To what extent can primary school agriculture help achieve effective agricultural extension? A case study on the Food for Thought programme in Uganda
Abstract

Agricultural extension is the set organisations which support the agricultural sector by providing information, skills and technology to all people involved in agricultural production (Birner et al, 2009). In the past, this idea has been fraught with problems of successful implementation, most notably due to the inapplicability of the advice promoted, the associated environmental damage, issues of financial sustainability and a lack of local participation. Primary School Agriculture (PSA) is the idea of educating children from poor, rural backgrounds in improved agricultural techniques with the aim of improving skills and knowledge across the agricultural sector and therefore can be perceived as from of extension. However, to date, there is limited prior knowledge in this area and therefore, this study aims to fill this gap. The research has been undertaken in Southern Uganda, using the Food for Thought programme as a specific example of PSA. The results suggest that, the FFT programme does achieve many of the desirable goals of a successful extension system as in general, it was shown to create a significant improvement in farming practices, was implemented using a high degree of local participation and was perceived to be reasonably cost effective. It is also shown that this could potentially be the case for many other PSA programmes. However, it is noted that the level of benefit will ultimately come down to the way in which individual systems are implemented and as such, several key factor for success are explored.
Contents

Abstract ......................................................................................................................................................... 2

1. Introduction ............................................................................................................................................. 5

1.1 Agricultural Extension ......................................................................................................................... 5

  1.1.1 The Aims of Agricultural Extension ......................................................................................... 5

  1.1.2 The Methods of Agricultural Extension ................................................................................. 5

  1.1.3 The Means of Support ............................................................................................................. 6

  1.1.4 Successful Agricultural Extension ......................................................................................... 6

1.2 Primary School Agriculture .............................................................................................................. 7

1.3 Background Information on Food for Thought .............................................................................. 7

1.4 Research Objectives ......................................................................................................................... 8

2 Methodology ........................................................................................................................................... 9

2.1 The Approach ................................................................................................................................... 9

2.2 Background Information ................................................................................................................... 9

2.3 Research Techniques ......................................................................................................................... 10

  2.3.1 Focus group discussions ......................................................................................................... 10

  2.3.2 In depth Interviews ................................................................................................................. 11

  2.3.3 Participant Observation .......................................................................................................... 11

  2.3.4 Data Analysis ......................................................................................................................... 11

2.4 Ethics ................................................................................................................................................. 12

3 Results and Discussion ........................................................................................................................ 13

3.1 The Aims of FFT .............................................................................................................................. 13

  3.1.1 The Information Transferred ............................................................................................... 13

  3.1.2 Environmental Sustainability .............................................................................................. 13
3.1.3 Applicability for Local People .........................................................................................14
3.1.4 Agricultural Productivity .................................................................................................16
3.1.5 Food Security ..................................................................................................................16
3.1.6 Rural Livelihoods ............................................................................................................17
3.1.7 Marginalised People ........................................................................................................18
3.1.8 The Impact .......................................................................................................................19

3.2 Methods ............................................................................................................................20
3.2.1 Implementation Methods ...............................................................................................20
3.2.2 Level of Local Participation and Knowledge ....................................................................20

3.3 Means of Support .................................................................................................................22
3.3.1 Cost Effectiveness ...........................................................................................................22
3.3.2 Financial Sustainability ...................................................................................................23

3.4 PSA as a means of Extension .............................................................................................24

4 Conclusions ..........................................................................................................................26

5 References ............................................................................................................................29

6 Appendix ..............................................................................................................................34
1. **Introduction**

1.1 **Agricultural Extension**

Agricultural extension is defined as ‘the entire set of organisations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods and wellbeing’ (Birner et al, 2009: 2). It is a long standing idea and throughout the last century it has been implemented in many different countries around the globe (Pretty and Chambers, 2003). There are however, many problems in creating a successful extension programme. Although these issues are often case specific, several common problematic themes can be highlighted.

1.1.1 **The Aims of Agricultural Extension**

Many extension services are often focused on increasing agricultural productivity through intensification and modernisation (Picciotto and Anderson, 1997). In numerous cases this has resulted in the promotion of unsustainable farming techniques and environmental damage, for example, the extensive use of chemical fertilisers and pesticides (Röling & de Jong, 1998). Additionally, this objective has often only been applicable for the wealthiest farmers due to the need to invest in external inputs. Therefore, in many developing countries, the majority of the population have received limited benefits (Borlaug, 2004; Chambers, et al, 1989). Furthermore, extension has often been used as a tool for increasing a country's economic growth which has consequently resulted in the emphasis being on commercial agriculture. In many cases this has come at the demise of local food security, as subsistence and traditional crops, have been replaced by goods grown for foreign markets (Haug, 1999).

1.1.2 **The Methods of Agricultural Extension**

Agricultural extension has frequently been run by top down organisations and as such local people have had limited input into the design and implementation of the service (Akinnagbe and Ajayi, 2010). This is not only an inherently patronizing view of development but additional it produces poor results and low
up take rates. The information transferred is not based on the local environmental, social and economic conditions and as such, the advice/technology promoted is often inapplicable or irrelevant for the needs of the local farmers (Davis, 2008; Osborn, 1995).

