

# Technology Options for Reducing Child Labour Demand on Tobacco farms in Malawi

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Paper for the National Conference in  
Eliminating Child Labour in Agriculture in  
Malawi

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## 1.0 INTRODUCTION

### 1.1 Tobacco and the Malawi Economy

Tobacco is a major driving force for Malawi's national economic development. It accounts for 60-70% of the country's foreign exchange earnings and approximately 11% of its gross domestic product. It also is an employment and income source for well over a third of the country's population. The major tobacco crop in Malawi is made up of Burley, with Flue cured and Western tobacco being grown to a lesser extent. Official crop estimates from the Tobacco Control Commission show that Malawi will produce 130 million kilogrammes of burley tobacco, 14 million kilogrammes of flue and 3 million kilogrammes of western tobacco during the 2011/13 growing season. Hence Burley tobacco represents 88.5% of the entire tobacco crop. In fact Malawi ranks as the biggest producer of Burley tobacco in Africa and ranks third after USA and Brazil in the World.

The Malawi tobacco industry has, over the years, received a fair share of blame for use of child labour. Published reports have highlighted the issue of child labour in Malawi tobacco. Palitza (2010), writing in The Guardian On-line, estimated that 80,000 children were used as paid labour on tobacco farms, some as young as 5 years old. The author claimed that child tobacco workers suffered from green tobacco sickness, or nicotine poisoning due to exposure to green tobacco leaves. A Channel 4 TV documentary on the subject (Kleeman, 2010) reported that most families used children in order to keep pace with unrealistic targets set by farm owners. This is most common during periods of critical activities such as weeding and reaping. The documentary explained that the impact of this included exposure of children to difficult work conditions, exposure to nicotine and consequently school attendance was adversely affected, creating a cycle of dependency. The International Labour Organisation (ILO), through the International Programme for the Elimination of Child Labour (IPEC) released a Child Labour Country Brief for Malawi which showed that approximately 4.7 per cent (0.15 million) of children participate in the labour force and do not attend school (ILO, 2004). A well publicized report by Clacherty (2010) who conducted some a participatory research project on behalf of Plan International concluded that the Malawi tobacco industry relied on child labour for most farm chores. The research found that children often worked for long hours on little pay, suffered physical and sexual abuse from their supervisors, regularly had their pay withheld and were unknowingly blighted by the effects of Green Tobacco Sickness (GTS). This particular report, and the comments it received spun the Malawi tobacco industry into action.

The tobacco industry has since risen to defend its reputation on the matter and also to address some of the issues that the bad publicity has raised. For instance, tobacco companies, associations and farms have reacted by developing policies and programmes that aim to eliminate use of child labour. These activities have included control of child labour as a condition in farmer production contracts, massive awareness programmes, and social responsibility programmes that aim to attract

children to attend school. Even the former State President is on record as having called for ‘an immediate end to child labour in Malawi, particularly in the tobacco industry’ (Mzumara, 2012). He started a campaign to get children to attend school. On their part, international, tobacco companies have joined hands with some the global food workers’ union IUF and the International Tobacco Growers Association (ITGA) to create the Elimination of Child Labour in Tobacco (ECLT), an organisation that creates awareness on the plight of the children and also undertakes projects aimed at addressing the situation including various social responsibility and education projects. The ECLT has had a marked impact in Malawi where it has implemented many programmes that address issues of child labour in tobacco farms. The impact of all these efforts is yet to be assessed comprehensively.

## **1.2 Tobacco Production Systems**

There are two clear production systems of tobacco in Malawi; A ‘High Input’ (HI) system that is used by large scale farmers and is characterised by a high level of mechanisation and use of hired labour; and a Low Input (LI) system, which is generally characterised by low levels of mechanisation and heavy reliance on family labour. The low input or smallholder system produces 97% of the country’s burley tobacco crop annually.

