. Next slide.

First, a comment on Zimbabwe. Zimbabwe has had such programs running back into the 1990s. I think after the – I think it was the '91, '92 drought of the century there was a growing interest in alternative distribution methods. There was some experimentation with vouchers by the mid-1990s. This is simply an example of one that we supported quite lightly. The aim of these programs differs the level of subsidies, differs methods of implementation, differs and these are simply three archetypical cases. In this case, it was an effort to revitalize small holder maize production after drought and in the context of a country and a economy coming out of hyperinflation. Hyperinflation which had largely destroyed rural trade and infrastructure so that by 2008-2009, when we started to think about this and design this sort of intervention, there was virtually no seed or fertilizer sold in the rural areas anymore and many of the rural retail shops had disappeared. So one of the interests was to reestablish that rural retail trade and the linkage between wholesalers and retailers. Target group 133,000 farmers. This was a typical post drought subsidy; 100 percent of the subsidy paid by donors. In this case only 50 KGs of, I think it was ammonium nitrate or _____ per household. The decision was made to concentrate on nitrogen and the belief that nitrogen was the primary limiting factor in most Zimbabwe soils.

In this case, there was a lot of debate about whether simply to continue to hand out fertilizer to farmers or to run a voucher program. There was a mixed opinion. Many people argued against the voucher program because they didn't think retail trade had developed well enough. In order to get around that problem, we contracted a fertilizer supplier, a company on a competitive bid basis and the company did everything. The company printed the vouchers, designed the vouchers; they worked with NGOs to distribute those vouchers. The company did the training with rural retail shops who we had hoped would continue on as dealers and they collected the vouchers from those rural retailers and submitted them for payment at the end of the season. It worked pretty well. In fact, well enough that it was expanded. It is being expanded and figures that follow and rural retailers were very happy with the system because it did reestablish the sorts of contractual relationships. Incremental production around 30,000 metric tons.

Here's a different program which is the Malawi program, which you've already heard discussed; The Agricultural Inputs Subsidy Program. Sorry, I'm not sure whether there's – oh, there we go. The aim, as stated by the government repeatedly, was to increase food security and the de facto aim was to maximize maize production and that was the measure by which the program was evaluated each year by the government and publicized each year by the government. 1.6 to 2 million plus farmers, depending upon how close you were to an election; level of subsidy plus or minus 90 percent on 100 KG, in other words, one pack of basal fertilizer and one bag of top dressing per household. So a massive subsidy which reflects perceptions that these farmers are extremely poor and would otherwise simply not be able to afford the voucher. Just one side comment here: I think rural farmers often are remarkable in their ability to find cash when they really need it and I suspect that while these are some of the poorest households in this continent, they could afford to pay, over time certainly, more than ten percent of the fertilizer costs and that remains a challenge for the government.

The government purchased all the fertilizer. It didn't trust the retail trade and this was a common argument between donors who were supporting the program either through budget support or directly supporting the program in the government. Market ____ smart subsidies _____ which would help build retail chains do not disrupt the retail trade of fertilizer in this case. The government did this because they just didn't trust the retail trade. They thought retail traders with taped coupons are vouchers and trade them – allow farmers to trade in for other sorts of consumer goods; that they would take them and cheat the farmers by demanding a subsidiary payment, extra rents

and so on, particularly in front of the last election campaign. It was a major argument and basically the government simply said, "We have to be sure that the fertilizer does in fact get to farmers and the only way we can ensure it is we do it ourselves." And that's what they've done ever since. So as Ian says, there was an effort to bring in private trade and allow them to participate in the program if it supported that with a guarantee on the sales and delivery of private traders but that then failed as the election approached.

Substantial program – I think the fertilizer costs alone was running often 120 to 140 million. The cost estimates that Ian's got are correct if we start covering all the administrative costs and so on of that program, as well. A large share of the Ministry of Agriculture budget and major questions of displacement arise. But a large program with large results, at least according to the government and I'll have another comment about that later. Next slide.

Third program – the National Agricultural Input Voucher scheme in Tanzania. It's one now – this is the fourth year running. Major objective, again, is to increase maize and, in this case rice production. A more primary objective on increasing fertilizer adoption. So, while the previous two programs were primarily talking about food security as the main goal, there was a more explicit objective of promoting adoption and there is a more explicit exit strategy associated with the objective. Farmers received coupons for three years and then they're out of the program. The expectation is that within three years, farmers will have learned the value of fertilizer, earned enough money from the additional production, been able to save some, and continue to purchase fertilizer under own and we're coming into the fourth year now with a real test of that proposition. And there was an explicit objective of agri-dealer development as well, which was less important, certainly in the Malawi program.