1.1.3 The Means of Support

There have also been many difficulties involved in trying to create a financially sustainable and cost effective programme. Traditionally, extension services were predominantly state run institutions, however this was often highly expensive to administer (Farrington, 1994). Therefore, in recent years there have been many changes to the way in which services are supported. Most notably this has involved; decentralisation of government extension (Anderson and Feder, 2004), sector privatisation (Neuchâtel Group, 1999) and a rise in other service providers such as NGO’s and farmer groups (Feder et al, 2010). However, such solutions have also been fraught with difficulties. Decentralisation has often done little to reduce costs (Anderson and Feder, 2004), privatisation has frequently led to the poorest people being unable to purchase the service (Anderson and van Crowder, 2000) and NGO’s and farmer groups have had a limited scope due to low financial support (Davis and Place, 2003; Faure and Kleen, 2004).

1.1.4 Successful Agricultural Extension

Due to these frequently encountered problems several academics have highlighted some key ways in which extension should be altered in order to create a more successful system. Firstly it is argued that the aim of agricultural extension should not only focus on increasing agricultural productivity but that this needs to be implemented in an environmentally sustainable manner (Pannell et al, 2006). There should also be an increased emphasis on local food security and improving rural livelihoods and moreover, these benefits should be accessible for everyone, including the most marginalised people (Birner et al, 2009). It is also claimed that there needs to be an increased focus on local participation (Asiabaka, 2003). Although it is still important that scientific expertise and external knowledge play a significant role (Farringdon, 1997), Berhanu (2008) argues that this should be more in terms of providing a learning environment in which the local people themselves are equipped with the skills and knowledge to become farming experts. Lastly, it is highly important that extension services are financially sustainable but that this does not compromise the quality or quantity of the service. Davis (2008) argues that pluralism; the idea of using different organisations where they are most effective could be
the most applicable tool. For example, commercial agriculture may be best left to the private sector and this could then allow the public services to concentrate its limited resources to more marginalised farmers (Picciotto and Anderson, 1997).

1.2 Primary School Agriculture

Primary school agriculture is the idea of making the school curriculum more applicable to rural children by introducing agriculture as a compulsory subject (Gasperini, 2006). It is based on the theory that purely academic schooling is often irrelevant to the needs of people in developing countries due to the predominantly rural economy (Bude, 2000; Graham-Brown, 1991). This subject is meant to provide information on agricultural techniques which are either more sustainable or more productive than the farming methods which are currently used. It is therefore hoped that this will have a beneficial effect on agricultural production as it is presumed that the children will transfer this knowledge to their family farms and additionally uses these skills in later life when they themselves become farmers (Bude, 2000; Bergmann, 1985). As such, this idea has the potential to be a positive tool in terms of achieving agricultural extension, however to date, there has been little research in this area. This study aims to fill this gap by using the example of the Food for Thought programme as a case study.

1.3 Background Information on Food for Thought

Food for Thought (FFT) is a project initiated by the Devon Development Education (DDE) centre, a UK based organisation that was set up in 2001. It is a school linking project between primary schools in Uganda and the UK, and the school connection is emphasised through educating children about the importance of sustainable food production. All participating schools have a garden which is used to teach the children in a practical manner, sustainable food growing techniques. This focus is then used as a means to share experiences from around the globe. For example, children will write to each other about what they have grown in their garden, what is their favourite food, methods they use to grow vegetables etc. The programme is funded through schools in the UK and this money is used to buy the necessary garden equipment and train the teachers in sustainable agricultural methods. The project is seen as a tool in which to educate children about global and environmental issues through providing them with a ‘window on the world’ experience. Additionally, it is also providing children with practical growing skills which they can use to make a positive impact.
In Uganda the FFT programme operates in three different regions and in a total of 46 primary schools. All the children in the participating schools will attend an agricultural lesson at least once a week. The lessons involve both theoretical and practical aspects and the ultimate aim is to provide the children with productive and sustainable agricultural skills which will help them to feed themselves and their families both today and in the future. The programme is implemented through a partner charity called the Kulika Charitable Trust. This charity is involved in training the selected garden teachers in appropriate agricultural techniques so that they are then able to pass this knowledge on to the students. Additionally, Kulika provide the schools with Key Farmer Trainers (KFT). KFT are experienced farmers who are highly trained in sustainable agriculture and they visit the schools at least once a month to enhance the pupils and the teacher’s knowledge.

1.4 Research Objectives

The aim of this study is to investigate to what extent the FFT programme can help achieve effective agricultural extension and furthermore, what conclusions can be drawn about other PSA systems. As such, the key objectives are

1. To gain a detailed understanding of the main objectives of the FFT programme and to understand how successfully this has been implemented.
   - Is the information transferred relevant to the farmers needs, is it promoting productive agricultural methods and are these techniques environmentally sustainable?
   - To what extent are the techniques taught in school, implemented in practice? What impact has this had on the local community in terms of agricultural productivity, food security and rural livelihoods?
   - Who are the main beneficiaries from the programme? Does it have the capacity to target more marginalised groups?

2. What are the methods used to achieve extension and how successfully has this been implemented?
   - To what extent are the local people encouraged to participate in the project, how does this participation take place and exactly who is participating?

3. How is the project funded? Is this cost effective and financially sustainable?

4. What conclusions can be drawn from the FFT case study about the implications of other PSA?
2 Methodology

2.1 The Approach

This research project has used a case study approach. This is the use of either a single or small number of case studies to investigate a qualitative research problem (Yin, 1984) and it can be used to create novel theories or provide fresh insight into an already researched topic (Eiesenhardt, 1989). This method excels when there is a need to investigate a ‘contemporary phenomenon within its real life context’ (Yin, 1984; 2) and additionally when there is the need for intense analysis of specific details (the implications of the FFT programme in Uganda). Furthermore, this approach is highly effective in analysing complex systems such as, the delivery of an agricultural extension programme (Kumar, 2006; Gerring, 2007).

