

A photograph of two women sitting in a market setting, surrounded by large white sacks and buckets filled with produce. The woman on the left is wearing a white headscarf and a patterned top, while the woman on the right is wearing a red and white headscarf and a patterned top. They are both looking towards the right. The background is filled with more sacks and produce, creating a busy market atmosphere. The entire image is overlaid with a semi-transparent green filter.

Behind the Market

Interviews conducted in Kenya, Uganda and India illustrate the outcomes of five contrasting strands of research

Why research matters

Sometimes it is hard to see how research is relevant to development.

The impacts of science on poverty – especially in the short term – can be rather subtle. Changes in attitudes, skills/knowledge and relationships, within individuals and organisations, may be the first signs that research is having an impact on poverty.

Such ‘invisible’ changes are often the precursor to longer-term, visible improvements in

people’s livelihood outcomes. Contrary to what is often assumed, they can be demonstrated and, to some extent, measured.

The pathways of change that connect science to poverty reduction are complex and unpredictable. That said, it is possible to manage these pathways to some degree. In our experience, research impacts are most likely to be seen when:

- The project has been correctly identified, the team has understood the root

cause of the problem, and the research is addressing the problem rather than its symptoms. A ‘bottom-up-meets-top-down’ approach to problem identification can be more effective than either participatory rural appraisal or traditional needs analysis by scientists.

- Potential users of the research, and organisations which hold the key to solving non-research aspects of the problem being

investigated, are involved alongside scientists as equal partners in designing and implementing the research.

- Local or national government policy supports uptake of the research results; or the project can bring about a change in policy.
- Science is valued within the ‘culture’ of organisations making decisions about agriculture.

Experience has taught us to be cautious and modest about

attributing impacts to single interventions. Innovation always builds on existing knowledge and ideas. Research alone is not effective without a supporting environment.

These are some of the lessons that our research portfolio is teaching us, reflected in the stories that follow.

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Maize marketing in **Uganda**



Maize is one of the most important cereal crops in Uganda. Many small-scale farmers rely on the crop for their income, but it can be harvested only at certain times of the year. During harvest time, there is an excess of maize available, and lack of storage facilities mean that farmers cannot keep their crop until prices rise again. They are often forced to sell it immediately after harvest, when prices are at their lowest. If the quality of maize is poor, due to dampness or insect damage, then farmers will receive only minimal returns.

The National Post-Harvest Research Programme based at the Kawanda Agricultural Research Institute (KARI) in Uganda, developed a range of technologies which are sustainable and easy to use. The project focused on improving drying, shelling and storage methods for small-scale farmers, in the Kiboga and Apac districts. Empowering them with knowledge about the quality and volume of maize required by the market has been another objective. KARI also identified a direct link with a buyer, so that reliance on middle-men, who often dominate the market and dictate low prices, is reduced.

During the rainy season, maize develops mould if it is not

properly dried and stored. Maize cribs, built using local materials, were introduced to prevent mould and ease drying, irrespective of weather conditions. Anti-theft mechanisms were improvised to allay farmers' doubts about storing maize outside for long periods of time. Maize shellers were also introduced. They offer a simple way of shelling maize, which is more efficient than traditional methods, and reduces grain breakages.

If farmers work individually, they are unable to produce large enough volumes to sell in the market. Patrick Kalunda, a Social Economist at KARI, comments on important cultural differences discovered during the course of the research: "In Apac, another district where we are working, forming groups is the normal way of life so it has been much easier there." It is important to encourage farmers to form groups, so that they can be taught how to use the new technology, and to increase their bargaining power.

Ms Najjemba Annabel, an extension worker for BUCADEF (Buganda Cultural and Development Foundation), explains why forming groups has been a challenge: "Everybody in the group comes with their

own ideas of what they want from it. Some think that they will get money, some think that they will get free inputs, others come to learn." Some farmers are also sceptical of groups because of previous bad experiences with state-owned cooperatives. Groups are now forming in the Kiboga District, where training is taking place to sensitise farmers to the benefits of being organised.

New varieties of maize seed have offered farmers the advantage of growing a crop of better quality. With local varieties of maize, they find problems securing a buyer. Agricultural Engineer, for KARI, Cedric Mutyaba, explains: "Some traditional varieties of maize seed have a mixture of colours, which may compromise selling capacity. I think that the market forces have encouraged farmers to grow new types of maize."

Mobile phones provide a useful way of gaining information about market prices – what any given produce is being bought for on that day. However, mobile phones are expensive and often not an option for small-scale farmers. Information can also be out of date, and although farmers are aware of their potential, they remain inaccessible to the

majority. Through workshops and training, farmers have been made more aware of what the market requires, mostly regarding quality standards.

The traders themselves have to be involved in training farmers. The grain trader Afro-Kai has provided workshops to improve understanding between farmers and those who buy the maize. Mr Chris Balya, Managing Director of Afro-Kai Limited, emphasises this necessity: "You will have to plough for them; you will have to give them the type of seed you want and that you think will meet the quality of contractors outside. So really, it has to be two way."

Market information increases the ability of farmers to bargain for better prices. One technology introduced by the project was the use of plastic bottles as moisture meters - they are cheap and easy to find locally. Agricultural Engineer, Cedric Mutyaba, explains the intervention: "You put the grain inside the bottle, shake it, leave it there to settle, and if the grain is about fifteen percent or lower, then the bottle will be clear." As the market demands roughly fourteen percent moisture, the farmer will know that he can sell it.

Information is also

being shared amongst farmers themselves. A maize farmer in Kiboga District, Mrs Nagiita Kasumba comments: "When I go back to my village and implement what I have learnt, other members who are not in the group learn from me." Kiboga District Marketing Officer, Katusiime Jackson, agrees that workshops and training have been an important tool for improving the ability of farmers to bargain: "Previously, farmers were in a black-out."

Challenges remain to be addressed; many farmers face problems with accessing direct markets, as a result of problems like bad infrastructure. Interventions such as weighing scales introduced by the project are still scarce. Such challenges need to be addressed if the full potential of the research is to be realised.

Project Leader, Dr Ambrose Agona, emphasises: "Having money does not mean that you are food secure! The farmers' bank is the crop itself." Despite constraints, farmers are being taught how to use their crop to their best advantage. That is the beginning of empowerment.

Interviews conducted with stakeholders in **Uganda**

Project Leader, KARI:
Dr Ambrose Agona

Before we moved in, farmers were selling maize by volume and not by weight. The intervention here by the project was to emphasise that maize should be sold by weight. To do this properly, we had to buy a weighing scale financed by the project. With growing maize for the market, there must also be something for home consumption, but to strike a balance between the two is still a problem. The moment farmers see money coming, they sell everything, but having money on you does not mean that you are food secure! The farmer's bank is the crop itself.

Maize cribs to protect the crop from dampness



Agricultural Engineer, KARI:
Mr Cedric Mutyaba

We have introduced technologies like some maize cribs, tarpaulins and solar drying systems to reduce contamination by pests. Farmers now produce high quality products, and levels of contamination have also fallen, so there is a clean product on the market. Because most farmers do not have moisture meters, they can use a plastic bottle - it is free and very common. You put the grain inside the bottle, shake it, leave it there to settle, and then

if the grain is about fifteen percent or lower then the bottle will be clear, so the farmer will be confident to take it to the market. If not, then they have to dry it. The market will demand fourteen to fifteen percent moisture in the maize. Drying in the tropics is a bit of a problem because of the rains, which intensifies at around harvesting time, so you can't afford to put the crop outside. If you leave your crop and it rains for two or three days, then it goes mouldy, so we have introduced the maize cribs which are raised off the ground.

Having money on you does not mean that you are food secure! The farmer's bank is the crop itself.

Kiboga District
Agricultural Officer:
Mr Issa Byabagambi
Simon Akiiki

Bearing in mind that our farmers get most of their income from agricultural produce, we have been concerned with the losses that they have from the period of harvesting to the time of selling. Quality assurance starts from the time of planting until you market your produce; so in addition to marketing issues, we have been looking at the agronomic issues that deal with standards. I

have been sensitising farmers on where to buy higher-yielding seeds, how to keep the crop until it is harvested. If we are advising the farmers to keep their crop and not sell it all at once, then we should tell them how to keep it better. Quite a number of the farmers have also now started making their own maize-storing cribs, which is a good demonstration that they have picked up the technology. We have also been involved with BUCADEF, and with female farmers to open up shops, bringing in the high-yielding varieties of maize seed.

Quite a number of the farmers have also now started making their own maize-storing cribs, which is a good demonstration that they have picked up the technology.