Due to its very nature, tobacco farming is labour intensive. In order to produce a high quality leaf, it is important that farmers conduct operations in a timely manner over a period of three to four months from planting to reaping. It is this factor that leads farmers using many sources of labour, including family and hired labour in order to address shortfalls during the season. This paper attempts to examine the labour requirements for the production of burley tobacco based on studies undertaken by scientists and specialists at the Agricultural Research and Extension Trust (ARET). It also looks at the technology options that are available for farmers in order to reduce labour demands and its unintended consequences including possible use of child labour. The paper will focus on the low input farming system or smallholder system as it produces the bulk of the Malawi tobacco crop.

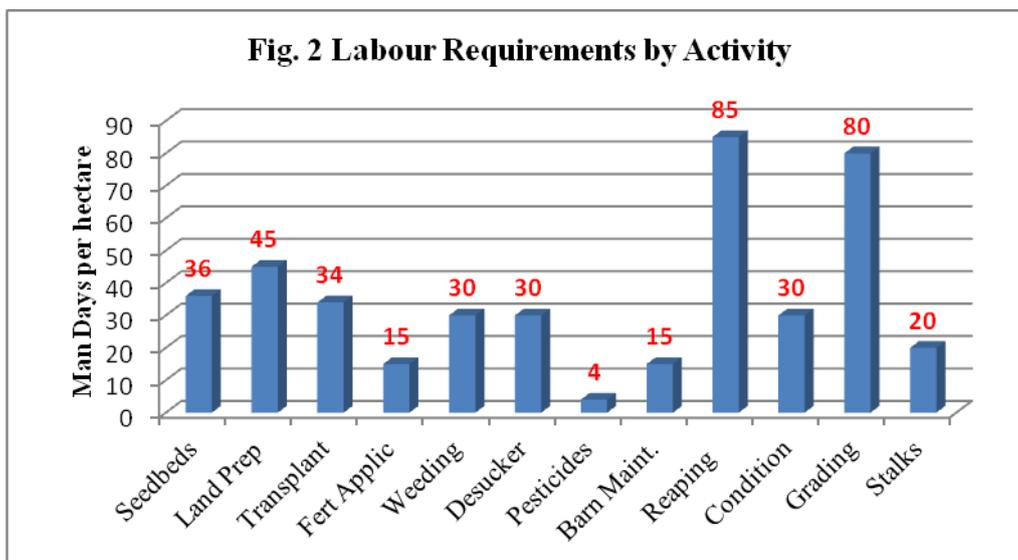
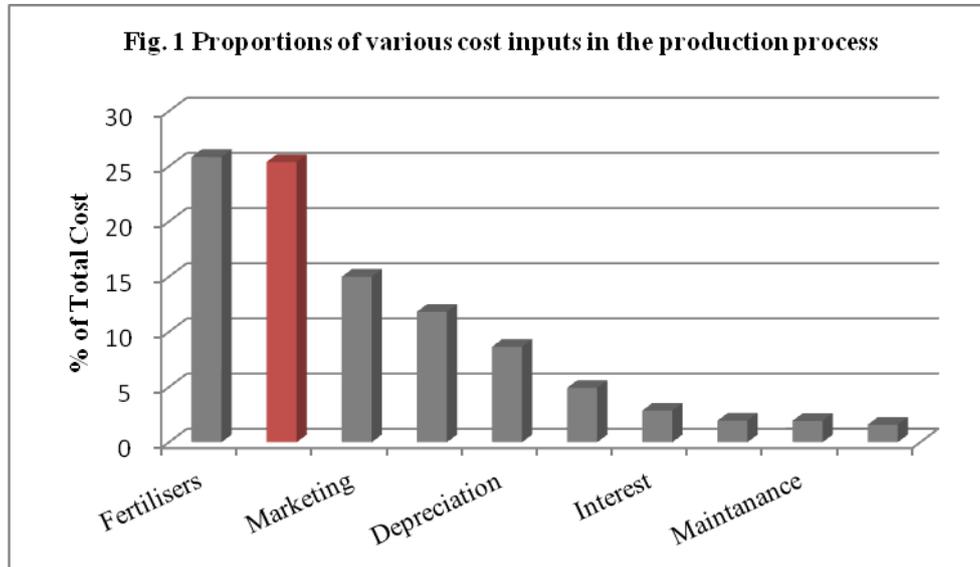
## **2.0 PRODUCTION AND LABOUR COSTS**