Initially the literature on agricultural extension was reviewed in order to produce a framework for what theoretically constitutes a successful extension system. This information was then used as a guide to design the key research objectives to ensure that the results would yield the necessary information. Additionally, the literature on primary school agriculture was also reviewed in order to highlight any previous studies which highlight the connection with extension. This was important so that a comparative analysis could be completed during the discussion.

2.2 Background Information

The research took place Southern Uganda in two different districts (Mubende and Tororo) and was carried out in June 2013. In each region, three FFT schools were selected and thus a total of six sites were used in this research. These schools were chosen by the FFT regional coordinator as this person holds detailed knowledge about the implementation of the programme in the area. They were asked to select one successful school, one poorly performing school and one school which was performing
adequately. This was done in order to ensure that a range of views were recorded and thus not to bias the results.

2.3 Research Techniques

At each selected site a range of different techniques were used and a variety of participants were selected. This was implemented in order to allow for triangulation: the ability to check for ‘different opinions and observations’ (Pratt and Loizos, 1992 p 71).

2.3.1 Focus group discussions

Focus group discussions (FGD) are when a group of participants are interviewed at the same time. This method tends to be an informal discussion and participants are encouraged to talk to other members in the group (Patton, 2002). This method was selected due to its ability to gain detailed information from a range of participants in comparison to what could be achieved with one to one interviews (Morgan, 1996). Additionally, the interactive nature of group discussion has the potential to bring out other points which may have otherwise gone unnoticed as participants are encourage to ask each other questions and to feed of other’s comments and experiences (Kitzinger, 1995). FGD were held with the students who are currently participating in the agricultural lessons, with the parents whose children are in FFT schools and with past pupils who have now left school and are currently farming. The groups consisted of 5 to 10 participants who were selected by the regional coordinator and the garden teachers. It was requested that they choose a variety of participants, ranging from those who were positive about the programme and those who had little interest. The selection process was also dictated by the availability and the willingness of the participants to take part in the study (Glaser and Strauss, 1967). The questions were designed to obtain the necessary information, however the interviews were semi structured and all questions were open ended in order to encourage group discussion (Patton, 2002: Lindsay, 1997). Each discussion lasted around an hour and all conversations were recorded. Interviews were translated from English to the regional language and vice versa by an independent translator.
2.3.2 In depth Interviews

In depth interviews were also undertaken at each site. Interviewees were purposely selected in order to obtain the most knowledge informants on the FFT programme (Dane, 1990). As such, interviews were undertaken with the head teacher of the selected school, the garden/agricultural teacher, the key farmer trainer and the regional coordinator. Additionally, an interview was also undertaken with an employee from the National Agricultural Advisory Services (NAADS)\(^1\) in order to obtain more general information about the current situation of extension in Uganda. During the interviews specific questions were asked in line with the research objectives. However all questions were open ended in order to obtain the participants personal feeling and to allow them to expand on points they felt were relevant (Glaser and Strauss, 1967; Lindsay, 1997). Interviews lasted for around 40 minutes and all conversations were recorded. All participants spoke English to a comprehensive level and therefore no translation was required.

2.3.3 Participant Observation

Information was also gained from personal observations from time spent in the field. At each site additional information was also obtained from visiting the school garden, the local village/community and the homestead of one of the past pupils. Personal observations from these experiences were written down at the end of each day and were used as a means to verify the information obtained from the interviews and to prevent naive assumptions from influencing the results (Pratt and Loizos, 1992).

2.3.4 Data Analysis

After the completion of the fieldwork, the data was analysed thoroughly using insights from the qualitative research methods literature (Dey, 1993; Glaser and Strauss, 1967; Miles and Huberman, 1994). The interviews and personal observations were transcribed and coded into relevant themes that had been highlighted from the literature. As such, the data was grouped into four key categories; the aims of the project, the methods used in implementation, information on how the project is funded and any additional background information. Each of these groups were then further sub categorised into the finer points. For example, in the aims of the project, the information was further broken down into:

\(^1\) NAADS is Uganda’s government run agricultural extension service.
environmental sustainability, agricultural productivity, rural livelihoods/poverty and beneficiaries. Lastly the data was analysed in comparisons to previous studies on primary school agriculture in order to draw out wider generalisations of the effects of PSA as a means of successful extension.

2.4 Ethics

Full ethical approval was granted by the ethics committee of the College of Social Sciences and International Studies from the University of Exeter (see appendix).
3 Results and Discussion

3.1 The Aims of FFT

3.1.1 The Information Transferred

The methods taught in the FFT programme are predominantly based on organic food growing principles. This type of production systems relies on ecological processes and biodiversity rather than the use of external inputs (Luttikholt, 2007). There are several methods which are commonly utilised in organic systems and it was predominantly these techniques which were taught in the FFT schools (See box one).

3.1.2 Environmental Sustainability

It is currently a highly debated topic whether organic techniques are the most environmentally sustainable. Advocates for organic farming argue that ‘conventional’ agriculture which relies heavily on the use of synthetic pesticides and fertilisers causes immeasurable damage to the environment. Some of the most commonly noted problems include; eutrophication, ecosystem damage and the release of greenhouse gases (Mondelaers, et al 2009). It is therefore reasoned that low input systems which are based on natural and local products, are more environmentally sustainable due to the reduced impact on ecosystems and a reduction in the amount of greenhouse gasses released (Beus & Dunlap, 1990).

