AGRICULTURE AND MARKET LIBERALISATION IN TANZANIA:

PROBLEMS OF COTTON PRODUCTION AND MARKETING IN BUNDA DISTRICT

Final Report

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Cover Picture: Open Cotton Boll - Credit ICAC

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Problems of Cotton Production and Marketing in Bunda District

**Abbreviations**

BDC  Bunda District Council  
BOT  Bank of Tanzania  
CDF  Cotton Development Fund  
CDR  Center for Development Research  
CIDF  Cotton Industry Development Fund  
CIF  Cost, Insurance and Freight  
CU  Cooperative Union  
DALDO  District Agriculture and Livestock Officer  
HIPC  Highly Indebted Poor Countries  
ICAC  International Cotton Advisory Committee  
Kg  Kilogram  
Km  Kilometer  
MARCU  Mara Regional Cooperative Union  
MP  Member of Parliament  
NBC  National Bank of Commerce  
SIDA  Swedish International Development Agency  
TADREG  Tanzania Development Research Group  
TASA  Tanzania Agriculture Situation Analysis  
TCL&SB  Tanzania Cotton Lint and Seed Board  
TFNC  Tanzania Food and Nutrition Center  
UK  Ukiriguru (Cotton Research Station)  
URT  United Republic of Tanzania  
WCGA  Western Cotton Growing Area
EXECUTIVE SUMMARY

This report covers research undertaken in Bunda District, Mara Region of Tanzania, during February 2002. The research is part of larger project - Tanzania Agriculture Situation Analysis (TASA), developed by TADREG and supported by various donors - whose general objective is to look critically at the problems of agriculture development in the environment of produce marketing liberalisation in Tanzania. This component, which is supported by SIDA, focuses on problems of peasant cotton production and marketing in Bunda district.

Currently, cotton farming in Bunda District is not an enriching but an impoverishing activity for most farmers. Farmers put more into cotton production than they get out of it, and they are aware of this. The main reasons for this undesirable situation are low productivity of the land, low productivity of labor and, to a lesser extent, low producer prices. With the coming of competition in cotton buying, farmers have become more dependent on world market prices, although the setting of “indicator prices” by the Cotton Board may have a depressing effect on the farm gate price.

Low productivity of labor is to a large extent a result of land holding fragmentation even though this may not be immediately apparent. A sample of 23 cotton farmers farmed a total of 378 acres, but these 378 acres were broken up into 84 scattered fragments. The biggest farmers hold up to 66 acres of land. Sixty six acres of farm land are a good candidate for application of mechanical farming and other labor productivity enhancing tools. But when these 66 acres are broken up into ten scattered fragments, the prospects for applying such technologies becomes very low. Hence such a farmer is forced by this circumstance to continue to rely on the hand hoe or at best an ox plow and to farm pretty much like the smaller farmers.

The farmer wastes up to three hours a day commuting to and from these farm fragments and has to expend substantial amounts of energy carrying inputs to and outputs from the fields. The Bunda farmers, who own relatively substantial numbers of livestock, are simply unable to cart the manure to the fields because of its bulk and the distance. In addition, with the owner up to eight kilometers away, the crops in the fields are left to the mercy of nature as well as larcenous pests and individuals. Thus, the conditions in which the farmers have to produce create formidable problems of soil fertility restoration and labor productivity enhancement.

Without addressing the land and labor productivity problems, farmers will not reap significant benefits from cotton. And these productivities cannot be achieved under the present fragmented structure of holdings because this structure hinders the application of both soil and labor productivity enhancing technologies.

Overall, market liberalization has been positive for the cotton producer. The farmer now has options in terms of buyers, is paid immediately in cash and receives a somewhat better percentage of the world market price. But he has lost input credit as well as pesticide subsidies although these two are not necessary consequences of marketing liberalisation.
1.1 BACKGROUND TO THE STUDY

This report covers research undertaken in Bunda District, Mara Region of Tanzania, during February 2002. The research on cotton is part of a larger project - Tanzania Agriculture Situation Analysis, (TASA), developed by TADREG and supported by various donors. It is a multi-sectoral research project based on the experiences and perceptions of small-scale farmers. The analyses focus on the major cash and food crop sectors.

