

Technology Transfer and Government Direct Involvement in Improved Seedling Production for Farmers: Lessons from the Integrated Tomato Project in Zaria, Nigeria.

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Abstract: This study assessed government policy of direct participation in seedling production for farmers using the Zaria integrated tomato processing project as a case study. The project jointly financed by Cadbury Nigeria Ltd (a commercial concern) and the Kaduna State government, involved raising of tomato seedlings for farmers, aiding them in the establishment of their tomato farms and purchasing the produce (tomato fruits) for processing at the Cadbury factory located in Zaria. The project was assessed by comparing the costs of raising seedlings at the farmers' level and the government (or ministry) management level using data collected during the 1975/76 dry season cropping from three selected villages in Zaria area, namely Tsugugi, Hunkuyi and Garu for assessing nurseries managed by farmers and the nursery located at Galma, in Zaria for the government managed nursery. The data collected were analysed using the cost accounting technique. Results obtained showed that total costs of raising seedlings at the government nursery was about 135% higher than that of nurseries managed by farmers per hectare. Total costs ranged from N3,376 on the private-individual nurseries at Hunkuyi village to as much as N11,508 at the government nursery. This higher cost at the government nursery was attributed to the daily attendance/daily wage rate payment pattern adopted which had no bearing with the daily work output. As much as 21,868 unproductive labour man-days were paid for. The study also observed that supervisory labour cost accounted for as much as 40% of the total labour cost or 23% of total cost of seedling production at the project site. Transport was a major constraint for the effective management and distribution of seedlings from the government nursery site. Based on these findings the study recommended that government investment support to agriculture should be focused on farmer training programmes and infrastructural provision while the responsibility for seedling production should as a matter of policy be left to farmers.

Key words: Technology Transfer, Government involvement Improved Seedling Multiplication, Tomato Project, Zaria.

INTRODUCTION

One of the major declared constraint to the growth and productivity of the Nigeria agriculture is inadequate supplies of vital agricultural inputs ^[7,5]. Some of the programmes government had put in place, in an effort to ameliorate this problem include the importation of fertilizers to augment local production, establishment of seed and seedling multiplication centres, etc, all aimed at providing the inputs to farmers at subsidized rates or without costs. Such programmes are also viewed as ways of encouraging the use of improved inputs and measures to reduce the initial high production cost associated with most improved technologies.

More recently a number of questions have been raised as to the justification for government's full-scale commitment of resources to some of these projects. The questions raised relate to the efficiency and cost-effectiveness with which these project have been

managed. For instance the complaints of high unit cost of inputs, untimeliness in deliveries and inadequate supplies of these inputs to farmers have remained a perennial problem. The issue then is, can farmers, given the basic production inputs by government, be able to produce some of this vital inputs (e.g. seeds, seedling, plant cuttings, etc) in sufficient quantities and quality to meet their requirements? How much more or less would it cost, if the government only partly gets involved in the provision of these inputs?

These questions are of immense importance in the light of the fact that:

- (1) Nigeria, like some other developing countries, has a widely dispersed agricultural population, characterized by small farm holdings; as a result getting farm inputs to them, particularly the fast degenerating inputs like seedlings, could become rather tedious and expensive in terms of transportation and human resource efforts.

- (2) Capital is a constraint and therefore government may not adequately meet all the input requirements of all able and willing farmers.
- (3) The existing ratio of Extension workers to farmers in Nigeria is very low, as a result most farmers are not aware of the available improved production technologies.

This paper examined some of these issues with particular reference to the Zaria tomato seedling multiplication scheme.

Background to the Zaria Tomato Seedling Multiplication Scheme: The Zaria tomato seedling production scheme was part of an integrated tomato processing project jointly financed by Cadbury Nigeria Ltd (a commercial concern) and the Kaduna State Government. The project was aimed at introducing farmers to modern techniques of tomato production, which will raise productivity and hopefully lead to improved standard of living for the farmers ^[1,9]. It was also to reduce the country's dependence on imports of tomato paste and puree through the development of a commercially viable tomato paste and puree industry.

As a result of the negotiations between Cadbury and the Government of Kaduna State in 1971, it was agreed that necessary credits (in kind) should be supplied to farmers to ensure that the complete package of inputs recommended for the crop was being used. Cadbury on its part agreed to import and supply improved tomato seeds to the State Ministry of Agriculture, Zaria, assist with extension effort, fix product price in consultation with the Ministry, purchase and transport the tomatoes from project sites managed by the farmers. Cadbury was also to assist in the recovery of credits given to farmers at the time of crop deliveries.

The Ministry on the other hand, agreed to raise tomato seedlings at its nursery sites for distribution to farmers, hire-out tractors, spraying and irrigation equipments from its hire pool. In addition fertilizers and chemicals were supplied to farmers at heavily subsidized rates by the Ministry.

The farmers on their part, agreed to these credit arrangements and were obliged to deliver their produce (fresh tomatoes) to Cadbury factory, from where the credit deductions were made. For a number of reasons, this agreed course of production never materialized ^[12].