Box One: Agricultural Methods Taught in FFT School

- Maintenance of soil fertility
  - Application of compost made from organic waste products
  - The use of organic fertilisers e.g. liquid manure
  - Crop rotation
- Natural pest control
  - Organic pesticides such as liquid tea
  - Biological pest control
  - Mulching of crops to suppress weeds
- Water conservation techniques
  - Mulching to reduce water evaporation
  - Contour ditches (Swales) to reduce water and soil run off
- Efficient land use techniques
  - Intercropping- planting mutually beneficial plants in close proximity
  - Planting crops in rows instead of seed broadcasting
  - Crop diversification to reduce the risk of crop failure
  - Optimal spacing of crops
- Encouragement of growing an increase in diversity and quantity of crops at home
  - Veranda gardens, key hole beds, methods to use vertical space (sack mounds)

- Other practices promoted included
  - Nursery beds
  - Improved banana management
However, there are many academics who perceive that such techniques significantly reduce yields and thus, in the light of future population growth, it is argued that organic based systems will not be sufficiently productive (Godfray et al, 2010). Therefore, in recent years there has been the call for sustainable intensification of agriculture. This aims to raise yields by intensification, but to do so in more sustainable manner by increasing the efficiency of inputs. It’s claimed that this approach is more environmentally sustainable as it has the capacity to significantly reduce agricultural expansion, thus preserving natural environments (Foresight Report, 2011).

However, sustainable intensification is currently not a feasible option for Uganda. This region is characterised by low agricultural investment and poor infrastructural development and therefore there is an inability to obtain and implement any of the inputs necessary for this type of production. As such, the techniques promoted under the FFT programme offer a pragmatic solution to the environmental problems caused by conventional farming. Furthermore, in comparison to the agricultural practices currently used in this region\(^2\), the organic methods were said to have increased productivity. One interviewee highlighted ‘Our crops our much more productive these days, the soil is more fertile and it is especially beneficial during the dry season as the soil is better able to maintain the moisture’. As such, the results suggest that the methods had contributed to a reduction in ‘harmful’ farming practices and additionally, were reducing the need for agricultural expansion due to an increase in productivity.

### 3.1.3 Applicability for Local People

It was perceived by the majority of the participants, that a key benefit from the FFT programme was the fact that the methods utilized the application of locally available and affordable materials. This was something which was easily accessible for everyone and moreover because it helped to reduce financial output. One participant said ‘One of the best aspects of these techniques is that it is money saving because instead of buying the chemicals we use the resources which are available locally, for example organic compost is cheap and easy to make’. Additionally, it was also noted that the seeds were well suited to that environment and were available for everyone as they could be obtained from the school garden for free ‘These varieties grow well for us and we are often able to collect the seeds and suckers

\(^2\) It was perceived by many participants that the farming practices currently used in Uganda were not environmentally sustainable. It was noted that those who could afford chemical inputs, did apply them to their land. However it was claimed that this was often not used in an appropriate manner due to lack of training and knowledge on how to apply them correctly. Additionally, it was also noted that little was done to help maintain soil fertility and moisture retention, thus consequently resulting in declining productivity.
Box Two: Sack Bags

Sack bags are used as a means to encourage children to grow more vegetables in the area around their house. They promote an efficient use of space as the vegetables grow out of the holes made in the sides of the sack.

from the school garden’. There was also an emphasis on making small areas of land productive and teaching the children how to use their verandas to grow food. One parent said ‘Before, we (in reference to the local community) used to waste our verandas and we didn’t grow anything, but now we use this space to grow food and we have many more vegetables at home now’. This was perceived to increase applicability as the majority of local people do not own large areas of land and thus there is a need for techniques which are suited for small scale growing.

However, there were certain examples of when the project was not so relevant. Several of the participants mentioned that the methods were highly labour intensive and that they did not have the time to commit to this. ‘It’s much harder to work the land using organic techniques and this why many people are attracted to chemicals. It takes a lot more time and effort to farm organically.’ Furthermore, the use of sack bags which was promoted as a means to grow vegetables using vertical space (See Box Two), was perceived by many to be a ‘waste’ of the bag and as such many of the children did not implement this method at home.

However, in spite of these examples of inapplicability, in general, the techniques were perceived to be relevant to the economic, social and environmental needs of the local people. The majority of participants were highly satisfied with the programme and said that there would be little they would change about the information transferred. Moreover, the programme was noted to have increased people’s interest and enthusiasm for farming as they were encouraged by the beneficial results. One teacher said ‘Before the FFT programme, I was not interested in farming and wanted little to do with it, but now I am keen to grow crops and really enjoy it. I think that this has also been the case for the children as well’.
3.1.4 Agricultural Productivity

The FFT programme has a substantial focus on increasing agricultural productivity. For example, many of the techniques are aimed at improving soil fertility and moisture retention, thus consequently benefiting yields. Moreover, these techniques appeared to be working in practice, with the majority of the participants claiming that there had been a significant increase in productivity since the introduction of these methods.

It was however evident that producing a reliable and healthy yield was still problematic, most notably due to the detrimental effects of drought. Crop yields were suffering severely from lack of rain, and although it was mentioned that the moisture retention techniques had gone some way to lessen the impact of the dry season, it was clear that this was not sufficient in order to maintain sufficient productivity. One participant mentioned ‘In some years, when the drought is not so bad, these measures can help us to maintain yields, but this year for example when we have had virtually no rain for the last few months, the techniques are not really helping’.

It is certainly a clear aim of FFT programme to increase agricultural output and many of the methods have helped. However, in reality some of these techniques are not as beneficial as hoped for due to the adverse climatic conditions. This is certainly true for crops that are grown on a larger scale\(^3\) as it was noted that many of the water saving methods such as swales and mulching, were not easy to apply to larger plots of land due to the amount of labour and materials needed to implement this.