A detailed analysis of the cost of production (COP) for Burley tobacco, derived from around 120 cost items in the production process, shows that it costs USD1, 862 to grow one hectare of tobacco, or to produce 1,200 kg of leaf (Jiyani, 2011). This is an equivalent of USD1.552 to produce a kg of tobacco leaf. The labour component alone constitutes about 25% of the total cost. This makes labour the highest input cost alongside fertilisers in the production chain. It is for this reason that it has attracted a lot of attention among farmers and researchers as they try to find ways on cost reduction measures.

### **2.1 Labour Demand**

An analysis of the labour profile for tobacco production shows that there are 12 key activities that require use of labour, and these range from preparation and

management of seedbeds through all field practices to grading and baling of tobacco. In Burley tobacco, the total labour requirements amount to 424 man days (Jiyani, 2011). The most labour-demanding operations include seedbed management, ridging, transplanting weeding, de-suckering, reaping, and grading of tobacco (Figure 2.).



### 2.1.1 Seedbed Management

The management of tobacco seedbeds takes place over a period of 10 to 12 weeks and involves preparation of soil seed beds, sowing of seed, watering of seedlings, weeding of seedbeds and application of pesticides as seedlings grow. The watering process is quite tedious as seedlings have to be watered up to three times a day, and farmers have to carry water from shallow wells in watering cans. A hectare of tobacco requires 90m of seedbeds and about 31,000 litres of water for its growth in the nursery. The entire process to raise seedlings to a level where they can be

transplanted, requires 36 man days of labour per hectare of tobacco. Since the carrying of water is not a complicated task, it is open to abuse by farmers who use either women or children to perform the tasks.

### 2.1.2 Land preparation

Tobacco is often grown on ridges that are made on well tilled and ploughed fields. On large estates, operations such as land clearing, ploughing, harrowing and ridging are often done by machinery. However, on smallholder farms, all these operations are done manually and require a large labour pool. The labour requirement for these activities is 45 man days per hectare. Although the operations are tedious, they are not a complex and are, therefore, open to abuse by farmers who use child labour.

### 2.1.3 Transplanting

Transplanting of tobacco is one task that also demands a lot of labour because it has to be accomplished in a timely manner before moisture disappears from the soil. It is also accomplished in several steps and involves uprooting seedlings in the nursery, carrying seedlings to the field, and planting them out. Most smallholder farms use family labour for these operations which requires 34 man days per hectare. Children, for instance may be required to carry seedlings from the nursery and also place plants near planting holes.

### 2.1.4 Fertiliser Application

The standing recommendation for fertiliser application on tobacco requires an initial application of a compound fertiliser at planting or soon thereafter (basal dressing) and application of a nitrogen fertiliser two weeks later (top dressing). The fertiliser application process requires the punching of a hole using a stick near the tobacco plant, placement of the fertiliser using special cups and covering of the holes. The total labour requirement for fertiliser application is 15 man days per hectare. Many farming families use children in carrying fertiliser around the field and covering fertiliser holes.

### 2.1.4 Weeding

The removal of weeds through weeding and banking is very timely in tobacco as uncontrolled weeds compete for space, moisture and nutrients with the tobacco crop. The operation demands a lot of labour, requiring 30 man days per hectare. Most farmers understand the harm that weeds pose in competing with their crops for moisture, nutrition and light and are, therefore, very keen to remove them. It is normally done twice during the season and since it does not demand special skills, it can be done by most family members and is one of the operations often performed by children.

### 2.1.5 De-suckering

Tobacco plants need to be topped - a process that involves the removal of flowering parts so that leaves mature. Topping stimulates the development of suckers in leaf axils and if not removed, suckers compete with leaves for water and nutrients and will result in poor leaf quality and low yields. Hence, topping and desuckering are critical operations that farmers have to pay attention to. Although topping may be done once, removal of suckers takes place several times during the season as the suckers keep shooting. These are also labour demanding operations and require 30 man days of labour per hectare. From this stage onwards, most farm labour is also exposed to tar and nicotine on the leaves and their inherent health effects.