The objectives of TASA are to:
- provide a comprehensive, multidisciplinary overview of the agricultural sector on Tanzania mainland focusing particularly, though not exclusively, on issues of income growth and poverty reduction in the small-holder sector
- inform government investment priorities through the Public Expenditure Review
- assist the HIPC2 and Poverty Eradication Strategy implementation and monitoring processes
- inform agricultural and cooperative policy and the Agricultural Sector Development Strategy
- guide future donor support for poverty alleviation or for agricultural development

This component of TASA focuses on problems of peasant cotton production and marketing in Bunda district and is supported by the Swedish International Development Agency (SIDA). SIDA’s District Development Program is a long term development program focused on the Lake Victoria Basin using the districts of Bunda, Serengeti and Ukerewe as an entry points. The program supports the ongoing Local Government Reform Program which aims at decentralizing administrative structures to improve service delivery as well as reviving the economy and creating a framework for sustained economic growth. SIDA considers the role of the agricultural sector central to poverty reduction efforts (SIDA, Semi-Annual Report, Tanzania: 1 April - 30 September 2001: 9-15).

1.2 METHODOLOGY

Bunda District is divided into four divisions - Serengeti, Chamriho, Kenkombyo and Nansimo – 20 wards and 93 registered villages. Four villages were selected one in each of four wards in three out of the four divisions. The location of the four villages is as follows:

<table>
<thead>
<tr>
<th>Village</th>
<th>Ward</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migungani</td>
<td>Bunda</td>
<td>Serengeti</td>
</tr>
<tr>
<td>Kabasa</td>
<td>Kabasa</td>
<td>Serengeti</td>
</tr>
<tr>
<td>Sarawe</td>
<td>Nyamuswa</td>
<td>Chamriho</td>
</tr>
<tr>
<td>Namitwebiri</td>
<td>Neruma</td>
<td>Kenkombyo</td>
</tr>
</tbody>
</table>

The villages were purposively selected on the basis of having significant cotton production activity and being sufficiently spread out in the district in order to avoid peculiarities that might arise out of accidental geographical concentration. In each village focus group discussions were arranged with the help of an extension officer from DALDO’s office and the village government.
Problems of Cotton Production and Marketing in Bunda District

The focus groups consisted of from 12 to 17 people. General questions regarding cotton production and marketing were discussed at these meetings and the farmers’ views and opinions on the liberalization of cotton marketing were sought.

After the focus group discussions, six farmers were selected for intensive study. This selection was again purposeful, efforts being made to have in the sample, two farmers considered to be “well off”, two farmers considered to be “poor” and two farmers considered to be average. The selection was carried out with the help of the extension officer, who accompanied the researcher throughout and acted as research assistant, and officials of the village government. The interviewees may or may not have been part of the focus groups.

Usually the head of the household was interviewed but in a few instances the eldest son and in one case the wife were interviewed as the household heads were not available. The information collected from the farmers regarding household resources, production, costs, incomes, sizes of and distances to fields was given by the farmers themselves. Information on production costs could often be counter-checked with data collected from the focus groups and data on distances to the fields were counter-checked with estimates of time it takes to commute to the various fields. With regard to data on household resources, incomes and field sizes we took the farmer’s word for it.

Interviews were also carried out with selected cotton buying and ginning companies, individual cotton buying agents, officials of the Bunda District Council (both political and executive) and of the Cotton Board in Musoma and Dar es Salaam. Historical data were collected from files in the DALDO’s office as well as from the literature.