3.1.5 Food Security

It is important that agricultural extension has a focus on improving food security i.e. ensuring that local people have access to ‘sufficient, safe and nutritious food’ (Pinstrup-Andersen, 2009). The FFT programme has a heavy emphasis on encouraging the children to grow more crops at home and moreover, for this to be consumed for their personal needs. One teacher highlighted ‘We emphasise that they must eat first and then sell’. This finding was also confirmed by the students who told me ‘We learn how to grow vegetables for ourselves and sell the excess to gain an income’. The programme is also trying to improve the nutritional value of the food consumed. Crop diversification and the

\(^3\) In this context, large scale refers to people who own several acres of land and grow food specifically for local markets as opposed to solely self sufficient needs.
importance of growing fruits and vegetables for their increased nutritional value, is something which is heavily promoted throughout the classes. This was perceived to be having a significant impact in practice and one person commented ‘Before, people were not so interested in growing fruits and vegetables, but now there is more interest in growing different types of food not only the staple crops’. It was also observed that a key aim of the programme was to use food from the school garden to provide a meal for the children at lunchtime. Many parents believed that this has significantly improved the diet of local children, as previously, many children would have received no food during the school hours. One parent said ‘Now that the children receive a school dinner they are much better able to learn at school as they are not as hungry and in general they are healthier’.

However, it was evident that many children were mainly using the produce in order to gain an income and thus were not reaping the nutritional benefits. Although all children interviewed said that they were now growing more at home, in several cases, the pupils mentioned how most of this was being sold. In some respects this was beneficial, as the money was often used to pay for schooling expenses. However, it does suggest that there may not have been such a significant improvement in the children’s nutritional intake, as was intended.

Nevertheless, it was perceived that the techniques have made a significant contribution towards increasing food security in the region, through an improvement in the crops grown at home and additionally through the feeding programme at school. The majority of interviewees mentioned how they perceived a significant increase in nutritional and health benefits since the introduction of the programme. As one of the participants claimed ‘One of the best things about this project is that we now grow a wider diversity of foods and this has really helped improve our diet and health’.

3.1.6 Rural Livelihoods

Many of the techniques taught are applicable for small scale growing and are equally suitable for larger plots of land. The addition of organic composts and fertilisers was something which could easily be made and applied to crops grown more

Box Three: Banana Management

It is recommended to allow only two or three banana suckers to grow and to remove the others when they are young (as shown below). This helps to increase productivity as the banana bunches are larger.
for commercial purposes. Several people mentioned how this has helped to increase their productivity and thus ultimately benefited their income. It was also noted that the encouragement of crop diversification was a key benefit to their livelihood. One participant said ‘With a bigger diversity of crops, we can now grow things throughout the year and therefore our income is more constant’.

Another common theme highlighted was the benefits gained from improved banana management techniques (See Box Three). Several interviewees mentioned ‘Having more productive bananas has really increased our income as there is a strong local market for this’.

However, other participants mentioned that they did not perceive there to be such a positive effect on their livelihoods. Some people said that the techniques were more applicable for small plots of land (as mentioned above with the inapplicability of swales and mulching on large plots of land) and as such, it was claimed that ‘Many of the techniques do little to improve commercial crop production’.

In general there was a strong focus on helping to improve the rural livelihoods of local people. The majority of interviewees were highly positive about the effects of the programme on their livelihood. This was not only through direct benefits to the agricultural sector, but additionally, many people claimed that the increase in farming income has had a ‘knock on effect’ and as a result, many more business had increased in the area. One parent said ‘Since the introduction of FFT, many more business have grown up in this area as people now have more money. More children are also attending school which will hopefully have a greater benefit in the future’.

3.1.7 Marginalised People

In Uganda primary school attendance is compulsory for all children. However, in reality, the school dropout rate is high, especially for girls and for children from the poorest backgrounds (Atchoarena & Gasperini, 2003). This is a vitally important point as it is the poorest people and women who are most dependent and involved with agricultural production, thus suggesting that this extension system may be bypassing those who are most in need.

However, it is not unanimously every child that drops out of school and it was noted that there was a high level of school attendance of children from all backgrounds, up until the age of 8 or 9. Furthermore, other extension systems in the region, most notably that of NAADS were perceived to be particularly poor at targeting marginalised groups.
Therefore, the programme does have some scope in targeting a marginalised audience, certainly in comparison to other existing forms of extension. However, school dropout rates for the most marginalised groups, was clearly a problematic issues. This issues was further exasperated as it was observed that the younger year groups were not as engaged in the subject as the older children and thus had less capacity to understand and utilise the information.

3.1.8 The Impact

The results clearly suggest that some of the children were taking the information back to their family farms. All of the children interviewed listed numerous techniques which they were now using at home. The most common techniques mentioned include: mulching, planting in lines, nursery beds, veranda gardens, growing an increased variety of vegetables, soil conservation measures, proper banana management, improved spacing of crops and how to manage weeds organically. Several children also commented that their parents were reluctant at first, but claimed that when they saw the beneficial results, they were willing to experiment. Furthermore, from speaking to the past pupils it was clear that several students were utilizing these methods in order to further their agricultural livelihoods and were clearly receiving a large benefit from this. One farmer said ‘I am currently using the water and soil conservation measures on my corn fields and it has really improved productivity and profits’

However, it is important to note that there were many children who were not as enthusiastic about the project or had problems in implementing this at home due to resistance from the parents. As one headteacher put it ‘The percentage of children implementing these techniques is quite low and the children are often not allowed to implement what they have learnt at school on their land. Countrywide, children are not involved in decision making and therefore the parents don’t listen to their childs advice. There was a similar finding for past pupils as well, and it was perceived that the percentage of people using these techniques was fairly low.