Social Economist, KARI :
Mr Patrick Kalunda

The cultural way of life has been a major challenge in this project. In Apac, another area where we are working, forming groups is the normal way of life, so it has been much easier there. In Kiboga, it is much more individualistic, and the tribes are different. We have some indicators that storing as a group will mitigate these constraints in the market. The storage has improved, you can see by

the quality and the numbers of people engaged in the groups. The communities that we work with are small farmer groups and, in order to bulk their maize, we have decided to make them into associations. We met with Kiboga Development Farmers' Association and this project started with that community. As we were starting this project, we noticed that the farmers have to be assured of a market. The farmers told us that there was no market, and that the prices fluctuated.



Maize shellers are quick and minimise grain damage



Womens' group shelling maize



Kiboga district farmer

Managing Director,
Afro-Kai Limited:
Mr Chris Balya

The weakest point in the farmer's product is the market, and the worst part about the market is knowledge that there is a product out there to be got. To a certain extent, I think that stakeholder partnerships will be the vehicle though which they will affect the policies of the local government, their districts, and then national policies, because they will not be

talking as individual farmers, they will be talking as a forum of farmers. If we have a target of raising one hundred thousand tonnes, the farmers won't produce it unless you give back to them. You will have to plough for them, you will have to give them the seed; the type of seed you want and that you think will meet the quality of contractors outside. So really it has to be two-way. It's about keeping the flow of information between the farmer and the trader.

Kiboga District
Commercial Officer:
Mr Katusiime Jackson

Largely, farmers have been sensitised to bulk their produce, bargain together, set prices as they rate the market conditions, then store and sell together. That way

they can be competitive on the market. Previously, farmers were in a black-out. A pertinent issue is that of weighing, and more farmers need scales so they know the exact weight of their produce. You would find that the middlemen still take

advantage of those who have still not got organised. The farmers did not have appropriate methods of storage, which is why we involved KARI. In short, farmers need to own the interventions at the end of the day. Sustainability issues have been there at the early stages.

Maize grown in Kiboga district



The weakest point in the farmer's product is the market, and the worst part about the market is knowledge that there is a product out there to be got.

Farmer:
Mrs Namuleme Kasfa

I'm here so that I can learn the modern ways of farming, and make it into a business. Now I use the system of mono-cropping, and I plant in lines. I had doubts about this system to begin with. I thought mine was best, but now I have seen that this way I can grow more. From the project, we have got improved seeds, fertilisers, tarpaulins, shelling equipment and the stores to stop insects ruining it. One time when we were in training, I brought some different crops along which had a disease and I was given pesticides to control it. I have now got better quality maize, with fewer pests. As women, we would like to make a group, so that we have our own money to pay labourers and people who help us, because they charge extra. Many people are having problems with loans.



Kiboga district farmer

Farmer:
Mr Kalifan Katende

Before the project came, I had really lost morale with farming. As we talk, I have regained strength and we are growing the crop more vigorously. We had low yields due to old farming practices. We have been trained in the use of the right seed which has higher yields. We have learnt how to get market information, mostly from markets in

Kampala. Before, we were bulking maize in a sack and then we would sell; but now we are selling in kilograms with weighing scales, which were supplied by the project. When someone wants to use them, they come and take the weighing scales, and they weigh, but there are not enough of these. In discussions that we have been having, our trainers have been making us realise our potential, and some of the changes we

have come up with have been listened to. But, because of money, we are mostly handicapped. We have had the training very well but, as regards an actual market, we have not yet identified it. If the loaning scheme could allow us to mill the flour ourselves, then we would be able to buy a mill and add value here. There are impassable roads and it makes things more expensive when we try to get to the market.



Kiboga district farmers

Representative of Women's Affairs and Widows
Mrs Nabatanzi Kasfia

I have a problem with my post as Representative of Women's Affairs and Widows. Some women cannot sustain themselves, so mobilising them is a very big problem. These women look after orphans and have no income, or no capacity to make the changes that I am telling them to. Although the training is better, implementing is the problem. But there has been change. Now we can work for

ourselves, unlike in the past when we were working as we had to, and I think that technology has helped this. Formerly, the markets were poor and many did not have the courage to get involved in farming. Now at least we have improved, since we have knowledge about the market. But as women we have many problems, and the marketing is still not very good here. In the future, I would like to see my children taught well. I can see this because I have noticed a difference, and I can see we are moving ahead.



Farmers' workshop in Kiboga district



Rural transport in **Kenya**



Rural transport is a complex issue. In Kenya, sixty percent of the road network lies in rural areas. During the rainy season, many of the roads become swamped with mud, and are even more inaccessible to local people. But rural transport cannot be seen as an isolated issue. It is important to consider who uses the roads, and why they need them. Alternative modes of transport need to be explored which can be used more efficiently in difficult conditions, and on the existing networks.

Otherwise known as IMTs, Intermediate Means of Transport are being developed, based on a better understanding of the connection between farmers who need to transport their goods to market, and the roads themselves. As ILO (International Labour Organization) Technical Advisor, Mr Stephen Muthua explains: "There is a tendency to look at things in sectors, like rural transport. The people on the ground do not see issues as transport on one hand and agriculture on the other. On the local level, these things are fully linked."

With support from the CPHP, the Society for the Protection of Animals Abroad and Brooke Hospital for Animals (BHA), the Kenya Network for Dissemination of Agricultural Technology (KENDAT) use a

partnership approach to explore and research the difficulties that many groups in Kirinyaga and Kiambu districts face with local transport. Their conditions need to be understood to make changes. According to the KENDAT Technical Manager, Mr Joseph Mutua, "For a farmer who is far away in the interiors, getting a cart could be a major problem, and maintaining it is another. How does he get it repaired, and how do you access the support services?"

By forming a coalition and community parliaments, groups who use the roads are involved in shaping improvements on their own individual level, according to their needs. Among the groups are horticultural farmers, bicycle transporters known as Boda-boda boys, donkey cart owners, and women's groups. Each of these groups have their own specific problems which need to be addressed. KENDAT, together with other organisations like Practical Action, act as facilitators to bring these stakeholders together.

One of the main problems for horticultural farmers are the middlemen who dominate the local markets. Without good transport infrastructure, many farmers are forced to take their produce to the nearest possible selling point. These are not necessarily the best, but for many farmers, there is no alternative. One local farmer, Mr

David Ngugi, explains the problem: "Traders get a very beautiful chance of saying 'I'm buying at this price'. The seller has no voice there completely. He is already at the market, and he must sell it, or lose it."

Farmers are being encouraged to group together. This not only strengthens their bargaining power, it also reduces the cost of transporting goods to the market. Collection points have been established to help farmers secure a buyer for their product, and training is taking place to provide these groups with market information. Many farmers lack knowledge about what the markets want, so workshops are being set up to teach farmers about handling requirements, and EU restrictions, which remain a problem for many farmers.

Forming groups has not been an easy process. As KENDAT Project Officer Mr Eston Murithi comments: "They have been farming for a long time. They think that they are independent of information regarding markets and mass production. Also, if they don't see the immediate benefits, then they might not stay." To improve market access, the coalition involves and sensitises private companies like the East Africa Growers' Association (EAGA) to buy horticultural produce. While this has been successful on some

occasions, farmers still face problems with direct market access.

Getting to the market in the first place is often a major problem for farmers in rural areas. Rural transport is infrequent, unreliable and expensive to use. So, KENDAT work to improve IMTs, which were accessible and reduce long travel distances. A typical example are donkey carts, either owned by farmers themselves, or hired by them. Donkey carts are a reliable method of transporting goods, despite bad infrastructure.

The Donkey Welfare Programme was set up to improve the design of donkey carts. Using local artisans, technology is introduced to balance the carts, and make the donkey harnesses more comfortable. The health of the donkeys is also considered. Many develop sores as a result of heavy loads and uncomfortable yokes. Training has been introduced to illustrate the importance of donkey health, and their importance for community livelihoods. Advice is given on different medications, to address illnesses.

Another group to benefit are the Boda-boda boys, who provide bicycle taxi transport. They provide an important, affordable service for passengers and produce alike. The Boda-boda boys have been encouraged to form groups, so that they are

able to afford annual licence fees, and to improve their financial security. They receive training on how to manage their business more efficiently, and on how to secure a loan, which is still a difficult option.

Initially, the project focus was rural transport. As the research process developed, it became clear that conditions are not the same for all the interest groups. Project Leader of BHA Mr Fred Ochieng, explains that there are alternatives to using transport: "An interesting solution to this problem was actually introducing transport avoidance measures. That is, we told people that they had to find ways of harvesting water, so that they did not have to travel such long distances."