### 2.1.6 Reaping and Curing

The removal and preparation of leaves for curing is another labour demanding activity. The process involves removal of 2 to 4 leaves at a time and carrying them to a shed area where they are tied and hung in the barns. Tobacco leaf has to be reaped fairly frequently and quickly to avoid it becoming overripe or dry on the plant, factors that may lead to quality losses. As many as 8 reapings may have to be undertaken on each plant. Reaping, therefore, is one of the most critical operations and farmers tend to use as much labour resources as possible to accomplish it. The entire process is labour demanding and requires 85 man days of labour per hectare. Reaping is one of the operations that various media reports have targeted with regard to child labour.

### 2.1.7 Grading

Once tobacco is dried in the barn, the key remaining operations are untying, conditioning, grading and baling. Untying involves the removal of the string that is used for hanging tobacco. It is a fairly simple operation and does not require much skill and can, therefore, be accomplished by all labour categories and family members. Once untied, tobacco is conditioned. Conditioning of tobacco involves getting the leaf to become more pliable for ease of handling. Among smallholder farmers, tobacco leaf is conditioned in many ways including natural conditioning, barn floor watering, and use of green grass. Following this, tobacco is then graded into as many as 50 grades. Grading, requires more skill as it involves placing individual leaves in grades based on leaf position on the plant, leaf colour, and defects such as water staining, mould and wetness. Once tobacco has been graded, it is pressed in bales for presentation to the sales floors. The grading process requires about 80 man days per hectare. During this process, farms are likely to use child labour in carrying dry leaf around and in tying tobacco hands before baling as this does not require much skill.

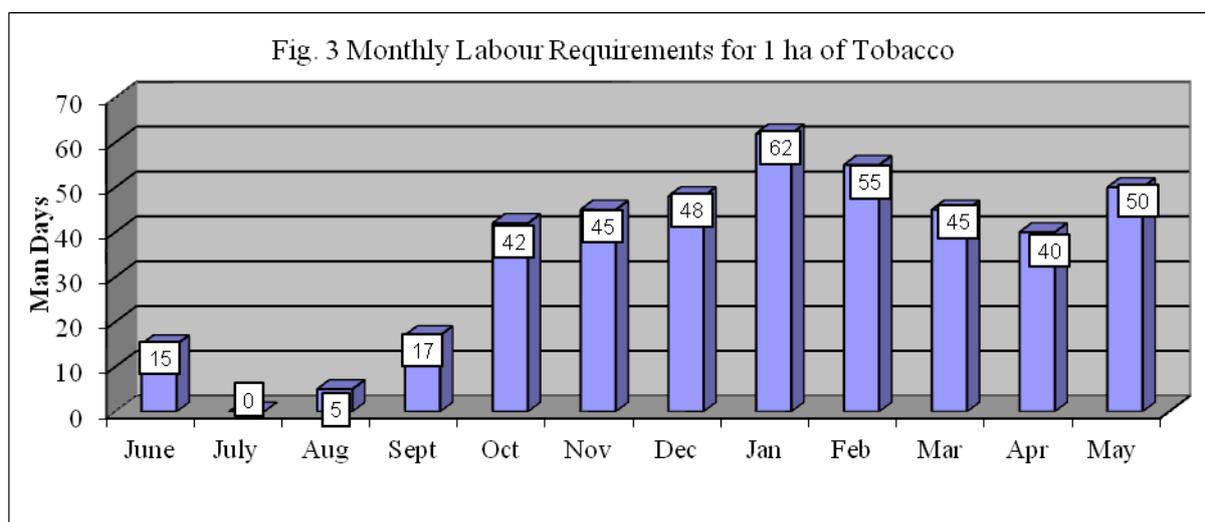
## **2.2 Seasonality of Demand**

An analysis of the seasonal labour demand for tobacco (Table 1 and Figure 3) shows a seasonal pattern with the demand starting in October (land preparation)

through the rainy season to May. The peak labour demand appears to be from December to February during the active growing months.