In general, most people estimated that around 40-50% of the children were implementing at least some of these techniques at home. Although this percentage is perhaps not as high as was aimed for, the results highlighted that the effects spread further than the targeted pupils. It was evident from the interviews and participant observation that many of the community members were starting to copy the FFT techniques and implement them on their own land. In many regions, especially in the schools
where the FFT programme had been running longest, the school garden appeared to be operating as a kind of demonstration farm for the whole community. Furthermore, the methods were clearly having a significant influence on the teachers. Virtually all the staff had implemented these methods on their own land and several teachers mentioned how their neighbours had began to copy their ideas. One of the garden teachers said, ‘At first the community thought the project was a joking business but now they have seen the benefits, they have started to embrace it and many friends and neighbours are beginning to use these techniques. For example, last time when we had so much rain I was not so affect and most of friends gardens got washed off. So they started to ask questions and I told them about contours and how to make them and now many of them have started to do the same’

3.2 Methods

3.2.1 Implementation Methods

The FFT programme is implemented through the partner charity Kulika; a local run NGO which work on sustainable agricultural development. This charity is involved in training the garden teachers with organic growing skills and additionally they provide KFT’s who come into the school once a month to participate in the garden classes, to help enhance their knowledge.

In the agricultural classes, the lessons consisted of two aspects; theory and practical. First the teachers would explain the theoretical reasons behind the methods being taught and then the children would be shown how to implement this is practice. For example, in the case of composting, the students would first be taught the reasons behind the use of compost i.e the benefits gained from adding more nutrients to the soil etc. They would then be shown how to make organic compost and apply it to the land.

3.2.2 Level of Local Participation and Knowledge

The information transferred is based on a combination of knowledge from local farmers and external information on organic farming principles. In theory, this combination of local and external expertise is thought to be highly beneficial, as the result is often agricultural knowledge which is locally applicable and effective (Berhanu, 2008). This was also perceived to be the case by many of the participants. As one KFT told me ‘In past generations, people used to use many of these techniques but over time and
with the introduction of conventional farming, many of methods have been lost. This programme has helped to reestablish these techniques, as well as introduce new ones and this has helped us understand the reasons behind why they are beneficial which encourages more people to use them’. As such, it is thought that the design of the programme utilises a positive level of local participation and knowledge.

However, the way in which the information was transferred to the school children was not utilising these participation principles. In many situations, the subject was being delivered to the pupils in a one way, top down transfer of knowledge and the children were not encouraged to question and participating in the knowledge process. It is important to note that there were exceptions to this rule, and in some cases the pupils were highly involved and interactive with the learning process. For example, in several schools, there was the creation of the FFT club (See Box Four). The students from this club meet with the teachers once a term in order to discuss and solve their agricultural problems together. Furthermore, this problem of limited student participation was something which was understood by the FFT organization and measures were being put in place in order to rectify this. Extra training was being provided to teachers to encourage them to utilise more participatory approaches and implement more critical thinking and questioning into their teaching methods.

The literature on participation also highlights how a desirable extension system is one which equips the local people with sufficient agricultural knowledge and scientific understanding to be able to become farming experts. Thus the participants are able to think critically about agricultural problems and have the capacity to experiment and

---

**Box four: The FFT Club**

The FFT Club is a group of students who are particularly interested in agriculture and gardening. In each school there are around 20 pupils who are involved. These students volunteer to take extra care of the school garden, for example they look after the crops during the school holidays. Additionally they are involved in the meeting with the teachers to discuss the project and any issues that they have.

**Box Five: School experimentation**

Several schools had implemented experimentation/demonstration plots. These plots were used to show different methods of banana management (number of suckers), mulching V.s open soil, planting in rows V.s broadcasting and the idea of growing food on more marginal land (as shown below).
implement ideas which are relevant to their own circumstances (Roling and de Jong, 1998; David, 2007). This idea was something which was encourage by the programme and was actively implemented in several schools (See Box Five). Furthermore, the garden classes involved an explanation of the scientific reasons behind the techniques used. As such, it is hoped that an increase in knowledge of environmental science would help the children to adapt and innovate agricultural practices (Orr, 2004; Jordan et al, 2008). The impact of these initiates on the children was fairly mixed. There were certainly a few students who were utilising these skills well. Some children were beginning to carry out small scale experiments on their own land and other were showing signs of adapting the techniques to suit their own environment. For example, instead of using the sack bag for growing vegetable (as this was perceived to be too expensive) several children had re created this idea of growing using vertical space by building a mini vegetable block from waste/ old bricks. However, on the whole it was perceived that this level of understanding and enthusiasm was quite rare⁴, and there were certainly not many children who were able to think this innovatively and willing to experiment with their own ideas.

3.3 Means of Support

The FFT programme in Uganda is funded through link schools in the UK. These schools pay a £600 a year to be part of the programme and this money is used to buy the garden equipment, to train the garden teachers and to pay the wages of the KFT’s.

3.3.1 Cost Effectiveness

At all schools, the land used to create the gardens, is part of the school property and as such, there has been no extra cost associated with purchasing the land. Furthermore, the equipment needed is reasonably cheap as it is mainly simply tools such as hoes, seeds and wheelbarrows which are being purchased. Although it was noted on a couple of occasions that sometimes the money was not sufficient to buy adequate equipment, in general, most people seemed satisfied with the amount and the quality of the tools provided. Furthermore, the programme also had the ability to influence a significant percentage of the population, through the education of the students and the demonstration

---

⁴ It was perceived that this ability to innovate agricultural practices was much more prevalent amongst older children as it was perceived that the younger students were often unable to make the link between the scientific explanations and application on their own land.
plots. Thus it appears that this programme is fairly cost effective due to the low costs of implementation and the benefit that it provides to a large target audience.