Infrastructure in rural areas is still a major constraint. Motorised forms of transport have been explored, but until infrastructure is improved they remain an expensive alternative. Through working together with other organisations, private companies, and local authorities and community parliaments, the importance of IMTs is becoming recognised in transport policy.

According to Project Leader Dr Pascal Kaumbutho: "This keeps the Government on its toes, which is the natural way of democratic development. So, I think the future is bright".

Interviews conducted with stakeholders in **Kenya**

Farmer: **Mr Kiratu**

I always use the donkey cart to bring my produce here. You weld some iron, and then you have your cart. I know the project of the donkey, and I have even visited one of the seminars which my friend invited me to. In fact, I came to like it, because the project is trying to modify the method of donkey-carrying. Before we were making

the yokes anyhow, but now we know different types. It has made it easier, and the carts are much better. Before the donkeys, women were carrying on their heads. We were told that donkeys should be our friend. This method is better. At the seminar, we also heard about different types of transport, bicycles and motorcycles, which we would like to see more of here.

Soko Muringa market



Improved donkey harnesses

Extension Officer:
Mrs Sarah Thiaka

We have an integration programme, and we collaborate with our stakeholders. We talk of agriculture and livestock production as well, which KENDAT is also trying to link to microfinance programmes. Being the church, we act as a link

so that we can all assist one another. We have had a lot of involvement with KENDAT. We started training farmers together on different issues. Draught animals was one area, the improvement of the bicycles was another. They were grouped together and made more active. Here, it is not too hilly, but the distances are long. They helped

them to understand how they could improve the donkey carts, and also the animals themselves. Now they are transporting people and items. You see, there are people who come to tell us their ideas, but then they do not come to see us how we are touched by these issues. We go into the field together, we link up.

Trader: **Mrs Joyce Bulu**

Yesterday, we bought kale at four hundred Kenyan Shillings. Now today there is no kale, and we have bought at six hundred Kenya Shillings, so you see a difference of two hundred within a day!

There is no control over pricing - it depends on the market for that day. This is a bad thing. The farmers complain day-in, day-out about this. You see these sacks are too big. There is a lot of produce in there, and that is a loss to the farmer. After labour, fertiliser,

inputs, transportation, there is little money. There are times when the trucks are not available here, then we must go by public transport, to the bus station. The big bags cannot enter into the buses, so we are forced to buy other sacks and divide the produce into

two and double the work. The donkey carts are very good, because the charges are not high, although it depends on the distance, but it cannot make the distance to Mombasa, only the local market. The Boda-boda boys can carry only one sack.



Secretary, KENDAT:
Ms Zena Wanjiru

I have had an opportunity once in a while to go out into the field. In my village, we had to go a very long way to get water. I have had to carry two jerry cans of water on my back before, and they are heavy. If you can use something else, well, it is interesting to me and also to my family. I think that the work with KENDAT is different, as we are really interested in the rural people. If I talk about gender, the women are important. If I need water, then it is my job in the family to provide it. If I have to go a long way, then it is so tiring for me, with back pains. This is the problems that we are trying to solve.



Boda-boda boys

Boda-boda boy
Mr Evan Mochira

My work is to carry people from homes to town, and to various other destinations. It is very important to us, and we would like to get some better training about this. I've known KENDAT for more than two months since I attended some training. I have learnt how to handle the bicycles and earn a living, and in organising more groups. I have been transporting goods from the shops. There is a difference between working in a group and as individuals. Now we have been able to support each other financially, giving each other loans and giving

each other security. The roads have become very bad. Now there are improvements with the roads, but in the rural areas the roads are still very bad. We decided ourselves to be in a group, because we did not know each other and we wanted the security of this for business. The leaders of the group ensure that others who join are trained. The group chose the leaders, and when it comes to making the decisions, the leaders will make them for us. The community parliament is made up of representatives, and I was chosen as one. We are hoping that we can get some loans to improve our means of transport.

Donkey transport



Secretary, Murubara Horticulture Group:
Mr Alfred Murage

We usually grow maize and fruits. KENDAT has introduced bicycles, with the Boda-boda boys, so the work is easier. Now we can have parallel lines so that the donkey and bicycle users are not affected. They have

seminars on how to look after the donkeys to avoid harm to them, and also to tell us about medicine. Regarding marketing, the prices were very low. The middle men tried to exploit them. They would sell it for a much higher profit margin, and he is not playing any part. You have got the fertilisers, the seed, the hard work,

and now this person is only coming to collect. At market level, the price is very high for him, and you as a farmer will earn very little. That means that we were not going anywhere. I was straining as to how I was to get the school fees for my children, and now they are not sent home. I am now earning more. The workshops have

been very vital to us. Actually, when we organise these groups, they invite Agricultural Officers and Veterinary Officers so that we can be trained. We have some surplus from the crops we grow that are rejected. They told us to feed them to the goats and animals. From a hen, you go to a goat, then to a cow.

Donkey Welfare Programme:
Mr Anthony Kamau

We talk with the donkey owners on how best to use the donkey, for it provides farmer's livelihoods. In fact, in these rural areas, more than seventy percent of

the transport is by donkey. The people who do not have donkeys usually hire, and a few you can find carrying on their backs and heads. The donkeys are brought here, and our main issue is to make them productive, so that they can be bred here.



Transporting produce

District Agricultural Officer:
Mr Mri Gikonyo

Our main activity is to train farmers so that they are able to produce and add value to their product. KENDAT have been involved in rural transport, rural marketing and in road networks. We know that one of the challenges in being able to effectively serve their farmers is the road network we have. The other challenge is bringing the farmers together so that they can market their produce. We have been collaborating with KENDAT to sensitise

the farmers, and encouraged them to add value and to provide volumes that can be marketed and negotiated at the market place. We have been looking at using animal transport to access areas that cars cannot. This is where KENDAT came in, because we already had donkey carts but they were not very efficient. Previously, someone would come up with their own design, and the animals would carry large loads and have sores. The farmers now know how to make different harnesses.

Farmer in Mwea:
Mr Michael Warui

Mostly we have contact with KENDAT. They are the ones who assist us with getting a market, people who can come and buy our product. We always wish that we could get a direct exporter, who pays us straight. We had been doing this for years and years. Our request is: why can't farmers have a company selected for them that can buy the product without using a third party? Payment for the groups within the area is very low. When KENDAT came to us, we told them that we have a problem with the market. They introduced us to a buyer. When EUREPGAP came to us, they told us that they cannot buy our product until we meet their standard. So we asked what the standard was, they sent some people here, who started teaching the farmers how to meet the EUREPGAP. They told us that what we should do first is to build a shed, but this shed has not met the standard. It is supposed to be sheltered. We tried to ask them please to assist us on where we are now, because we are now stranded, and how are we to get money in order to complete our shed?

Farmer:
Mr Esbon Karuri

This road was impassable, the rains came, and even the cows could not pass here. This was personal initiative, because I could not get to the road to take my goods, French beans, tomatoes, water melon and avocados. We are forced to use the local transport, like ox and

cart, because we cannot use the vehicles. This gravel I have bought myself. We do have collecting centres, there are many and they have been around for a long time, but they cannot come here. They are helpful, more or less like a cooperative. Being in a group has changed many things. We transport together. These goods are perishable, so you must take it there.



Improved water harnesses

Farmer:
Mrs Mary Withera

This is a bore hole: it is like a big well. I want you to see what I have done. We built this in September last year, and it has been very good, because it helps me with growing trees and plants. We dug it ourselves, in collaboration with

KENDAT. The plastic came from a different company, and it is quite expensive. When I learnt about this, I thought it was a very good idea. I used to go for eight kilometres before I could get water for domestic and other things. The water that I have here from this water pan I use mainly for my family and for growing the plants.

Community Head of Women
Family Planning:
Ms Beatrice Nyokabi
Weinainah

I am also the
Treasurer of the
community group.
We were involved by
KENDAT, and we started

to join in groups. In the
first instance, we were
helped by micro-finance
to assist us in business.
If we have a little
money, then KENDAT
usually train us as to
how we can use it. We
also learn more about
village banks, so that we

can manage. I did not
have a mobile, but I was
issued a loan, so I
manage. We have profits
in it. Gradually, we can
see the profits, and we
expect more from it in
the future. I represent a
Single Mothers' group,
where we share

problems. Problems that
we face are isolation,
and it has taken time to
get to know one another.
The community did also
not accept single
mothers, many feel
rejected because they do
not have a job. Many
believe we cannot be

leaders. I can say that
we are really pulling up
our socks, my children
are in school. They are
moving themselves to
work hard. We expect in
the near future to grow
more than we have done
already.