Table 1. Monthly labour demand for the various operations in the tobacco production chain

Activity	Total Man Days	June	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May
Seedbeds	36		5	9	15	7						
Land Prep	45	0	0	8	22	15						
Transplant	34					13	21					
Fert Applic	15					5	10					
Weeding	30						15	15				
Desucker	30							10	10	10		
Pesticides	4						2	2				
Barn Maint.	15	5			5	5						
Reaping	85							25	35	25		
Condition	30							10	10	10		
Grading	80	10									30	40
Stalks	20										10	10
<b>Total</b>	<b>424</b>	<b>15</b>	<b>5</b>	<b>17</b>	<b>42</b>	<b>45</b>	<b>48</b>	<b>62</b>	<b>55</b>	<b>45</b>	<b>40</b>	<b>50</b>



### 3.0 LABOUR SAVING TECHNOLOGIES

Although the labour demands for tobacco production are quite high, there is a range of technologies that have been developed over the years that may be used to reduce labour demand. These technologies can be used to reduce the cost of labour in the production process and also ensure that child labour is no longer used on tobacco farms. The technologies include the following:

### **3.1 Nursery Technologies**

It is common practice that tobacco seed be sown in the nursery first, in order to raise seedlings that are transplanted in the field. In Malawi, tobacco seedlings are raised through three systems that have been developed by ARET over the years (Mtonga and Mumba, 2010): the 'conventional' seed bed system, the 'float tray' system, and a 'mother bed' system. Under the 'conventional' system, tobacco seed is sown on soil beds and the seedlings are managed over a period of ten to twelve weeks before planting out in the field. This is the most common method used by smallholder farmers. Under this system, seedbeds need to be watered two to three times every day. Apart from requiring a lot of water, the system requires a lot of labor for watering, weeding and pest routine sprays. In the 'floating tray' system, seedlings are raised in trays that float in water. The system uses less space and requires less labour as watering takes place less frequently. The 'mother bed' system involves the raising of seedlings initially on a small area called the 'mother bed' and later transplanted to normal beds. Under this system, seed is thick-sown on the mother beds and re-set after 4 weeks on normal beds in a systematic pattern. It requires about 40% less water and 50% less labour than the conventional system of seedling production.

### **3.2 Land preparation**

Land preparation operations are tedious and require a lot of energy. In order to reduce the associated drudgery, farmers can use technologies such as draught animal power and tractors. For instance, smallholder farmers should be able to benefit from the oxenisation and tractor hire schemes that Government has introduced in rural areas (Haraman, 2011). The schemes seek to harness draught animal and tractor power for use in carrying out various farm operations such as ploughing, ridging and transportation on inputs and produce. Farmers are able to hire the animals or tractors with their related implements for a fee.

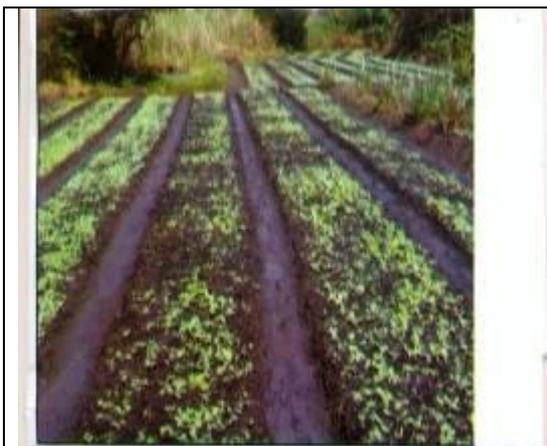


Fig 1 Conventional tobacco seedbeds showing the sowing of all beds



Fig. 2. The Mother bed seedbed with only part of the middle bed over sown



Fig. 3. Floating Tray seedlings

### **3.4 Weeding**

Weeding is time specific and any delays leads to yield and quality reduction. Most tobacco farmers hire labour including children for this operation. Most children

involved in this labour provision are disrupted from attending compulsory schooling and that their health and personal development is damaged. The labour demands for weeding can be reduced through use of herbicides. ARET has published (ARET, 2011) a range of herbicides have been approved for use in Malawi, including 'pre-emergent' or those that are applied before planting the tobacco crop and 'post-emergent' or those that are applied after the crop has been planted. The ARET recommended pesticides list includes the herbicides Clomazone, Metazachlor, Metolachlor, Trifluralin and Cycloxdim methylolate.