This study is structured as follows. Section 1 covers the background to the study and the methodology used; Section 2 a historical overview of cotton production in Bunda district from its beginnings at the turn of the last century to the present; Section 3 and 4 look at the way Bunda farmers produce cotton and the problems confronting them while Section 5 looks at the subject of cotton marketing and prices in Bunda under liberalization.
2.0 HISTORY OF COTTON PRODUCTION IN BUNDA DISTRICT

Cotton production in Bunda District is almost exactly 100 old. In 1903, a German farmer named Yebeck was given land for cotton cultivation in the Chiefdom of Majita near Bunda. A few other settlers followed in Yebeck’s footsteps. Labor was of course a problem and at first the Chiefs had to assign days for clans to detail a number of young men to work on the settlers’ farms (Magoti 1984, 42ff).

The Germans wanted to promote cotton production in their colonies in order to reduce reliance on the US which had virtually a supply monopoly. So, besides encouraging settler cultivation of cotton, they gave the chiefs cotton seeds and asked them to establish cotton fields and from there the people picked up the habit gradually. At the same time

“While the Jita were working on Yebete’s [i.e. Yebeck’s] field some of them took seeds with them and planted in their own fields. They then went to sell their products to Yebete.” (Iliffe, J. “Modern Tanzanians” pg. 182 – cited in Magoti, op. cit., pg. 48)

As the former natural economists increasingly picked cotton production for the cash it brought and the benefits of cash, the settlers found it more profitable to buy cotton from the cultivators surrounding their farms.

The British who succeeded the Germans after the first World War continued the policy of encouraging cotton production and commercialization of the economy. During the depression (1929-32) the fall in commodity prices led the emerging peasants to revert to barter trade, an attempt which was attacked by the Traders Licensing Ordinance (1932) which stipulated a list of agricultural produce which “had to be paid for in cash only and anyone who did not pay for cash became guilty of an offence” against the Ordinance. At about the same time, with the establishment of Provincial Administration in 1932, the British Colonial Administration began to send technical support staff to the districts, notably agricultural and veterinary staff, to advice and promote various agricultural and livestock rearing activities.

By 1941, the four chiefdoms of Bukwaya, Majita, Ushashi and Ikizu, with a total of 18,924 taxpayers, produced 1,290 tons of seed cotton worth almost 10,000 Pounds sterling.

After the Second World War, an energetic agricultural expansion program took place largely through bringing new land and new population areas into the cash crops economy coupled with quality improvement and increased delivery of agricultural extension services. Thus between 1940 and 1955 the acreage under cotton in Mara rose from 8,500 acres to 16,000 acres. Furthermore, cotton cultivation had mostly been limited to the Ushashi, Ikizu and Majita chiefdoms around Bunda and Bukwaya chiefdom near Musoma. Now it was being promoted in most parts of present Mara region with the exception of essentially pastoralist areas (Magoti, op. cit.).

\[\text{1}\]

\[\text{So that people will not deduce from this that the government was only thinking of cotton, the acreage under groundnuts also increased from 15,300 acres to 30,000 acres during the same time period.}\]
Table 1: Cotton Production in Musoma District – 1941

<table>
<thead>
<tr>
<th>Chiefdom</th>
<th># Taxpayers</th>
<th>Cotton Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bukwaya</td>
<td>7,565</td>
<td>402</td>
</tr>
<tr>
<td>Majita</td>
<td>5,617</td>
<td>427</td>
</tr>
<tr>
<td>Ushashi</td>
<td>2,542</td>
<td>305</td>
</tr>
<tr>
<td>Ikizu</td>
<td>3,200</td>
<td>156</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18,924</strong></td>
<td><strong>1,290</strong></td>
</tr>
</tbody>
</table>

The net result of this energetic expansion policy, coupled with stable producer prices, was a steep rise in Mara cotton production from 1,290 tons in 1941 to 4,280 tons in 1950. During the Korean War, producer prices for cotton rose from 34 cents per pound in 1951 to 50 cents in 1953/54 to 60 cents in 1954/55, a level which was sustained into the 1960s (Magoti, op. cit., 66). This rise in producer prices consolidated this expansion and crowned cotton as the king cash crop of Mara region, particularly of Bunda district.