Horticultural farmers in Kenya

Senior Programme
Manager, Practical
Action:
Ms Rahab Mundara

At Practical
Action, we
believe in
working through
networks and
partnerships. In
Kenyan transport
policy, the emphasis
has always been on
vehicle transport, and
there is a lack of a
policy framework
around which rural
transport can be
addressed. We have
worked around policy

dialogue to change
transport policy
nationwide and
sensitised farmers
about what is available
to them through
parliaments. For me,
capacity-building is
very fundamental in
terms of change,
because communities
do not have to wait for
us to show them what
to do. Previously, as
generally happens
with a lot of
communities in Kenya,
donor support was
making people
dependent. You do a
project, and then you

move out, and they
wait for you, because
people do not believe
in themselves. The
farmers now question
development,
challenge and speak
for themselves. We are
only a catalyst. I would
say that there has
definitely been an
attitude change at
local policy level,
where the mentality
has changed in terms
of recognising that
this is a good option to
transporting goods and
people in some of the
rural areas.



Farmers' workshop



Fruits of the Nile in **Uganda**



Horticultural fruits like pineapples, mangoes and bananas grow in abundance in Uganda. At certain times of the year, there is a surplus of fresh fruit on the market. Because many small-scale farmers who grow the fruit lack storage facilities, it will go bad in a very short space of time. As a result, farmers are forced to sell their produce as soon as they harvest it, at very low prices, or leave it to go to waste.

The Kawanda Agricultural Research Institute (KARI) in Uganda, together with the Natural Resources Institute in the UK, identified solar drying as a sustainable method of reducing these post-harvest losses. Solar drying would enable farmers to produce high quality dried goods that not only can be stored for long periods of time, but can also be sold as an export. This provides small-scale farmers with an alternative market for their produce, which also guarantees higher returns than selling the fresh fruits.

In 1992, the company Fruits of the Nile was formed. It was founded by local entrepreneurs specifically to provide a stable and sustainable market for the dried fruits. Market research was conducted to identify potential for the dried produce in the UK, and Tropical Wholefoods was

established by Adam Brett and Kate Sebag as the UK-based buying and marketing partner of the company, later merging with FM Foods Ltd. in Sunderland.

With a sustainable market identified, Fruits of the Nile began sensitising farmers to the potential of investing in solar drying techniques. They worked with farmers to encourage them to form groups, and to teach them about the drying technology. Jane Naluwairo is chairperson of the Patience Pays Group, formed to process dried fruits to supply Fruits of the Nile: "Adam found me at a sewing machine; they were looking for organised women's groups. They taught me about drying, and I came back with the knowledge."

This was a slow process. Charles Naluwairo, Secretary of the Patience Pays Group, explains: "Farmers were complaining: 'If I eat dried fruit, then I will not get anything from it because all the nutrients have gone'. We had to tell them that there are not any nutrients lost." Groups came together through interest, and to reduce the cost of transporting processed goods to the factory. As groups have expanded, they have incorporated health care and HIV awareness activities, which are indirectly related to the ability of farmers in the area to

supply processed fruit.

Training and support have been supplied by Fruits of the Nile throughout the project. If farmers are in financial difficulty, they can obtain an advance which will be deducted when they have delivered their fruit, allowing them to spend cash when it is needed on farming inputs and school fees. This illustrates the unique relationship that exists between farmers and the company. Personnel and Financial Controller Nathan Komunda comments: "They trust us. We are ever there, and when we are training, we are going round in the field with them."

As well as financial support and solar technology training, farmers are also supplied with materials to construct the dryers. Plastic sheets and mesh, and on occasion complete driers, are provided to farmers who are just starting out, giving poor farmers an opportunity to see the benefits themselves. Horticultural farmer, Yunusu Kafuuma, explains: "I went to the Fruits of the Nile, and they offered me two dryers. When I discovered that this was actually profitable, I decided to ask others to join me."

Before solar drying technology was introduced, farmers were unable to secure a

stable market for their produce. Because Fruits of the Nile do not restrict those with a small amount of produce, farmers are assured that they will be able to sell whatever they produce. James Zirimala, a farmer in the Kayunga district, explains the problem: "With the fresh fruits, we were worried. When you dry the fruits, you are assured that there is a market for them, and you know where you will sell them."

Another advantage of having a stable market is that farmers come to know from experience what is expected of them. Fruits of the Nile offer training in quality control, which means that farmers can keep track of what they are supplying, and improve upon it. Nabulya Flaviah sorts the produce as it arrives in the factory. She notes: "The fruits have a good quality, because the farmers know that if they do not, then they will be rejected."

Much of the success of the project can be attributed to the trust that links the growers, the processors, and the buyers of the fruit. From 1992 to 2000, the amount of dried produce exported to FM Foods in the UK has increased by thirty-five tonnes. In 1998, Fruits of the Nile was awarded Best Innovative Company. Farmers have been involved from the very start, and Fruits of the

Nile have created the demand according to their capacity to supply. Although prices do still fluctuate, and farmers would prefer a higher price at certain times of the year, the market is sustainable.

Through group formation and increased bargaining power, farmers are becoming heard. Many of the groups have written their own constitution, and are becoming registered as community based organisations. The Kayunga District MP, Victoria Kakoko-Sebagereka, visits the Patience Pays group often: "I take all their voices and introduce them to the Parliamentary Committee." Such progress is necessary to ensure that the demands of those often marginalised are met.

Fruits of the Nile adopt a unique approach to integrating farmers into the market chain. They grew as more farmers became involved in processing. This ethic is integral to the company mandate of fairtrade. Co-founder of FM Foods, Peter Fawcett, explains that supply is a problem, but "farmers know from practical experience that we sell everything that they bring. They get a reward for their labour, and we get a product that we have invested time into the quality of. It is a virtuous circle."

Interviews conducted with stakeholders in **Uganda** and the **UK**

Chairperson, Patience Pays group, Kauyunga District:
Mrs Jane Naluwairo

I am the Chairperson of the Patience Pays food handling and storage project. I give knowledge of processing dried fruits, which I have got from Kawanda Research Organisation. Adam, a founder of Fruits of the Nile, found me at a sewing machine; they were looking for organised women's groups. They taught me about drying, and I came back with the

knowledge. By then, we were calling ourselves 'Tusitukire' which means 'let us lift ourselves together.' Unfortunately, all of the women in this group were old women! I was the youngest. We then formed this group. It took a long time, and it was very difficult. That is why we called it Patience Pays Group. We got our fellow people, I taught them drying, to plant pineapples, and now the district is full of people drying fruits. We realised that the fruits

were still sweet when dried, so we decided to try it in Europe. People here start with agriculture on a small scale, because they are poor. If you tell them to plant something, they will ask 'How will you help me?' I was encouraging them to plant pineapple because I wanted to buy from them. We need to be organised and link up with farmers from other projects. We would like to help those infected with HIV. Most of my farmers are sick, and I'm worried about it.



Mrs Jayne Naluwairo

Warehouse Sorter:
Ms Nabulya Flaviah

Before I came here I was a student. I am sorting bogoya fruit, which comes from

villages around Kampala. Our job is to sort different types of fruit like banana and pineapple, which we either put into line or poured into the bags

which are shipped abroad after being frozen. I know that the farmers earn money from this, and I know some farmers who produce this in the villages. I know that

some people have bought the fruits when they are dry, then they put them in the dryers and bring them here. The Fruits of the Nile provides the dryers to our farmers,

and they send people to show how to use them. The fruits have a good quality because the farmers know that if they do not, then their fruits will be rejected.

Patience Pays Group:
Mr Charles Naluwairo

We found that people in this area have so much fruit, but they lack knowledge of how

to make money from them. So we started slowly by convincing them in groups. We needed to get people into groups, which was difficult. At the local stage that we are, it is

not easy to convince people. The source of support has been from Fruits of the Nile. They have given us advice and material support, like polythene sheets and plastic mesh, also some

capital occasionally. Farmers were complaining that 'If I eat a dried fruit, then I will not get anything from it because all the nutrients would have gone', so we had to tell

them that there are not any nutrients lost. They come here and see that there is no juice that comes out when it is dried. Even the schools are now coming here to get them as well.