### 3.3.2 Financial Sustainability

However, in spite of the low costs of implementation, it is still problematic for the programme to maintain a steady flow of funding. In theory, the idea of the school linking should be a financially sustainable option. Children from schools both in the UK and Uganda gain an enhanced education through providing a unique experience through which to learn about other cultures and additionally are provided with practical growing skills. This mutually beneficial relationship has the potential to encourage schools to investment in the project, certainly in comparison to a simple donation. However, in recent years, due to a reduction in government spending on public services, UK school budgets have been significantly cut. As such, the number of UK schools willing to sign up to the linking programme has decreased, thus questioning the financial sustainability of the programme.

Due to these concerns, there are certain measures which have been implemented in Uganda to help rectify this problem. In some schools the idea of the young farmer networks was something which was promoted. This involves the encouragement of children sharing their knowledge and agricultural experiences. For example, talking about problems which they have encountered and techniques which they have used to overcome this. It is hoped that this will carry on into the future when they become farmers. This idea was also spreading to the community and one parent commented ‘*Now when I sell the vegetables, people ask me how come I grow so much and I tell them the techniques I have learnt so that they can go and use that information at home*’. This implementation of farmer networking, combined with the encouragement of agricultural experimentation, has the potential to reduce the need for other extension systems and thus external funding, as the farmers themselves provide an extension services. However, it was evident that this idea was not promoted in all schools and thus not apparent in every community. Furthermore, in the schools where it was promoted, it was perceived to be problematic to implement successfully. For example, many people perceived that this idea would need extra funding and were not willing to try and implement the idea without external support. Additionally, there may be limited benefits from this type of networking without an improvement the capacity of students to innovate with agricultural ideas.
It was also noted that in some schools, a small proportion of the food was sold. In many respects this was detrimental to the core principles of the project, as a key goal of the programme is to use the food to provide the children with a meal at lunchtime. However, in many cases, the income gained from selling the produce was invested back into the project. This in turn has helped to reduce the reliance on external donors and thus has the potential to ensure a self-sustaining project.

So far, it is unsure whether the measures put in place to reduce the reliance on external funding will have the capacity to maintain the project in the long term. It was believed by many that there is the potential for the project to be financially sustainable, but it was noted that this was often dependent on the willingness and the attitude of the people involved. The FFT programme was keen to promote an attitude of people working together to help themselves, rather than becoming reliant on donations. This idea was something which was picked up on by many people, but there was still a common feeling from many of the participants that they needed extra money in order to make the programme work. As one of the district coordinators put it ‘Some schools which are established, who have impressive gardens and have changed their attitude, I think that these schools would be able to continue without external funding. In other schools, we will need to make them aware that it is not only money that can make the project work but more dedication towards the programme.’

3.4 PSA as a means of Extension

Many previous studies on PSA have suggested that this idea, has an insignificant effect on the agricultural sector, primarily due to the poor quality of the information being taught (Bergmann, 1985) and the limited number of children implementing these techniques at home (Riedmann, 1994). However, the results from this case study suggest that this is not inherently the case, thus implying that the level of benefit received, will depend on how the programme is implemented. Several factors have been highlighted which can influence the outcome.

It was perceived to be highly important that the aims of PSA focuses on the entire range of extension ideals i.e. sustainability, food security and productivity and moreover, that the techniques taught, encompass ways to achieve these goals. For example, it was thought to be a highly positive asset that the techniques were applicable for small scale growing and also had the capacity to improve productivity for commercial production, as this helped to target ‘problems of personal food supply and
In addition, this study emphasises the work of Farringdon (1994), suggesting that a key tool for creating applicable and productive techniques, is to utilise a combination of local and external knowledge. It was mentioned by one of the KFT’s that ‘The information transferred is really well thought out and the majority of people are really pleased with the improvements’. This study also emphasises the importance of good quality teaching training. In past studies, poor teacher training has often been noted as a key reason for the substandard quality of the information transferred (Bergmann, 1985). In the FFT programme, all teachers were trained to a high standard in sustainable agricultural practices and this consequently resulted in a high quality of the information taught. If such requirements can be fulfilled in other PSA programmes, then there is the potential that the students will receive beneficial agricultural advice. However, it was noted that, at times there was a lack of teaching motivation from all the staff (not only the garden teachers) primarily due to low wages. Quote about having to get another job etc. Therefore, sometimes the teaching quality was delivered with limited enthusiasm and this was thought to have a detrimental effect on the number of students who were passionate about the subject. Quote from KFT. Furthermore, the sheer number of students in the class (often around a 100 pupils) meant that effective teaching was inherently problematic and such large class numbers is something which is common across schools in many developing countries. Thus it is clear that there is room for improvement in terms of the teacher’s ability to deliver the information effectively.

Furthermore, although only a limited number of students are taking home this information, it was highlighted that this does not inherently result in an insignificant impact due to the benefits gained from other community members using the techniques they had learnt from the school garden and from other farmers. If demonstration plots were utilised in other schools, then there is the potential for this idea to have a significant impact on the whole community. However, the results do also suggest that PSA may not have the capacity to target the most marginalised people. The FFT schools showed a high rate of school dropouts, especially amongst the most marginalised children, and this trend is thought to hold true in many other developing countries (Atchoarena & Gasperini, 2003). Although it is not every child who drops out of school and thus the programme does have some capacity to target such groups, it is evident that more work needs to be done, to make this system more inclusive.