After two years into the project life, the Ministry commenced distributing tomato seeds directly to the farmers (in addition to other inputs and services) for them to raise seedlings at their own sites while the Ministry still continued raising seedlings at its tomato nursery sites in Zaria.

This change in seed and seedling supplies arrangements was partly due to the Ministry's inability to provide transport on time from its vehicle pool, to convey seedlings to farmers and the late delivery of other inputs^[12]. The question then is could it not have been cheaper and more time efficient for the Ministry to entirely commit farmers to raising their own seedlings while it focused attention on other areas relating to infrastructural provision.

This paper has attempted to compare the costs of raising tomato seedlings in Zaria area at the farmer's level and the government management level. Specifically the paper addresses four major issues; What were the physical quantities of inputs and total costs (per hectare) of raising tomato seedlings at the farmers and government nurseries.

What were the causes for the difference in production costs at both levels of management.

What were the constraints to the establishment of tomato nurseries and the distribution of seedlings from the government managed nursery.

On the basis of (1), (2) and (3) above discuss the desirability of government direct participation in seedling multiplication projects intended for farmers use.

Review of Nigeria's Agricultural Development Policies: The Nigerian Government past efforts at achieving agricultural development, focused more on large scale capital-intensive agricultural projects like plantation development, farm settlement schemes, etc. With the realized failures of most of these projects, in particular their lower returns to invested capital (see Table 1), government emphasis shifted to policies designed to effect small changes over a large area ^[15,6,7]. Some of the policies in this direction include the large scale procurement and distribution of improved inputs such as fertilizers, agro-chemicals, improved seeds, seedlings, etc, to farmers rather than large changes in a small area. This change of policy direction, was also due to the increased awareness by the policy makers, that the small-holders still contributed well over 70 – 80 percent of the nations total agricultural produce despite the heavy investment on the large scale capital intensive agricultural projects. Thus raising their productivity and therefore output, with a corresponding increase in farm income, is therefore essential for continued economic development and political stability for the nation^[13].

The government programmes designed to promote agricultural development fall into two broad categories: the input approach and the output approach. The former which can be described as the improvement strategy, aims at the progressive development of the

small farmer through the provision of improved inputs (e.g fertilizers, insecticides, improved seeds) at subsidized rates^[12]. This strategy is based on the assumption that one of the reasons for the low adoption of the high yielding technology, which entails the use of complete package of inputs, is the lack of capital to purchase the inputs^[11,4,5].

The output approach on the other hand, aims at encouraging the growth of certain crops (especially for export) by adopting a minimum price legislation, either through government agencies, quasi-government functionaries or agro-based industries which utilize such raw materials in their production process. The underlying assumptions of this approach are that farmers respond to price incentives^[8,3] and secondly that the establishment of an assured market with guaranteed product price will boost production at the farm level. Idachaba^[10] however notes that stakeholders (e.g farmers, researchers, etc) participation in the policy making processes relating to agricultural projects is also very vital to their success. Part of the failure of Cadbury integrated tomato project, was attributed to the dissatisfaction among farmers, as to the system of group leadership appointment at the project sites, which was imposed on them rather than allowing them make their own choice of the group leaders^[1].

Other factors that lead to the total collapse of the tomato project were the delay and wrong timing in the delivery of inputs as well as the wide price margin that existed between the guaranteed product price at the processing factory and the price that prevailed in the open markets^[12]. The latter resulted in the diversion of fruits to the open markets rather than deliveries at the Cadbury factory where immediate payments were guaranteed.

Two years after the commencement of the Cadbury tomato project, the arrangement for seedling production had to be reviewed, due to the rising cost of maintaining the entire Cadbury scheme^[12]. It was believed that the cost of raising seedlings (at the government central nursery from where the seedlings were being distributed to farmers at the various project sites) could be reduced by allowing farmers to grow the seeds on their own at the various project sites. However to avoid any possible total failure at the initial trials of this new policy shift, the central nursery was still maintained while farmers were given seeds to grow on their own. A cost-accounting study of seedling production under the government manned central nursery and under private farmers nursery management was consequently undertaken to assess the relative difference in costs at both levels of management. Because of the high over-head costs often associated with most government managed projects, one of the

apriori expectation of the study is that the cost for government managed nursery would be higher but the magnitude of the difference is also important for recommending future policy direction.

Also, since the seeds being planted and quality of inputs for seedling production are the same at both levels of management, the difference in costs (if significant) would therefore be attributed to efficiency of management at the different levels.

MATERIALS AND METHODS

Data Source and Method of Collection: Primary data were used for this study. For the private nursery schemes, data were obtained from a cross-sectional field survey, carried out in three villages around Zaria area during the 1975/76 dry season cropping. The villages were Tsugugi (in Sabon-Gari district of Zaria Local Government), Hunkuyi and Garu (both in Makarifi district of Ikara Local Government). Garu and Hunkuyi tomato farmers were both in the joint Cadbury-Ministry managed tomato scheme but the latter opted out at the time this study was undertaken. Tsugugi village farmers were however never at any time in the joint project. For the Ministry-Cadbury nursery scheme, data were collected from the only central nursery project in Zaria located at Galma.