Table 2: Cotton Production in Bunda District 1992-2001

<table>
<thead>
<tr>
<th>Season</th>
<th>M Tons</th>
<th>Price Shs/kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992/93</td>
<td>12,715</td>
<td>60/-</td>
</tr>
<tr>
<td>1993/94</td>
<td>10,482</td>
<td>80/-</td>
</tr>
<tr>
<td>1994/95*</td>
<td>20,378</td>
<td>125-130/-</td>
</tr>
<tr>
<td>1995/96</td>
<td>19,536</td>
<td>215/-</td>
</tr>
<tr>
<td>1996/97</td>
<td>8,313</td>
<td>180-200/-</td>
</tr>
<tr>
<td>1997/98</td>
<td>4,667</td>
<td>155/-</td>
</tr>
<tr>
<td>1998/99</td>
<td>3,508</td>
<td>148-200/-</td>
</tr>
<tr>
<td>1999/00</td>
<td>3,008</td>
<td>150-200/-</td>
</tr>
<tr>
<td>2000/01</td>
<td>9,364</td>
<td>130-220/-</td>
</tr>
</tbody>
</table>

* First year of cotton marketing liberalization

During the 1970s cotton production fell in Bunda, as elsewhere in the country, as a result of disruption of the farming systems by the villagization program. But it rebounded from the mid-1980s with the relaxation of villagization, particularly of the rigid household farm structures established by villagization and the return of freedom of farmers to shift from exhausted fields and acquire new ones. In 1985/86 Bunda cotton farmers produced 12,496 tons and in the

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3 Source: DALDO’s Office
4 Both before and after villagisation, farmers practiced “shifting cultivation” by which system a piece of virgin land would be brought under cultivation and farmed for a few years until its natural fertility was exhausted. Then it was
following season they produced 18,166 tons (Bunda District, 1988). Bunda cotton production peaked at 20,378 tons in 1994/95, which also happened to be the first year of cotton marketing liberalization. But one should not jump to the conclusion that this high level of production was a result of this liberalization for between 1996 and 2000, production suffered a precipitous decline in spite of the fact that cotton marketing liberalization was in full swing and the producer price was experiencing a rising trend. The reasons for the rise and fall in cotton production in Bunda district as well as in the rest of the country will be discussed later in this paper.

3.0 MODE OF COTTON PRODUCTION IN BUNDA DISTRICT

3.1 The Peasant Household and Sources of Farm Labor

The average household size for Bunda is given as 6.8 (TFNC-SIDA) but this does little to give one a proper idea of the actual situation. In the sample of 20 interviewees who gave data on household size, the household size ranged from 2 to 24, with an average of 10.55 persons per household. Of these, the able bodied (15-65 but without counting school going members) ranged from 2 to 12, with an average of 4.45 persons per household.

The household is the primary source of labor for farm work and these are essentially the able bodied members. Within the household, both men and women participate in the labor process although cotton production is largely men’s work. However household labor is frequently supplemented with outside sources of labor which include hired casual labor, mutual help groups (lisaga), and the hiring of oxen or tractor. Supplemental outside labor is usually used for plowing, thinning the cotton seedlings, weeding and cotton picking. It is occasionally used in pre-hoeing (kusesa), planting, separating the cotton into two grades (AR and BR) and in transporting the crop to the buying points. Some farmers with large harvests may hire a truck and deliver their produce direct to the ginnery and realize a higher price of an additional 20 shillings per kilogram.

Lisaga is a mutual help system whereby a person who needs help for plowing his land or for weeding for example will ask his neighbors to come in and help on a specific day. The host has to prepare meals and drinks for his lisaga team. You can get lisaga help with ox plowing only if you have ox ploughs yourself. If you are a hoe cultivator then you must seek help from fellow hoe cultivators. Farmers noted that the food and drinks for lisaga may be even more expensive than direct hire for ox plowing or casual labor. In addition lisaga often conflicts with the interests of the individual farmers who may be wanting to plough or weed their own farms at the same time as they are requested to help out their neighbors. Clearly when people become more

abandoned to “long fallow” - for nature to restore the fertility – and a new field was sought and brought under the hoe. One of the main objects of the villagisation program was to put an end to this practice - which is highly inefficient in the utilization of the land resource – by enforcing continuous cultivation on the same field without proper regard to the fact of fertility exhaustion.