Drying pineapples at the Nazigo Group



General Secretary, Patience Pays Group:
Mr Onyago-Ogen Francis

We wrote the constitution of the organisation, then we started the process of registering with the district as a community-based organisation. We have had to put things to policy, and the District Council thought that it would be better to

register as an NGO, and we are now registered. We have been operating workshops to give the farmers knowledge, and they have been able to sell their fruits to us, so they can solve their economic stresses. We make losses if the weather is not good, as we rely on the sun as processors. But the farmers can gain, because they still sell their fruits to us, we just

cannot process it. Previously, we existed on a very small scale. We were invited to attend a workshop, and we were trained. This is the same time that Fruits of the Nile was founded. We were working on local products before, just the fresh produce. At least now we have added value by drying, and also by exporting through Fruits of the Nile.

We have been operating workshops to give the farmers knowledge, and they have been able to sell their fruits to us, so they can solve their economic stresses.

Farmer: **Mr James Zirimala**

Iknew Fruits of the Nile because I came to Patience Pays Group, and they taught me the drying process. I was born here and my brothers are from this place. I was also selling fresh fruits before to Patience Pays and they were drying them. So, I knew from there that it was possible and I decided to set up on my own. When you dry the fruits, you are assured that there is a market for them and you know

where you will sell them. With the fresh fruits, we were worried. I now have my own dryers. I asked the Chairman of the Patience Pays Group, Jane, who approached Fruits of the Nile, and they then gave me the dryers. I now sell directly to Fruits of the Nile. I can take as much as I can dry there. If I take the produce there, they bring the weighing machine, then they give me my money, then I come back to the village. I always get my money straight away when I go there.



Fresh pineapples

Financial and Personnel
Controller, Fruits of the Nile:
Mr Nathan Komunda

Most of our farmers are individuals operating under groups who have a name and leaders. We found it was difficult to have lots of individuals, so we said ‘Okay, operate as

individuals, but under a group’. Then they can share the costs of the transport as well. Here our farmers are very small producers. We tried to bring in the idea of making contracts with them, so that they would produce a certain amount for us. But we found that they could not afford to stick to this. So, we made

it open, each produces as much as he can afford, and it is working out. One thing is that they trust us. We are ever there, when we are training, when we are going around in the field with them, reminding them and making spot checks to see if they are following the training. At one time, we got a revolving fund

which helped our producers in getting more dryers and working capital. We advance money with free interest, which we deduct when the fruits are delivered. We work with the communities, and when we got the dryers, we told them to come and see. We spend quite a lot of time teaching people to give

the quality that we want, and we have stayed with the same people for a long time. We are now building a store in Jinja and, in three months’ time, we will move there so that we can expand the export. With the increase in volume, we can involve more farmers, and that is what has happened from the beginning.

Solar dried mango slices



Farmer, Nazigo Group:
Mr Yunusu Kafuuma

I went to Fruits of the Nile, and they allowed us to start the project. Before this, I used to teach Arabic. I wanted to expand on my ways of getting income. Before I had seen it, I had heard about drying fruit, but I could not believe it until I

had seen it. When you look at the fruit, it has a lot of juice in it, and you cannot believe that it can dry like that! Even now, convincing others that pineapples can dry is tough. I knew some other people who had started earlier, and they are the ones who introduced me. They taught me how to dry, and what to do with

the fruits. After learning from my friends who were already in the system, I went to Fruits of the Nile, and they offered me two dryers. When I discovered that this was actually profitable, I decided to ask others to join me. We have put up a house and there are other tangible things that I can see

happening. At the moment, though, the price of the fruits is going up, and the prices are going up as there is more competition. It is advantageous that I do not have to worry about storing so much, and Fruits of the Nile will buy whatever I can provide.



Mr Yunusu Kafuuma



Solar drying at the Patience Pays Group

Finance and Operations, FM Foods Co-Founder:
Mr Peter Fawcett

We don't have contracts with our farmers: we can't force them to sell to us. There is always a risk when you're looking at the market. What we are offering is a sun-dried product with no

additives whatsoever. In a sense, the market is coming to us. Then you look at the fair-trade angle which is our *modus operandi*. We take everything they can possibly produce. They know from practical experience that we sell everything that they bring, they get a reward for their labour, and we get a product that we

have invested time into the quality of. It's a virtuous circle. We have a problem with supply; for example, if we were to sell to a supermarket, we couldn't, because we don't have the volumes that they would require. But what we are not prepared to do is to question the quality of the product by spreading the net too

wide; we want to retain the core of producers that we have. It's a case of tempering the supply side with the demand. The concept of fairtrade is that everybody needs to be doing well out of it; in my view, there are no alternatives. We are built on trust and transparency. If there is an understanding by everyone in the

organisation of what it is trying to do, how they fit within it: that's fairtrade. If you truly understand what fairtrade is about, then you understand that there are risks associated with it. To some degree, we prepare for those, but the rewards far outweigh the risks.

If you truly understand what fair trade is about, then you understand that there are risks associated with it. To some degree, we prepare for those, but the rewards far outweigh the risks.

Transporting fresh pineapples to Nazigo Group



Assistant Quality Controller,
Fruits of the Nile:
Mrs Constance Tusime

Iam an Assistant Quality Controller, which involves checking the fruit quality and standard coming in, and then recording it. I am a teacher by profession. One thing

that I think it would be good for us to do is to get our workers to go and visit farmers in the villages, so that we know each other, and where these fruits come from. The farmers do not know what happens here. Of course, this is expensive; but, you know when you sort these things, you

would like to know how hard it is to produce them. I know that the drying has given farmers benefits. When I first joined here, it was very small, and when we were exporting, just a few kilos. Then the farmers increased in numbers, so we have moved from there.

Sorghum farmers and poultry feed in **India**



In Andhra Pradesh state, sorghum is an important crop for many households as both a staple food, and fodder for livestock. Its potential use in industry for instance in poultry feed is largely untapped. The problem with sorghum grown during the rainy season is that grain development can coincide with the rainfall, which leads to mould. Farmers have a problem selling this sorghum to a reliable market as there are misconceptions about the safety of the grain. They also face problems with quality and low yields.

ICRISAT (International Crop Research Institute for the Semi-Arid Tropics) decided that the thriving poultry feed industry would provide a viable market option. Maize is the main ingredient in poultry feed, but it is expensive, its supply is unreliable, and demand for the cereal outweighs supply. Sorghum had been used in feed, but only in minimal quantities, because of concerns that it is not good for the health of the birds. Research was undertaken to prove that sorghum could safely replace maize up to one hundred percent.

Once the potential had been identified, the coalition had to involve stakeholders with a range of different expertise, dealing with specific issues. It was important to involve buyers like Janaki Feeds from the very beginning, as they would be able to provide a ready

market for the sorghum. ICRISAT Visiting Scientist, Dr Gurava Reddy, explains: "We have been emphasising that the cycle is only complete when the market has been found, and that link has been found here."

Five main partners were identified to find a market for the rainy season sorghum. The Acharya N.G. Ranga Agricultural University (ANGRAU) in Hyderabad was involved in the coalition to develop previous research on higher-yielding varieties of sorghum, which would also be more mould-resistant. This would benefit the sorghum farmers because they would be better able to sell their produce. Buyers would save money because sorghum is cheaper than maize, and scientists would see their results on the ground.

Sorghum farmers were represented in the coalition by the Federation of Farmers' Associations (FFA). Many small-scale farmers are often unaware of market requirements, and their produce is rejected as bad quality by traders. When farmers work individually, securing enough produce to sell to industry is difficult. The Federation's Agricultural Expert, Varaprasada Reddy, adds that: "Initially, farmers expressed concerns about new varieties of sorghum, as they thought they were not good for the cattle."

Through workshops, farmers are taught how to

grow and obtain the new seed. Many are aware of the potential of new seed varieties of sorghum for producing higher yields, and better quality sorghum. Although bringing farmers together initially proved a challenge, they are beginning to see the results. Narasimhlu Goud is a sorghum farmer in Mahbub Nagar: "I could see the progression of sorghum over the last two years, and developed an interest. The yield has doubled."

Another problem for sorghum farmers is the complex network of middle-men, who often dominate the markets, and buy produce from individual farmers at a very low rate. Janaki Feeds manufacture poultry feed, and are integral members in the coalition, helping to reduce the number of middle-men. Although conditions are improving, middle-men remain a constraint to farmers. By linking farmers directly with a sustainable market, farmers will receive a better price for their produce, and a better understanding of what the market demands.