### **3.5 Fertilizer Application**

Most farmers have problems applying fertilizers according to recommendation due to competing labour demands. Most farmers delay fertilizer application in favour of planting field crops, at the expense of crop yield and quality. ARET has developed a new technology that allows 'Pre-fertilization' or application of fertilizers at ridging and before transplanting with no loss in yield or quality (Mtonga and Mumba, 2011). The key advantage of Pre-fertilization is that it allows farmers to perform the task during periods of low labour demand and reduces labour demand during planting time. It is often such peak labour demands that force farmers into use of child labour for some tasks. Hence pre-fertilization has the indirect advantage of reducing pressure on family labour which could result in children being exempted from fertilizer application. In addition, pre-fertilization has been shown to reduce labour costs considerably.

### **3.6 De-suckering**

The physical removal of suckers, or de-suckering, is a highly labour demanding activity. Research has, however, developed chemical agents, or suckerides, that can be used to control suckers. Suckerides are effectively plant growth regulators that kill of growing buds. Those recommended for use in Malawi include Butralin, Flumetralin, and N-decanol (ARET, 2011). It is estimated that use of suckerides reduces labour demand by about 50%. This is because hand de-suckering has to be done up to 4 times to achieve effective control whereas suckerides are applied only once.

### **3.7 Reaping and Curing**

The common tobacco reaping process in Malawi involves removal of two to three leaves at a time until all the 18-22 leaves have been taken off the plant. It is not only time specific, but is also labour intensive. However, ARET has evaluated a technology called 'Stalk Cutting' where the entire stalk is cut at once and hang in the curing barn (Munthali and Maguru, 2006). This means that the reaping process may be done at once and leads to reduction in labour. Another technology that is available for farmers to reduce on the labour spent on maintenance of curing structures is that of 'Live Barns'. Live Barns are tobacco curing barns that are constructed from trees that are planted systematically. So, rather that cut trees for barn construction, instead trees are planted in rows that enable construction of a barn. Research at ARET has identified tree species suitable for this system as well as structural designs that may be used by farmers. In this way, the labour demand

for the cutting of poles and grass as well as for maintenance of barns may be reduced.

### **3.8 Leaf Conditioning**

The standard methods of conditioning tobacco leaf require use of grass and tree leaves and this requires labour for either cutting the conditioning materials or drawing water. However, there is a technology that has been approved for use in Malawi that uses a micron ULVA + spinning disc sprayer for conditioning tobacco leaf (Kaipa and Mvulaatera, 2011). The machine conditions tobacco in much less time (12 minutes) compared to the use of green grass (50 hours).



Micron ulva + spinning disc sprayer showing water tank and spraying mechanism

### **3.9 Grading**

Tobacco grading requires a high level of skills. Although each leaf has to be graded individually, application of the sum of all technologies in the production cycle ensures that leaves of relatively similar grades are produced and, therefore, reduce on the labour demand. A highly skilled worker can grade more than 100 kg of tobacco per day whereas those with less skills may only be able to grade less than 50kg per day. In this regard ARET conducts more than 300 courses annually between February and April in order to upgrade the skills of farmers and graders so that the demand for labour for this activity is reduced. These grading courses also offer opportunity for extension agents to create awareness on child labour issues with farmers.