This figure is closer to current Bunda District Council projections of a population of 282,000 in 29,096 households, giving an average household size of 9.7 for the district as a whole. – Source: Halmashauri ya Wilaya ya Bunda: Programu ya Kilimo. No date but probably 2000.
conscious of the relative costs – including the disturbance factor - this practice may gradually decline in favor of direct hire of ox plough or labor for cash payment.

People who own tractors and some ox plough owners will rent out their plows for cash but this is when they do not need them themselves for their own farms. Others will not rent out for cash although ox plow owners may participate in lisaga. A class of tractor or plow owners who specialize in hiring out their plows was not yet evident in the villages visited.

Table 3: Hired Labor Costs of Producing Cotton

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-hoeing (kusesa)</td>
<td>4,000/-</td>
</tr>
<tr>
<td>Plowing (hand, ox or tractor)</td>
<td>6-10,000/-</td>
</tr>
<tr>
<td>Seed planting</td>
<td>1-3,000/-</td>
</tr>
<tr>
<td>Thinning</td>
<td>1,500 – 2,000/-</td>
</tr>
<tr>
<td>Weeding (x 3)</td>
<td>9-15,000/-</td>
</tr>
<tr>
<td>Spraying (x 3)</td>
<td>3,000/-</td>
</tr>
<tr>
<td>Harvesting (aver debe 72)</td>
<td>7,200/-</td>
</tr>
<tr>
<td>Grading (debe 72)</td>
<td>7,200/-</td>
</tr>
<tr>
<td>Transport (4 bundles) (ox-cart)</td>
<td>5,000/-</td>
</tr>
<tr>
<td>Uprooting old plants</td>
<td>1-2,000/-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>44,900 - 58,400/-</strong></td>
</tr>
</tbody>
</table>

Source: Own farmer interviews.

Although neighboring individuals may seek and perform casual labor for their neighbor, the casual laborers are usually a group of young persons who roam about the country seeking hand hoeing, weeding or cotton picking contracts. One person negotiates the price for hoeing or weeding an acre, the number of acres is stipulated and the ‘contractor’ determines how the task and income will be shared among his group. The going price for a specific task varies with the supply of the service or labor in a given village. It may also be lower at the beginning of the season for a specific activity and higher towards the end. Weeding an acre for example is 5,000/- in Migungani and Sarawe villages but only 3,000/- in Kabasa village. Ox plowing an acre will cost the farmer 6-8,000/- in Sarawe village, 7,000/- in Namitwebiri and 10,000/- in Migungani village. But the price for harvesting a ‘debe’ of cotton (approximately 5 kgs) is 100/- in all the four villages surveyed.  

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6 The transport cost varies with distance from buying post. The figure given is based on stated cost for transporting four “furushi” or bundles in Kabasa village. The furushi weighs 89 kgs (with 1 kg for the holding bag or ‘shuka’ the weighing scale actually reads 90 kgs). The frequently stated yield per acre is 356 kgs which is four furushi.

7 The ‘debe’ is a 20 liter tin container holding approximately 5 kgs of cotton. The farmers insist on paying by the metal container rather than the equivalent plastic container because the cotton can be pressed down into the tin container, something which does not work with the plastic containers.
What pushes some one into seeking casual labor is the need for cash – either because the individual has an emergency such as a sick household member or just for the benefits of having cash especially for the young persons. Typically the casual laborer will have less land and is less diligent as a farmer. Labor hirers complain about the quality of their work and emphasize that they must be supervised closely otherwise they will do shoddy work.