In theory, PSA has the potential to achieve a high level of authentic participation, as it has the capacity to equip students with the skills needed to become innovative and experimentally farmers, thus creating a situation in which local people become their own advisory agents (Roling and de Jong, 1998).
However, in reality, this type of learning environment has proven difficult to implement and in many cases PSA has done little to change the student’s way of thinking (Rickinson, 2001). To a certain extent the FFT case study does confirm this view, as it was perceived that in the majority of classes, the students were not encouraged to question and experiment. However, there were some examples, of where the teachers had done a successful job of encouraging this and in these schools, specific students showed an ability to think independently about agricultural problems. Therefore, this should not suggest that this is an unrealistic goal for PSA to achieve, but rather, implies that more work needs to be done on improving the learning process and more time needs to be given to allow cultural norms to develop (REF).

The FFT case study was experiencing problems of financial sustainability and this is a common problem with many other PSA programmes. In the majority of developing countries, schools have severely limited funds due to low government support (REF). Moreover, there is an unwillingness to invest in PSA as this idea is perceived to be an unpopular idea amongst students, staff and politicians primarily due to the negative connotations associated with an agricultural livelihood (Atchoarena & Sedel, 2003). However, this study suggests that this was not the case. All participants perceived the project to be a positive aspect of primary education, thus suggesting that increased backing would be well received. Furthermore, this study has shown that PSA can be highly cost effective due to the low costs of implementation and the ability to target a large audience. This is likely to be replicable in other situations, as many schools have existing land which could be utilised for no extra costs and all school would have the potential to reach a high percentage of the target population. This cost efficiency should have the capacity to encourage financial, which could come from a range of different sources, depending on which was most applicable. Lastly, these results suggest, that due to the financial problems associated with all means of support, a key aim of extension should be to try and create self financing programmes thus utilising the idea of pluralism but within one extension programme..

4 Conclusions

This research has investigated how beneficial PSA is, in terms of achieving successful agricultural extension and has utilised the FFT programme as a case study. It is important to note that the reliability of the results were at times compromised by several problems experienced during the data collection. The sample size was relatively small, with only 6 out of 47 schools being used in the research. Moreover,
the selection process used to choose the participants, was often problematic. Although it was requested that people with a range of views and experiences were selected, it was evident that only those who were most enthusiastic about the project were willing to be interviewed and furthermore, schools which were deemed to be a complete failure i.e. had not implement a school garden were not selected for this process. Such problems have meant that the data may not be truly representative of all the people involved in the programme as it would have the potential to bias the results to purely positive opinions. Additionally, the FFT programme is a very specific example of PSA and thus wider generalisations to other PSA programmes may not be reliable due to the idiosyncratic structure of this case study. With more time and resources, such problems could have been overcome by interviewing a larger and more diverse percentage of the population and additionally by using more cases studies. Nevertheless, in spite of these problems, this research has highlighted several interesting points about the contribution of the FFT programme and PSA in general, as a means of achieving successful agricultural extension.

There were several key problems with the FFT programme and thus areas which could be improved. At times, it was noted that some of the techniques promoted were doing little to help increase crop productivity, this was especially noticeable during the dry season. As such, a key area for improvement would be provided more information on improved soil moisture retention methods. To date, there is limited knowledge on how to achieve this and thus this would be a key area for further research. It was also evident that this system has a significant problem in terms of targeting the most marginalised people. This problem could potentially be improved by encouraging the idea of demonstration plots and increasing the community’s awareness of the work being done in the school garden. This would mean that even the children who were unable to attend school, may still be able to obtain some benefit. There were also several problems with the methods used for delivering the information and in many situations, knowledge delivery was perceived to be very unilateral. Moreover, it has proved problematic to implement a system of authentic participation in which the students are able to solve their own agricultural problems. Therefore, it is vital that work is done on finding ways of encouraging independent and experimental thought. It was noted that the older students were most successful in implementing new ideas and therefore, a possible solution would be to implement follow up classes throughout secondary school. Further research could also investigate the reasons why certain children were not using these techniques, with the hope that this could suggest new ways of increasing the uptake rate. Lastly, it was noted that the FFT programme was experiencing many problems of financial sustainability due to a significant lack of external support. As such, new systems need to be
implemented which create a self financing programme. The idea of the young farmer network has the potential to be a highly positive asset and as such, this could be promoted in more schools. However, this would need to be accompanied by an increased emphasis on the idea of community work and an improvement in critical and experimental thinking.

Nevertheless, in spite of these problems, in general the FFT programme was perceived to be highly effective as a means of agricultural extension. The information transferred was perceived to be environmentally sustainable, certainly in comparison to the existing methods being use in the region. Additionally, the programme promoted techniques that were applicable and productive and this consequently had resulted in an improvement in food security and rural livelihoods for a high percentage of the local population. Furthermore, the programme utilised a good use of local and external knowledge in designing the techniques and an effort was being made to include more student participation in class. It was also as a highly cost effective means of extension and thus with improved measures, there is the potential for this project to be self financing. It is important to emphasize that these results do not inherently mean that all PSA will have the same impact as ultimately the effects will depend on how each individual programme is implemented. However, this case study shows that if other PSA systems are based on a similar design i.e. with a holistic aim, grounded on well thought out techniques, delivered to the students in an effective manner and utilise the idea of demonstration / experimentation plots, then this type of extension system has the potential to be a highly successful and influential means of agricultural extension.
5 References


6 Appendix