Here we have an intermediate, a 50 percent subsidy so we have, in the case of Zimbabwe, 100 percent. In the case of Malawi, 90 percent subsidy; here, it's dropped to 50 percent. The actual subsidy on the ground today is probably closer to 35 percent, given the rising cost of fertilizer. Farmers exchange vouchers in a regulated market. The program was set up so that farmers could exchange a voucher with any local fertilizer supplier but again, because of nervousness about local extinction and district officials, the source of fertilizer and the reliability of that fertilizer supply, they have designated particular retailers to work with particular markets. The last thing the government wants is for the vouchers to be there and there to be no fertilizer. And so this is a major theme of the lot of methodological discussions with government. \$75 million a year into this program. Incremental production something in the order of 500,000 and I think as a basis for planning it's reasonable to assume you're

getting, on average, and a nitrogen limited environment, roughly 15 KGs of grain per KG of nitrogen going on in the soils which are relatively depleted. Next slide.

Let me talk about some of the lessons now. First set of lessons – we need to be much more clear about performance objectives and these programs. We talk about importance of food security. Everybody agrees that security is a valuable objective. We maybe add on to that market development, sometimes sustainable use for adoption is a primary objective but rarely do we get much beyond calling for a general promotion of food security and an expectation that the programs will be judged on the basis of whether they produce incremental grain or not. I think this undermines, really, a larger opportunity to both evaluate and to better target these sorts of programs if we take the case of food security. I think Ian mentions this.

There are two major differences in food security; one is increasing aggregate national production, in which case the complementary resources of land, water and know-how are commonly with better than average farmers and so there's a logic in putting your vouchers with your better-than-average farmers as opposed to putting your vouchers with poorer farmers with a primary objective of helping poorer small hold farmers net deficit households meet their food requirements. There's no question, again, in my mind that the primary objective of the government's program in Malawi was number one, the aggregate national base production and that's the basis by which they were applauded, internationally. Market development is commonly talked about, rarely measured. There's three possible measures of it. Numbers of commercial shops that are selling fertilizers; quantities of commercial purchases buy new adapters to _____ and fertilizer costs at the farm gate. Sustainable use is commonly or adoption rates are commonly identified but rarely consistently measured. Next slide.

Just a comment on the food security objective. The real question is who's food security are we talking about. Next slide.

Here's an example of the – a graphic of the Malawi so-called green revolution. You saw average production running around 1 to 1.5 million metric tons. Secondly, you had a production level running well over 3 million metric tons and all of that is attributed to the voucher program. I'll give you a clue of where I have a slide at the end of the show which is frankly, I don't believe that the numbers should have been that high. I think there was a proclivity to overestimate production levels in order to satisfy the objectives of the program. Next slide.

The Malawi program did, undoubtedly, have some payoff but the primary payoff, frankly, was to poorer households. If we look at the value of additional grain produced to a household producing a surplus, this is a household which is selling that drained into the market immediately after harvest, commonly trying to dump it as fast as they can in order to reduce storage losses but also to gain some quick cash income. They're getting about 15 cents per KG on average – this was in Malawi – in effect from the investment that they were making or the government was making with donors and fertilizer as opposed to the poorer household, which generally faces a food deficit, has to purchase later in the year when prices are rising court does not purchase at all. When they are purchasing, commonly there may be a doubling in prices. Actually it's not \$30.00 a KG. It should be 30 cents a KG. There's no doubt that there's much, much higher return to targeting vouchers to the poorer households to help them resolve a food deficit than to the wealthier households. Next slide.

And one of the reasons for that is the difference between import/export parity, particularly in a landlocked country like Malawi. Export parity in Malawi in the last few years up until a few years ago is running about \$180.00 a metric ton and they were selling into Zimbabwe. The border price from Malawi was at that level. Import. He was running around \$280.00. So the payoff to these sorts of programs really depends upon, you know, what is the market condition and whether you're really trying to produce a surplus or trying to resolve the deficits. And then we see very quickly and that table, there, that estimate price is high, you're facing an import requirement. Whether it's the country as a whole or whether it's individual households, you're starting to get into positive territory. If you're able to get good yields, a high price, you can get a high payoff to these sorts of programs. Malawi had the expectation that it could become a breadbasket for the region, Southern Africa region. It was very optimistic about expanding sales to Zimbabwe. Frankly, the sales were at a loss for the investment of the input subsidy program. Next slide.