Obviously when a farmer or a member of a farming household goes out to work on another person’s farm he cannot at the same time work on his own. His own situation as an independent small holder will deteriorate while that of the labor hirer improves. The following season and subsequent ones will aggravate his situation as an independent small holder while that of the labor hirer becomes stronger. In time the employment seeker will rely more and more on this way of life and eventually will become a wage laborer while the labor hirer will end up being a proper employer or capitalist farmer. This development tendency, which is positive and inevitable in the long run, ought to be encouraged and hastened by removing hurdles in its way. But the Tanzanian development policy experience has been mostly in the opposite direction, something which, to a large extent, accounts for the extremely poor performance of the agricultural sector during most of the post-independence period.

3.2 The Cotton Production Process

The cotton production cycle involves land preparation, planting the seed, thinning or spacing the seedlings (kuachanisha), weeding three or four times, insecticide application three to six times, cotton picking, sorting the cotton into two grades (AR and BR) and delivering the cotton for sale at a buying station or at the ginnery in the case of some bigger farmers.

Once all the cotton is harvested from the field the stalks are removed and burned as a precaution against transmitting plant diseases and pests from one season to the next. Then the farmer waits for the start of the next season which will begin with land preparation, etc. The season starts around October and ends the following September. The start of cotton planting will depend on the rains. Cotton planted in November is ready for harvesting in June, that planted in January is harvested in August. Some farmers will plant late just because they are laggards while others will do so because they figure that better cotton prices will come towards the end of the buying season, although this is not always the case.

3.2.1 Land Preparation

In Bunda, land for planting cotton is commonly land which was previously cultivated. But because there is hardly any soil nutrient replenishment, after about three to four seasons, the soil gets exhausted and the field has to be abandoned to long fallow and new land sought and brought under cultivation. Thus shifting cultivation is still being practiced though within limits because

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8 However, officially the cotton season is dated from harvest to harvest, unlike other Tanzanian crop seasons which are dated from planting to planting (Gibbon, 1998c).
“free” land is not as easily available as was the case in the past. Households with so-called “surplus land” will shift to another field which was not previously cultivated or which had been lying fallow for several years. Those without such land may have to rent land from another household or else suspend cotton production “for a while”. At any rate the farmer’s land holding is hardly ever in one contiguous field but scattered in fragments over various distances from the homestead. This problem is discussed farther on in the paper.

Usually, one may turn the soil using an ox plow or a hand hoe. When virgin land or land which has been left to long fallow has to be brought under cultivation, the field has to be cleared of bushes and trees and the stumps taken out to sufficient depth for the hoe or ox plow to turn the soil. The ox plow may belong to the farmer, hired by the acre or pooled in a joint mutual help group or “lisaga”. Hand hoeing may also be undertaken by own household labor, by lisaga or by hired casual labor.

Of the 24 households studied, nine own one or two yokes of oxen, eight reported hiring ox ploughs for cultivation and seven said they rely on hoe cultivation. The oxen hirers of course also cultivate by hoe, hiring the oxen when income allows, that is sparingly or when the soil is too hard for hand hoeing. In there is very little tractor plowing although farmers kept expressing the wish that someone, such as the cotton buying companies, would offer the service especially on credit. S & C Ginning Co. have a tractor which they hire out to farmers at 10,000 shillings an acre on credit for the farmers who live near the company premises. The problem with providing service to farmers on credit is in ensuring collection as the indebted farmers tend to avoid selling their crop to the creditor in order to avoid payment of the debt. In this case the creditor loses the money as well as a cotton supplier.

At any rate the plowing – whether by hand or ox plow - may have to be repeated if need be. Plowing is done in September to October ready for planting in November-January depending on the onset of the rains.

3.2.2 Planting

In the past farmers used to get planting seed free from the Cotton Board but at present they pay 35 shillings per kilo. This is up from 15 shillings per kilo the previous season but the Cotton Board says the price is still subsidized by the Cotton Development Fund (CDF). At any rate seed is sold to oil mills at 40-50 shillings per kg. To plant one acre you need about 15 kgs.