In order for Janaki Feeds to replace maize with sorghum, they had to be convinced of the results. The coalition could not afford to waste time or money on an initiative that was not going to work. Through informal networks and discussions, a common goal was understood. Janaki Feeds Managing Director,

C. Madhusudham Rao, explains: "We believed ICRISAT because they are scientists! It has to be done by them. They are transferring the technical knowledge to the practical people involved in this every day." The results were even repeated in industry conditions, to convince poultry farmers.

Poultry farmers are represented in the coalition by the Andhra Pradesh Poultry Federation (APPF), as the end-users of the product. They also needed convincing that sorghum would not affect the health of the birds. Mr C. Kanaka Reddy is a poultry farmer. He comments on the challenges ahead: "Many poultry farmers think that in the sorghum there are toxins. They will not listen to us. They don't want to take the risk." A potential constraint has been that sorghum can make the yellow colour of egg yolk paler, so *stylosanthes fruticosa* leaf meal is added to the feed.

Research proved that sorghum is a healthy, and cheaper alternative to maize. It contains similar levels of energy, and higher levels of protein. Contrary to perceptions, mouldy sorghum has also been shown to contain low amounts of toxins and tannins, which stunt the growth of the birds. It will take time to convince the entire poultry industry of the potential that sorghum offers, but because the poultry farmers are involved in the project, many are

ready to replace the maize, if enough of the produce can be supplied in sufficient quantities, and of good enough quality.

Where previously research like this would have been carried out by scientists working in isolation, it is now shared and developed by the very people who would use the results. Involving different groups is a unique approach to conducting research. Ms Laxmi Thummuru, a Senior Researcher at CRISP (Centre for Research on Innovation and Science Policy), explains that "There was hardly any interaction between the public and private sectors because of their divergence in mandates. The public sector would not think of profits, which the private sector invests in."

As a result of the coalition approach, research conducted has been taken up by the very people it was aimed at. Dr Shambu Prasad, former Director of CRISP agrees: "An advantage of the coalition is that partners understand each other's needs much earlier. Individual sorghum farmers are not able to meet demand. An interesting thing about having an industry in the coalition is that it has increased bargaining power with regard to public policy, which farmers usually do not have the potential to do." The project is now being up-scaled in two other countries.

Interviews conducted with stakeholders in **India**

Sorghum Farmer:
Mr Nageswararao Madanena

Voluntarily I keep all the seeds which I am given by the project, as I was selected as the person to collect them. I then give them to the farmers locally. Whenever a farmer wants the seed, then I give it to them. I can see some improvements with the yield of the sorghum now. We came to know about these seeds through the workshop and decided that we would try it. We pay for the seeds from those we collect it from.



Sorghum farmer in Mahbub Nagar

Sorghum Farmer:
Mr Vulli Sharanaiah

Iam farming in my local district of Mahbub Nagar. My family is very big as I live with my brother. Totally, we have twenty members in our family, and we have forty acres of land. I have been growing sorghum since my forefathers' time. If you compare with maize, the sorghum is an easy crop. Our staple food is sorghum only. If it rains during the early stages of the grain development, then we have problems with mould. As we came to know that these sorghum grains are being used in the poultry industry as an alternative to maize, now we are much interested to grow sorghum in this area with management for a more marketable surplus. We have been taking the crop together at one time. This reduces the problems with the crop. With improved cultivars, we have been getting better productivity and higher returns. After seeing the benefits of this we will continue the process for other crops also in the future. Some officers came and gave us some seed, and at first we were sceptical about them. We thought that we would try it to see the benefits in

the first year. Now, many farmers are interested to grow this hybrid sorghum, and we have grown to three hundred farmers using these seeds. We have seen the potential of the crop.

Growing sorghum



Our staple food is sorghum only. If it rains during the early stages of the grain development, then we have problems with mould.

Sorghum Farmer:
Mr Gantla Mallesh Yadav

Earlier, we used to grow local varieties of sorghum and, after the introduction of this project, we have been growing improved cultivars for the last three years. We have been able to produce more surplus which we

can sell. We have been selling the surplus collectively to the poultry feed manufacturers and, after forming into a group, our bargaining power has increased to such an extent that we can bargain for a better price. Before, the traders did not care for us as we were individual farmers. Our families have also

benefited from this. My earlier apprehension of growing sorghum has changed. If we were able to get still better prices in the market, we could increase our land in the future. In earlier days, we were only concerned with our fodder needs, and consumption in the home, and these two things we kept in mind when growing sorghum.

Visiting Scientist, ICRISAT:
Dr Gurava Reddy

Sorghum is viewed as a subsistence crop, but we have explored the industrial demand for sorghum in the poultry feed industry, and we have found that there are other uses for it. If you take account of the growth of the poultry industry in India, this has good potential. Farmers have been using local varieties of sorghum, but this needs to be tackled with new technology at the farmer level to link the farmers to the market. The coalition has explored the opportunity for mouldy sorghum in poultry feed. Though the poultry feed manufacturers have been using sorghum for many years, the amount of sorghum in the feed has

been at a minimum level. During the research, it was found that the levels of aflatoxins in the sorghum is at minimum level and does not cause harm to the bird growth. These findings have shown the poultry industry that they can use sorghum in the feed. Members of the coalition have been included at the initial stages, throughout the project, and after completion in informal discussions. Now that the industry is convinced with the results, the availability of sorghum needs to be increased. We have been emphasising that the cycle is only complete when the market has been found, and that link has been found here. Through this experience, farmers can use what they know to explore other industries.

Workshop with sorghum farmers in Mahbub Nagar



Freelance Consultant,
ICRISAT: **Ms Emma Crewe**

This project was extremely innovative in the way that people have worked together. All the key stakeholders had an interest in it really working. They had very regular meetings, they talked to each other when they needed to on the phone. They divided the tasks so that the people who were the experts were only

dealing with their expertise. ICRISAT formed a coalition not only with the private sector, but also with farmer representatives, sorghum growers, and potential buyers. The poultry manufacturers and farmers, they felt, could be persuaded to use larger quantities of the sorghum, if they could convince them that it was still healthy for the chickens. They found five main partners, who sat down

and planned the project. They were clear that ICRISAT should be the leading partner, and they jointly planned the experiments on sorghum. ICRISAT was well aware that they could not waste the time of these partners, and they would have been risking the investment of poultry industry unless they could provide them with convincing evidence that the sorghum was just as good.

testing egg yolk colour at ANGRAU



All the key stakeholders had an interest in it really working. They had very regular meetings, they talked to each other when they needed to on the phone.

General Secretary, Andhra Pradesh Poultry Federation:
Mr C. Janarehan Rao

I represent twenty-five thousand layer and broiler farmers of Andhra Pradesh state. The problem that most poultry farmers face is cereal availability. We depend on maize only at the moment, and maize availability is problematic. The sorghum is not so available, and we use it according to what is available. There are two types of feed required by the birds at different ages. After fifteen days, we change to a different type of food. We are ready to buy any amount of sorghum if it is a good price, between eight to ten percent cheaper than maize, and of sufficient quantity and quality.

We did think that sorghum was inferior to maize in terms of energy levels but, with research conducted by scientists in the coalition, these apprehensions have gone, as we have seen the results.

Sorghum feed for chicks



Seed availability is also a problem. Seed is being provided through ICRISAT, and quality of the sorghum has increased in the rural areas. As the small farmers are poor, they are not in the position to make a good quality product. With the project, dryers are helping the quality for poultry feed. The concerns for us are sufficient quality, quantity and the price. We did think that sorghum was inferior to maize in terms of energy levels but, with research conducted by scientists in the coalition, these apprehensions have gone, as we have seen the results. Sorghum can replace maize one hundred percent, and we are ready to purchase what they can provide.

Senior Scientist, ANGRAU:
Dr Rajashekher Reddy

My role is to conduct the poultry trials. We have conducted experiments utilising sorghum. As maize is costly, we have tried different cultivars to include in the poultry feeds. We prepared the diets with different levels of sorghum in replacement of maize.

Poultry feed trials at ANGRAU



The results indicated that it performed in some cases better, in terms of food efficiency, than maize, as it has higher levels of protein. *aflatoxins* were analysed, and low levels of toxins were indicated. At the same time, tannins which are growth-depressing were also low, even at complete replacement of maize with sorghum. We started at different levels

to study the performance of the birds. The problem with the sorghum feed is that it makes the egg yolk paler, but it is only an aesthetic issue. If we can include some organic or chemical substance to make the colour more yellow, then that is better. At the moment, we are using the plant extract *Stylosanthes fruticosa* to alter the colour of the meat and eggs of the chickens.