Another lesson on the difference between targeting and practice. Commonly, when these programs are set up, they're set up with long lists of targeting criteria in order to get the best – to reach the poorest farmers, the female-headed households and so on. In practice, we find commonly that it's ultimately the village leadership who identifies the best should benefit from the program and what we found in work in Zimbabwe and Malawi and here is the judgment of the village leadership is generally pretty good. They are able to identify poorer households. They're not necessarily sending it to their friends and relatives – it does happen on occasion but not consistently. There is an inclination in Tanzania to rotate across recipients but they recognize that this is

not destined and should not be destined to wealthier households who can otherwise afford fertilizer and yes, the key issue is they recognize, just as we recognize, the need to minimize displacement of commercial purchases. Obviously, they wouldn't put it in those terms. And commonly don't do a bad job of doing that but what's also important is that local ownership is quite important for effective implementation. We've had lots of debate about the need to better monitor targeting, better enforce targeting; frankly, I think that's a very costly thing to do and I think the payoff, in my experience, is not particularly high.

Lesson three, next slide. Choice of the voucher method really depends upon the fertilizer supply chain and a bit of politics. Market smart subsidies – we try to put them in place in ways which do not undermine commercial markets and in fact help to promote development of commercial markets but again, the major concern of governments and most implementing agencies is what's perceived to be a very high risk of sending of voucher out and not having the fertilizer or seed for whatever it is to redeem and so there is generally a tendency to try to lock in a market condition, either by buying and distributing on the fertilizer yourself or by contracting a particular supplier and holding them to the terms of that contract, not promoting development of competitive markets because the perception that the risks of having vouchers out there without fertilizer are too high. In Tanzania in particular, there was an effort to promote training of thousands of agri-dealers and to competitive market supply and we basically have failed in that because of this problem that district officials think we need to find the best possible and most reliable suppliers to make this program work. Next slide.

There are a range of add-ins that you can put into these programs to facilitate development of fertilizer supply chain. Better training of agri-dealers; contracting which requires the agri-dealer to carry an additional fertilizer for sale to promote a commercial market where it wouldn't otherwise be; contracts to establish credit lines. Despite all of this – and a lot of this is being tried increasingly in these sorts of programs – there remains a very high probability that when the voucher program ends, the supply to the farm gate will end. You may have supplies in nearby larger business centers but one of the huge benefits of this program to the farmer is generally it's supplied to close to the farm gate and that's exceedingly difficult to sustain. Next slide.

And this is a major problem for us here in Tanzania as it is in most other countries but most particularly here in Tanzania where we face the three-year rule and many farmers this year will not get the subsidy. With a 50 percent subsidy on the left-hand side of that graph, you were pretty profitable. If you remove the subsidy and assume no increase in transaction costs, that you could

still get the fertilizer at the farm gate at the same price you are buying it before, you're marginally profitable but if you can no longer get the fertilizer at the farm gate, you still got to go back to a major business center, find transport there, find transport back, certainly, the profits disappears and that's, frankly, is the largest single challenge we face in the sustainability of the program here in Tanzania and in many other countries. Next slide

An additional lesson. What are we trying to teach farmers? Here's a – this is a table which shows – I recently received, actually, from a fertilizer company which shows their fertilizer trials as a means to identify what the next stage of the subsidy program is. You can see that the farmer practice is the subsidy program in Tanzania two bags; one bag of DAP and one bag of urea with a reasonable net return according to this, the best option to this company is option two, instead of two bags, four bags. Instead of the farmer paying 108,000 – and that's at full cost – they're paying 192,000. They did put in a control and I credit them for putting in a control but my comment back to them is frankly, most farmers are of the control to start with and most farmers will be the control when the fertilizer subsidy program in and he ought to be looking not simply at getting farmers from a theoretical recommended standard of four bags or an option of four bags of fertilizer, assuming away all our capital constraints to looking at how do we more efficiently use very small quantities of fertilizer and build back up over time. And it's rare to find a subsidy program that deals with these sorts of issues. Next slide.

So the sustained success of these programs really depends upon improvements of fertilizer use efficiency in order to be profitable in these programs. That implies better targeting of fertilizer to the soils, identifying which crops, which nutrients are most limiting, combining organics with an organics, improving wheat control, water management, and linking it with quality seed. And I emphasize a preferred varieties, preferred for righties by the farmer, not by the seed company. Next slide.

There also complementary investments in reducing farm gate prices for farmers. As we mentioned earlier, business training with agri-dealers is one option. Partial credit guarantees – there is growing interest in these facilitating group purchases by farmers, contract farming, all of this takes time to develop and there I fully agree with Ian's comments. These should not be viewed as one year, or two-year programs. There really three to five, seven-year programs to build input supply systems and build improved experience that is necessary for fertilizer use efficiency. Next slide.

On to exit strategies or graduation strategies. We talk a lot about it; we don't do very much about it. The de facto exit strategy is, in the case of the Zimbabwe type of commitment, a rolling one-year emergency commitment. I think Zimbabwe must have had a some sort of fertilizer subsidy, not necessarily through vouchers, almost every here over the last 15 years. It's common in many programs, many countries that have drought is immediately we roll these things out and hope we don't have drought the next year. Second de facto exit strategy is when frankly, the budget runs out. The government can no longer afford it for one reason or another. Donors won't pay. We start to shut down these programs and then we've got the three-year rule within Tanzania which I have real question marks about as well. There's a strong hypothesis to be tested here and we'll know more in another year.