Planting is usually undertaken by household labor but farmers with bigger farms tend to supplement the household labor with hired outside labor. Most farmers will plant behind the plow or broadcast the seeds. Some will prepare and plant on ridges and some try to follow rough rows. The need for planting in rows is reduced by the absence of mechanical weeding.

Once the seedlings have sprouted and grown to a height of a few inches, they have to be thinned out to improve the spacing between plants. Thinning is frequently done by household labor but weeding is frequently undertaken by hired labor. Weeding is done three to six times before the

9 The casual laborers refuse to handle extra hard soils.
crop is harvested. Six times is the number recommended. At the rate of 3-5,000 shillings per acre the weeding operation alone can eat up to 30,000 shillings an acre. Thus farmers try to cut costs by reducing the number of times they weed which in turn has a negative effect on the yield.

### 3.2.3 Insecticide Application

Insecticide is the make or break of cotton production. In Bunda, every cotton farmer knows the importance of insecticides in cotton farming. The difference between “proper” application of and non application is dramatic.

“Aliyetumia dawa sawasawa anapata kilo 356 kwa eka. Asiyetumia dawa kabisa hupata kilo 20 kwa eka.” [With proper application of insecticide one gets 356 kgs per acre. Without applying pesticides the yield will drop to 20 kgs per acre] (Focus Group, Kabasa).

The common cotton plant diseases are **Cotton Fusarium**, **Cotton Wilts** and **Cotton Bacterial Blights**. The main cotton pests are American Boll Worms, Cotton Stainers and Cotton Aphids. There has been a variety of pesticides used over the years in Bunda. According to the DALDO’s office, during the 1970s Thiodan was commonly used. But this has been discontinued for environmental reasons as it has the same side effects as DDT. Since then the pesticides have included the trade names of Ripcord, Karate, Bull Dog, Cypercal, Fenon and Decis.

The pesticides come in two forms: oil based and water based. Oil based pesticides are of a variety of brand names and are sold by private suppliers for 3,500-5,000/- per liter, enough for spraying one acre once. The water based pesticide (Decis 250 ml) is supplied by the Cotton Development Fund, sells for 6,000/- and is enough for spraying two acres once. Thus to apply pesticides to one acre for the six recommended times would cost the farmer 21-30,000/- for the oil based pesticides or 18,000/- for the water based insecticide.

The recommended number of applications is six times but the cost makes farmers to cut corners. Of 14 farmers who gave information on the number of times they applied insecticides to their cotton fields, two did not spray at all, two sprayed once, two sprayed twice, one sprayed three times, four sprayed four times, two sprayed five times and only one sprayed the recommended six times.

The trouble is last year the Cotton Board supplied oil based pesticides which became heavily adulterated with diesel oil along the way and became virtually useless. This is in fact the reason the Cotton Board decided to supply the water based pesticide this season just in case there are stocks of the adulterated brand waiting to be inserted into the market. Yet the adulteration made farmers suspicious of Cotton Board supplied pesticides. Secondly farmers do not have as much confidence in water based pesticides as they do in the oil based ones believing that when it rains it will wash away the pesticide rendering it less effective. Thirdly the water based pesticide, Decis, is being presented to the farmers for the first time and the farmers say its efficacy is unproven.
Fourthly, even though the cost per acre for the water based pesticide is lower than for the oil based one, the cash outlay is higher – 6,000/- as compared to 3,500-5,000/-. Fifthly, the water based pesticide has a complicated and much more expensive pump than the oil based pesticides.

Box 1: Musa M., an Energetic Farmer

Musa M. is a young energetic farmer of Kabasa village. He is about 35 years old but runs the household on behalf of his father who about 70 years old. There are 10 persons in the household of whom three are adults. The household has 35.5 acres of land on which they plant cotton, cassava, maize, millet, fruits, vegetables, Irish potatoes, sweet potatoes and ground nuts. Some of the crops are planted in mixed stands but cotton is usually planted alone in the field. Crop rotation is practiced and some of the land is left fallow for two or three years.