Sorghum crop



Poultry Farmer:
Mr C. Kanaka Reddy

We have been using sorghum, only five to ten percent in the feed. Sorghum is less available than maize and, although maize and sorghum are the same energy-wise, there are different perceptions. The poultry farmers think that in sorghum there

are other toxins. Farmers will not listen to us, they don't want to take the risk. They think they will not get a price for their sorghum or maize. There are small plots and mechanisation is not used in the farmer's fields. Farmers have been trained to use sorghum as a substitute to the poultry farmers for the future.

General Manager, Janaki Feeds: **Mr Bayasagar Rao**

About eighty percent of our produce goes to the poultry farmers of Andhra Pradesh. We are currently replacing sorghum with maize in parts, and it is equally good. Generally, there is a mind-set with the farmers that maize is better. Scientifically it is proved that energy levels are the same in sorghum, so I think that things are changing. I can use it one hundred percent, but we have to prove it to others, and I think that it will take some more time. Most poultry farmers are seeing the change, but they look at the commercial value. The smaller farmers don't want to take any risks. We conducted the trials in our farms once ICRISAT had conducted the seminars, and then the replacement started spreading. I attended a seminar, where the results were displayed to the farmers, and I think that helped the farmers to accept it. There were questions raised over the concerns. The future is there, but availability we need to see. The quantities are quite small. The traders do not take any risks because they know the quality that we accept, and that it will be rejected if it is not the right quality. We cannot get supplies from small farmers because the quality is not so good.

Agricultural Expert, Federation of Farmers' Associations:

Mr K.M. Varaprasada Reddy

I have been working with ICRISAT and the FFA [Federation of Farmers' Associations, Andhra Pradesh]. I work with farmers in the rural areas. I am conducting training programmes with farmers on pesticide

uses and appropriate uses of fertilisers. I tell them what to use with certain seeds and crops; they often do not know about the treatment and its benefits. Initially, the farmers have expressed concerns about higher-yielding varieties of sorghum. They had their own ideas about it, and they thought the cultivars were not good for the cattle. We have

been able to prove them wrong, as the new varieties are of better quality. Farmers often say that new varieties need more water and are more expensive. But the yield is almost double. Technology has been given by ICRISAT, and I am the person who has been transferring the technology to farmers. ICRISAT linked with the poultry manufacturers

Janaki Feeds. They purchase sorghum seed directly from farmers. Prior to this, farmers sold the produce in the markets and the transportation costs are high. The poultry feed manufacturers who are part of this coalition, have been linked to reduce the middlemen.

The poultry feed manufacturers who are part of this coalition have been linked to reduce the middlemen.

Vice-President, Federation of Farmers' Associations, Andhra Pradesh:

Mr Akkineni Bhavani Prasad

The object of our federation is to empower the farmers, to improve their livelihood, and to make them more knowledgeable in the agricultural sector. India is basically an agricultural country, and more than eighty percent of farmers are small and marginal in nature. When we started, we found that the farmers were not getting quality seeds, they were not getting credit from institutions like banks, and the last thing is that they were not able to market their produce properly. A lot of money was wasted on the middleman structure. The FFA came into contact with ICRISAT, and we realised that if the research community and

the farmers work together, better results can be achieved. The sorghum farmers selected for the project are mostly small holders who have cultivated only native varieties of sorghum. In the initial stage, seventy-four farmers in two districts have been identified and supplied by cultivars developed by ICRISAT. The yield has improved and, in the process, we could bring the farmers to work together, and make them understand that this will get better results. They were also linked by supplying the product to the poultry federation. In the traditional context, every farmer is an independent worker - in growing the crops, in selling - but, in this project, we made them understand the importance of collective cultivation and decisions of selling and buying inputs.

Mahbub Nagar village



Linking tribal communities with markets in **India**



The state of Orissa is densely covered with forests and hilly terrain. It is populated with an ethnic group known as Sauras, who make up some of India's poorest people, living below the official poverty line. The area is rich in horticultural produce, like pineapples or mangoes, and these are grown by local small-scale farmers. Bad road infrastructure means that farmers cannot transport their produce to a reliable market, and as they cannot store their produce, it goes bad within a matter of days.

As a result of these constraints, many farmers remain isolated, and unable to tap into the potentially high prices for horticultural goods. Traders often take advantage of the situation, and because farmers have no alternative, they are forced to sell at a very low price. Mr Mohanbhu Yea is a community worker, and explains the problem: "Whenever you pick a fruit, you get problems with it on the second and third days after picking. Have you heard of distress sell? At one time the traders stopped coming here. Everything we had was completely lost."

The research partner of the coalition is OUAT, the Orissa University of Agriculture and Technology. University Dean, Dr Mohnty,

emphasises that all coalition partners share a common goal: "We were all interested in projects which have a social impact, particularly the tribal communities." The university worked to develop methods of storage and technology which are affordable and easy to use in local conditions.

Scientists at the university worked together with a local grass root organisation, the Center for Community Development CCD. IDEI had previously worked with this organisation, and they had a strong link with local communities. CCD was already involved in forming and supporting women's Self-Help Groups in isolated areas.

The university developed a technique, osmo-dehydration, which would dry the fruits, together with other techniques like juice extraction and pickle-making, which add value to the fresh produce.

CCD invited local community groups to visit the university, and learn these new methods of value-addition. Groups made up of young women travel long distances to reach the university. Ms Janaki Nayak, a fruit processor explains why: "Even though some of us are educated, we did not know how to go into

business using our own product. We pass over many hills to get to the university sometimes, but we do go there to learn."

Technologies like juice extractors and pineapple corers are demonstrated in the laboratory. Groups are provided with these at subsidised cost by CCD who hold demonstrations in isolated regions like the Gajapati district, where the project was implemented and where CCD is based. Mrs Kalpana Rayaguru, an Assistant Research Engineer at the university comments: "The ladies that we see in the villages don't process, they sell fresh fruits. We feel that we have given them technology that they can use."

In order to ensure that a market was found for the semi-finished products, IDEI invited other companies to join the coalition, which would be able to identify a market. Sri Jagannath Merchandising Ltd. is one such company, and Managing Director, P.K. Tripathy, observes: "There was huge potential, not met by local production. We found it a good experience working together with the public and private sector."

Selling the processed food has raised issues of quality control, which buyers request.

Hygiene and packaging are of major importance, and groups have been trained in hygienic handling and preparation. Mr Miharramjam Sahoo is an assistant food microbiologist. "If these things are entering the market, it is important to reduce hygiene problems, which the farmers don't know about." Such considerations are necessary to sell products of high quality, and to get the best prices.

Many cooperatives are selling their produce to companies like Arren Foods and OMFED. But there is still a problem with supply to these markets, as volumes produced by the cooperatives are very low, and many companies only buy in bulk. Local markets do not provide competitive prices, and bad infrastructure makes it impossible to go elsewhere. CCD have applied for a processing unit from the local authorities, yet to be approved, to scale up their production so that larger companies will invest in their business.

Knowledge about the market has been important for the farmers. The project coordinator of CCD, Mr Dhanuenjaya Patnik, notes some changes that have taken place: "Now the groups are bargaining, and they are asking: 'What is the market, and what is it

doing?' We pushed them to know this." Groups have offered women in particular an opportunity to become entrepreneurs, giving them the power to save and invest in health care and education.

CCD has been working with local groups like the Gajapati women Self Help Cooperatives for a long time, not just on agricultural issues, but also on gender issues and training in micro-finance. There is a relationship of trust that exists between members of the local community, and the organisation. Farmers have better bargaining power. Mrs Kuri Behar Dulhe says: "The prices of our produce are fixed by us and not the merchants. We feel more in control, and we also have more identity in our families."

Constraints such as bad infrastructure and lack of processing facilities mean that market links are unstable. Despite this, cooperatives continue to work together to build their businesses and invest in supplying local markets.

Interviews conducted with stakeholders in **India**

Research Engineer, OUAT:
Dr Md. Khalid Khan

We are a research and development organisation. We look at pineapple, which we have a huge quantity of in Gajapati District, where two varieties are grown: Giant Kew and Queen varieties. The Queen variety are smaller and sweeter, and they are the improved variety. What happens is that tribal people are exploited by the middlemen, they have no idea about how to develop value-added products. We, with IDEI and CCD, work together to help tribal people get some more profit out of this. I was invited to a workshop organised by IDEI in Hyderabad, where we all discussed

the problem. We developed the project to improve the Giant Kew variety, which is sour in nature, and developed osmo-dehydrated pineapple slices. The technology has to be simple to use, and we have developed this and taught them the practices, so that easily and quickly they can remove the outer skin. Then we have developed a corer to remove the hard core. The ring, if dried in hot air, is not of a good quality for the market. It is also sour. So, we prepare sugar syrup to make the pineapple sweeter. Then we remove the pineapple rings from the syrup, and dry it. They are now getting twenty-two rupees, where the fresh pineapple is two rupees.