## **4.0 CONCLUSION**

Clearly, the use of children to perform chores on tobacco farms remains a challenge. Most farmers use this to pass on skills to their children who often have the burden of carrying on the farming operations in their adulthood. At the same time, others exploit the situation by asking or employing children to perform tasks that are not suited to their age. Farmers claim that they are forced to do this due to high labour demand for specific operations such as weeding or reaping. Hence the use of

technologies may play a critical role in reducing the demand for labour for tobacco operations and inherently prevent the use of child labour. Technologies such as mechanisation, oxenisation, use of herbicides, suckerides, stalk cutting and leaf conditioning machines may directly reduce demand for labour for those critical operations. At the same time technologies such pre-fertilisation will reduce peak labour requirements by spreading operations. The technologies highlighted in this paper have been published by ARET in the various burley and flue handbooks (ARET 2005, ARET 2012) and many leaflets and circulars. Furthermore, the building of skills and capacity amongst farmers will reduce the amount of time required to perform operations such as leaf grading. Baker and Ngwira (2011) have estimated that application of various technologies and changes in operational efficiencies can reduce the labour demand by about 34%. Most savings were envisaged from improvements in land preparation, sucker control, reaping, and grading. Such reductions mean that pressure on labour could be reduced and inherent need for the use of children for most of the chores eliminated as a result.

Obviously, there is need for more detailed studies on child labour in tobacco, the gender roles that are necessary for managing the enterprise as well as the impact of the various child labour programmes being implemented in the tobacco industry. Further work is important in the areas of development of technologies that reduce drudgery and labour demand. Above all, there is need to step up advocacy and awareness campaigns on the dangers of child labour on all agricultural enterprises including tobacco.

## 5.0 REFERENCES

- 1) ARET (2005). Burley Tobacco Handbook. ARET, Lilongwe, Malawi.
- 2) ARET (2011). Pesticides Recommended for Use in Tobacco in Malawi - 2011/12 Season, ARET, Lilongwe, Malawi
- 3) ARET (2012). Flue Cured Tobacco Handbook. ARET, Lilongwe, Malawi.
- 4) Baker, P.B, and Ngwira, R. (2011). Burley Productivity Options. Alliance One International, Lilongwe, Malawi.
- 5) Clacherty, G. (2010). Hard Work, Long Hours and Little Pay – Research With Little Working on Tobacco Farms in Malawi. Plan International, Lilongwe, Malawi.
- 6) Haraman, E.M.K (2011). The Role of Labour Saving Technologies and Safer Agricultural Pratices in Addressing Issues of Child Labour in Malawi. Paper Presented at Workshop on Capacity Development Workshop on Child Labour in Agriculture, Kasungu, Malawi, 11-15th July, 2011
- 7) ILO (2004). Malawi Child Labour Data Country Brief. International Programme on the Elimination of Child Labour, Geneva Switzerland.

- 8) Jiyani, J.W (2011). Cost of Production for Tobacco for the 2011/12 Season. ARET, Lilongwe, Malawi
- 9) Kaipa, J and Mvulaatera, P. (2010), Evaluation of Micron Ulva+spinning Disc Sprayer for Conditioning Tobacco. ARET Annual Report for 2010/11 Season, Lilongwe, Malawi.
- 10) Kleeman, J, B (2010). Unreported World - Tobacco Companies Profit From Child Labour in Malawi, Channel 4 TV, [WWW.channel4.com](http://WWW.channel4.com)
- 11) Mtonga, Y and Mumba, J.B. (2011). Effect of Pre Fertilization on the Yield and Quality of Flue Cured Tobacco. ARET Annual Report 2011, Lilongwe, Malawi.
- 12) Mtonga, Y.P and Mumba, J.B. (2010). Evaluation of the Mother Bed Nursery System – a Novel System for the Production of Tobacco Seedlings. ARET Annual Report for 2009/10 Season. Lilongwe, Malawi
- 13) Munthali, F.C. and Maguru, K. (2016). Evaluation of Suitability of Tobacco for Stalk Cutting. ARET Annual Report for the 2005/06 Season, Lilongwe, Malawi.
- 14) Mzumara, F. (2012). Malawi President Calls for End to Child Labour in Tobacco Industry. Nyasa Times, [WWW.Nyasatimes.com](http://WWW.Nyasatimes.com)
- 15) Palitza, K. (2009). Child Labour: The Tobacco Industry's Smoking Gun, The Guardian on-line, Monday 24 August, 2009. [WWW.Guardian.com](http://WWW.Guardian.com)