The 35.5 acres are not in one contiguous field but in 10 fragments, with the smallest fragment being one acre (the homestead), and the biggest being 6.5 acres which is located about three kilometers distant from the homestead.

<table>
<thead>
<tr>
<th>Fragment #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6*</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (acres)</td>
<td>6.5</td>
<td>5.5</td>
<td>3.5</td>
<td>6.0</td>
<td>1.5</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>5.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Dist to commute (km)</td>
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<td>2.0</td>
<td>1.5</td>
<td>1.5</td>
<td>1.0</td>
<td>0</td>
<td>1.5</td>
<td>1.0</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Commut’g time (min)</td>
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<td>20</td>
<td>15</td>
<td>15</td>
<td>10</td>
<td>0</td>
<td>15</td>
<td>15</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>

* Fragment #6 is the homestead.

The household owns one plow of four oxen but during plowing Mr Musa organizes lisaga support of 5 to 10 plows from his neighbors for whom he provides drinks and slaughters a goat which is cooked with rice and ugali. For planting, thinning, weeding and harvesting he uses casual labor in addition to household labor.

He has 4 head of cattle (for the plow) and 10 goats which are kept at the homestead. There is no question of carting the manure to the fields because of the distance and the bulk of the manure.

Last year he planted 15 acres of cotton and received income of 780,000 shillings. That is an average of 52,000 shillings per acre but he is happy about getting that amount of money in one go because he “can do important things with it”.

All their land was acquired through inheritance or allocation by the village government. There is hardly any land sales in the village but there is land shortage and one may rent land for 5,000 shillings an acre from a friend or a neighbor. Common lands for pasture and fuel wood existed previously but have disappeared or are disappearing fast. But one must rely on his own resources as there is no market for animal fodder or fuel wood (yet!).

Mr Musa is positive about liberalization and negative about the old cooperatives. He said the coops bought cotton on credit and some people in the village are still owed more that 500,000 shillings dating way back to 1995.
Decis comes with a special pump which costs 60,00/- but has been supplied free by the Cotton Board, one pump per village. Farmers have to rent these pumps for 100/- per day. For the oil based pesticides the pump costs 7,000/- and many farmers have their own.

As a result of all these factors farmers are not buying the pesticide supplied by the Cotton Board. In Kabasa village, only nine out of 600 Decis canisters received had been sold by mid-February. In Namitwebiri village, only three out of 110 units received had been bought by farmers. And the cotton crop was already growing buds.

**Box 2: Erasto M.: a Casual Laborer**

Erasto is 57 years old. His household has 9 persons of whom four are able bodied adults. He owns no livestock. His land holding consists of the one acre homestead and a 4 acre field which is one kilometer away from the homestead. This latter he was given by the village government.

Last year, on the 4 acre field, he planted 2 acres with cotton and two acres with maize mixed with “finger millet” (eleusine). He applied insecticide for the cotton only once and received income of 20,000 shillings from the crop. He did a little better with the food crops, getting 10 bags of maize and one and a half bags of “finger millet” (eleusine) from the other two acres he cultivated.

He works as a casual laborer hand hoeing, weeding, harvesting, etc. The price is negotiated with the labor hirer and agreed upon before hand. According to Mr Erasto some people spend almost all their time on casual labor but he spends more time on his farm than on casual labor. He seeks casual labor because it is a source of “immediate cash”. At any rate he is frequently short of money.

What the farmers are doing is they are buying the oil based pesticides offered by private suppliers as well as using some rather dis -ingenious methods to solve the pesticide problem. The latter includes using the bed bug killer, Dyson. They buy Dyson at 700 shillings a bottle which they can then mix with five liters of water and spray on one acre for up to four times that is at a cost of less than 200 shillings per acre per spray. Others use the livestock Superdip which they buy at 3,000 shillings for a 350 ml bottle. They mix 2 ml per liter of water so that 350 ml is enough to make 175 liters of pesticide. The use of Dyson and Superdip for spraying cotton is actually dangerous because these penetrate the cotton seeds which are used for making edible oils.