Assistant Food Microbiologist, OUAT:

Mr Miharramjam Sahoo

Iam a food technologist, so I have been developing ideas on how to store horticultural produce. I also look at marketing. The basic problem is that the farmers are very small

producers, so we do not get the best quality. When it comes to teaching hygiene, this is important and we have to be watchful about cleaning, using gloves and sterilisation. If these things are entering the market, it is important to reduce hygiene problems, which they don't know

about. They are getting this, as we transfer it to their local languages. We show them though pictures, lectures and demonstrations. From a microbiologist's point of view you have to take a lot of care over these things. Packaging is also important, and we have also looked at that.

Horticultural farmers are shown how to de-core pineapples



Fruit Processor:
Ms Janaki Nayak

I grow horticultural fruits, and I also do the household work. I am a member of the Self Help Group. There is an NGO called CCD in my area, and through them I came to know about this group. Even though some of us are educated, we did not know how to go into business using our own product. We have to pass over many hills to get to the university

sometimes, but we do go there to learn. We have had some training free of cost, so that we could know about better technology and cultivating. After learning this new kind of preparation, we have started noticing a difference. We have started moving around from our villages, which we did not do before, and we have noticed a difference between selling the fresh product and the new ones.

Extracting lemon juice



Horticultural Processor:
Mrs Kumari Karjee

I think there is more unity now. We don't really think of differences, we are all one. The farm that we get the fruits from is about three kilometres, and we come here by walking. When the stock is more, then we have more work. We also cultivate and plant crops, sometimes with our parents. We have enough for ourselves of the other things, but we prepare cashew and tamarind for the market.

Actually, before the communities came in here, we did not know what the juice was! Sometimes the traders would not come here, and what we were harvesting would be thrown by the roadside, as the traders would go to the other villages first. The groups told us what profit we could get, and they told us about value-addition. Out of this money, we have been able to spend some more on health and the purchasing of ploughs. We are also able to rent land.

Fresh pineapples for market



Community Leader, CCD:
Mr Mohanbhu Yea

I joined CCD so that I could learn new things in a broader way. We established a link with the bank, and we have been taking loans so that we can start a small business. As a group we are releasing individual

land and working together. It is because of organisation CCD, getting a loan is possible. When we are not in a group, then getting a loan is very difficult. We have been making jams, juice and other things which we sell locally, as the market is still not very good. This is one of the

things that we want to work on. Whenever you pick a fruit, you start to get problems with it on the first and third days after picking. It has to be disposed of in this way. Have you heard of distress sell? At one time the traders stopped coming here. Everything we had was completely lost.

SHGs processing fruits at CCD



Area Manager, International Development Enterprise India:

Mr Shyam Sunder Barik

In the southern parts of Orissa, tribals live in the hills and forest in the most difficult conditions. There are no value-addition facilities, and during peak harvest time, the produce goes rotten. Commercial business is more sustainable, and so we tried to develop this

process, which was long as it is not easy. We tried out technology, we tested in the market, and took samples to sell. It took time to convince them. They wanted samples of the juice to test in their laboratory, and were only interested if they found the quality good. We supply to Arren Food, who took samples of the cashew and tamerind, to explore for an international market. OMFED were

also interested. Last year, we supplied one tonne of pineapple and lemon juice, extracted by the women's group members, who utilised the technical skills given to them by OUAT. They could supply a semi-produced product. The growers found it difficult, but simple techniques like pickle- and jam-making they could do very well. CCD is taking the step of trying to find a

processing unit. Demand has been high from the producers, as they want a regular source of income, and a good price which they can supply without being exploited by the middlemen. It is difficult for them to sell directly to the manufacturing unit. First, they have to get organised through the federation and so they can interact with the market chain. OUAT will go to the field and try it

out, and the process continues even after the project has finished. The individuals cannot have direct access to the market. CCD helped in other areas, in health and education. A single individual cannot do this. We came across different stakeholders. For example, we felt the need for packaging materials, so we looked for an agency to print and develop it.

Weekly market place in Orissa



Secretary, CCD:

Mr A. Jagannadha Raju

IDEI invited us to come to workshops to work with the CPHP Programme; they also found the potential partners for us to work with; then we worked together on that objective. They made a study of this area, and chose it to work in, and we invited them so that

we could learn together. We have been trying to motivate the community to find some linkages to another market. There was a lot of demand when we started working here about ten years ago. OMFED is an organisation which markets some of our horticultural produce, which has come out successfully, and we have sold juices and

other things to them. When we started these trials of linking to the market, trademarks and licensing have been a problem, together with communication, when traders cannot reach here. On a larger scale or for export, we need other certification and licensing, which is a problem that we face. We need a processing unit here.

At work in the lab at OUAT



Horticultural Farmer:
Mr Ramo Mondal

I have brought lemons to the market today, about one hundred and twenty from my tree. My farm is quite far away from here, and I come to the market whenever my fruit is ripe. I have only

got four rupees for my lemons today. I am not happy about this, but it happens! I have an idea about what I will get before I come, sometimes I get more, another week I get less, because I'm not sure what the price will be when I get here. Each individual has different

types of lemons, which is why I don't come in a group. I am not aware of any juice factories around here, I have not heard of that. Transport is the biggest problem, as I have to come from the hill top and carry the lemons on my head.

Horticultural Processor:
Mrs Kuri Behar Dulhe

Right now, we have some financial control. The identity of the villagers has also increased because we have financial control. We also have more of an identity in our families. We follow the seasons of the different fruits, so we always have something, and now it is the pineapple. We are looking to obtain a small processing unit, so we can develop what we have here to produce all kind of products and finish them here. These prices are fixed by us and not the merchants. We feel more in control.

Right now, we have some financial control

Community Representative :
Mr Gaurango Gomononga

CCD is an NGO working with much commitment, and we have been able to mobilise the community. The promotion of horticulture crops has helped, as before we used to grow little, which we used to carry on our heads. We are forest-dwellers, and we do not know about the market. We know about this problem, but at the moment we do not have an alternative. Local area development is very slow. In the future, I think that people should be trained in value-addition, so that throughout the year we are able to produce and have an income. We have seen the visible efforts of people in the area, through groups, and we have belief in them.

Horticultural produce grows in abundance in the forests of Orissa



SHGs in Gajapati District, Orissa



Food Processor:
Ms Susma Bhuya

I have learnt how to make jam, squash and jelly and pickle. Earlier, we did not know about processing. As a

group, we buy together, and sell processed food. Last year, we supplied juice to OMFED. I also know of OUAT, and I have been there to look at the technology and learn. There is still a

problem with the market, and we are not able to expand. Earlier, we were depending on our brothers and parents. Now we are taking small initiatives, and we are feeling

independent. We discuss problems with the village. I have one son who is six years old. He is now going to school. We are promoting education for girls in the village. I have sold

some produce today, fifty pineapples, and I sold at five rupees. I think that I got a good price today. The season is coming up so we are not sure if we will get a good price now.

Partners for Innovation

Maize marketing in Uganda:

Kawanda Agricultural Research Institute (KARI)
Natural Resources Institute (NRI) The University of Greenwich, UK
Farmer Representatives of Kiboga District sub-county
Afro-Kai Limited
Buganda Cultural and Development Foundation (BUCADEF)
Appropriate Sustainable Development Initiative (ASDI)
Department of Agriculture
Kiboga District Authority

Rural transport in Kenya:

Kenya Network for Dissemination of Agricultural Technologies (KENDAT)
Practical Action
Silsoe Research Institute
Swedish University of Agricultural Sciences
University of Warwick
International Forum for Rural Transport and Development (IFRDT)
International Labour Organization (ILO)
The Society for the Protection of Animals Abroad
Brooke Hospital for Animals (BHA)

Fruits of the Nile in Uganda:

Kawanda Agricultural Research Institute (KARI)
Natural Resources Institute (NRI) The University of Greenwich, UK
Tropical Wholefoods (TW)
Target Packaging (TP)
FM Foods
Post Harvest International
Fruits of the Nile, Uganda
The Patience Pays Group
The Nazigo Group

Sorghum farmers and poultry feed in India:

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
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Janaki Feeds

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