Alternatives do need broader testing. Reducing the subsidies gradually over time methodologically difficult for a range of reasons but I think it's, it is practical with some thought. Encouraging savings or commitment savings – there is some growing literature about these sorts of micro-savings, small-scale savings. In Malawi is a program of commitment savings were farmers put aside their money at the end of the harvest in an account that was designated for fertilizer purchases later on. So farmers could, in effect, could not get access to that account until their fertilizer purchasing time of year came. Facilitating input supply during periods of crop sales – farmers say this again and again and again. However there fertilizer commonly doesn't appear to just before the planting season, promoting contract farming. Next slide.

Just three more slides as they bring this to a conclusion. Significant risks – there are a range of significant risks which we could talk about for a long time. Vouchers or fertilizer is distributed late. Always an issue, always a problem. I daresay it rains here began in September in some parts of the country, October in earnest, the vouchers are going out today. The government did try to respond by putting certificates out earlier in lieu of vouchers but it is always a struggle in my experience to get these programs running on a timely basis. No quick solutions.

Vouchers are redeemed by agents who are distributing them. There has been some corruption here in one part of the country. Extension workers and district officials pulling off the vouchers before they got to farmers and starting to redeemed in themselves but overall, it's happened on a relatively small scale. There were questions about this in Malawi as well, but I don't think we ever had good enough data to estimate the size of that. But it is a risk. Counterfeiting vouchers. Ian says he's never heard of it. I've seen it. I've seen it in Malawi on a fairly substantial scale in several different ways. We can talk about that at some point.

Vouchers redeemed for cash. Farmer brings in the voucher; doesn't want to pay the 50 percent top up or 10 percent top up but gives the voucher to a retailer and says, "Look, give me something else to give me cash in the with this voucher." It happens. Very hard for us to diagnose the extent of that also there's some significant questions here about what appears to be a disconnect between the quantities of basal fertilizer going out in the quantities of vouchers coming back in.

Price inflation. My sense of it frankly, is that if the voucher goes out every year and the fertilizer trade sees it goes out every year and there's not enough competition in the fertilizer trade, your cost of fertilizer is gonna go up and see what appears to be some evidence of that. He's got a lot given market; they're chasing this vouchers. It's not competitive for various reasons and fertilizer costs are rising. Farmers are _____ what was meant to be a 50 percent top up are now paying 60, 70 percent.

Target numbers of recipients grows faster than the population. We always set these programs in relation to what is perceived to be a population of farmers, try to reach whatever it is; 40, 50 percent. Almost invariably, I've seen these programs that run several years, the population of farmers raises very rapidly. I think in Malawi it rose from something like 2.5 million to 4 million farmers in a period of about 4 or 5 years. We're seeing the same thing happen here with the expectation that if the district populations go up, they'll get more vouchers.

Over-reporting of production. Just the – next slide. The tendency to be over optimistic about the returns to these sorts of programs or at least the production growth of these sorts of programs – here's a slide – I think it's coming up – on the Malawi circumstance. Could you hit the button one more time, because I think there's some words that come with that. Your peak in November, in late 2001, was a drought. Your peak in – I'm sorry let's go back. Sorry. We've missed it somewhere. Your peak in prices in 2005-2006 were clearly because of drought. Your peak in prices after the 2008 harvest was not a drought at all. There was a good rainfall season; reasonably good rainfall season, as you may recollect from the earlier slide that I showed you, and yet there was a massive increase in prices and frankly, there were shortages on the market. There was rationing of grain on the market. The government shut down most large-scale private trade of maize. They forced people to go to Admark to purchase their grain. Admark rationed to 20 KG's per person and this was at the time when Malawi's green revolution was being lauded in Rome and in New York. I'm sorry, there something wrong with this production numbers and I think it comes back to the inclination to try to show the success of these

programs, even when it's not quite there and raises a broader issue of the quality of agricultural statistics in some parts of the world.

Finally, final slide on future directions. Undoubtedly, there's lots of work to be done on improving fertilizer use efficiency, alternative strategies for strengthening competitive input markets, testing exit strategies, smart vouchers. I'm inclined, based on my limited research, to agree with Ian. They're much more expensive than we had anticipated. Third-party monitoring for improved management. I think there's lots that can be done there because of the proclivity of many who are implementing these programs not to identify problems which frankly they're not that difficult to resolve, if we knew about them early enough. So I think these are evolving programs. There's pluses and minuses. There's lots to be learned from the experiences and I think they will be with us for some time; hopefully continuing to evolve. Thank you very much.