The cost-route survey method was used in data collection. The method basically involves frequent visits to respondents to record field activities and other related events as they occur throughout the crop cycle. Farmers and the Ministry staff directly attached to the project were interviewed twice a week using structured questionnaire.

As to sampled farmers selected for the study (apart from the group nursery projects at Hunkuyi and Garu), a complete random sample approach was adopted in the selection. For the group nursery scheme, the entire farmers that made up each group were selected and interviewed. On the whole 115 private farmers made up of 17 and 13 private-individual nursery farmers at Tugugi and Hunkuyi respectively, 15 and 70 private-group farmers at Hunkuyi and Garu respectively. For the government (Ministry) nursery project, the agricultural assistants and agricultural superintendents directly in-charge of the day-to-day operations at the nursery site were interviewed.

Analytical Technique: Crop enterprise costings can be done using any of these three different approaches or a combination depending on the focus of the study. One method suggested by Barnard and Nix (1976) is to classify the cost items by operations and materials. The method analyses cost in three parts:

- a Costs of raising the crop (i.e growing cost)
- b Costs associated with the harvest and post harvest activities (harvesting, storage etc.)
- c Overhead costs (rent, general overhead expenses, etc)

The second method also suggested by Barnard and Nix (1976) involves analyzing all costs as factors of production. This method simply lists and analysis all the cost items under one general heading as “factors costs”. They are therefore not analysed as variable, fixed, operating, growing or harvesting cost. In particular all labour inputs are lumped together as labour cost.

The third method which Olson (2004) describes as “cost measures” show the efficiency with which costs are controlled relative to production level. The method analyses total costs per unit of production in two parts direct operational costs per unit (i.e. variable) and overhead cost per unit (i.e. fixed).

This study adopted the third approach in analyzing the cost of seedling production because part of the focus of the study was to identify if it was the variable or the fixed cost that was responsible for the high operating cost of the Cadbury tomato scheme. Labour cost was consistently found to be the single highest cost element in tomato seedling production at both management levels (government and farmers).

RESULTS AND DISCUSSIONS

At the farmer’s level two classes of nursery scheme were identified: private – individual and private–group nurseries. The private–group nursery refers to the situation where two or more farmers joined their resources together to establish their own nursery.

Also the study noted that the seed sowing procedure as recommended by the Extension services of the Institute for Agricultural Research (I.A.R) – 7.6cm – 10cm between drills and drill depth of 0.7cm – 1.3cm was followed by all the selected farmers and Ministry staff. Therefore it was assumed that the seedling population between nurseries are comparable. The costs for establishing and maintenance of the different nursery schemes are presented in Table 2. The table result showed that the average variable cost per hectare ranged from N3,376 on the private-individual nursery scheme (in Hunkuyi) to about N8,671 on the government nursery. The average total production cost also followed the same pattern, N3,376 for the private – individual scheme (in Hunkuyi) to a rather high figure of N11,508 for the government nursery scheme. The added cost in the case of the latter is as a result of the salaries of supervisory staff and day watch-guard employed at the nursery site to check against illegal

removal of seedlings. Depreciation on farm equipment used in the case of the private – individual nursery farmers was rather negligible. Items mostly used for irrigation include discarded paint containers and locally made buckets which were also used for domestic purposes. For the two private – group schemes (in Hunkuyi and Garu) irrigation pumps provided by the Ministry were used by the farmers but payments for their use are charged on the tomato farm to be cultivated by the individual farmer. Thus in arriving at the total cost figures for the two private – group nursery schemes, only the costs of fuel, grease, engine oil and depreciation on equipment were included.

Also a look at the share of costs to the farmer and to the government it can be observed that there were wide margin of differences. For instance, the cost to the farmers ranged from a zero Naira, at the government managed central nursery, (since participating farmers in the joint scheme were given seedlings free of charge), to about N4,907 for the private – individual nursery scheme (at Tsugugi). On the other hand the share of production cost to the government ranged from a zero Naira for the private – individual nurseries (at Tsugugi and Hunkuyi) to a rather high figure of N11,508 for the government central nursery. On the average total cost per hectare for raising seedlings at the farmer’s level was N4,904 as against N11,508 for the government nursery (representing a 135% difference). With this wide margin of different the question that arises is why the higher total cost for the government managed nursery project? The difference is better explained by examining the various cost items under the different nursery management.

From table 2 again, it can be observed that despite the higher total non-labour input costs for the private – group nursery at Garu, the average total production costs (N7,347.68) was 36% lower than that of the government nursery (N11,507.56). This difference suggests that the percentage of labour cost to total production cost was higher for the government managed nursery scheme. For the private – group nursery at Garu for instance, the ratio of labour cost to total production cost was 31.5% as against 56.8% for the government nursery project.

On further examination of the labour man – hour input for the different nursery management schemes, Table 3 revealed that despite the lower labour man – hour input on the government central nursery, the labour costs was higher. Actual labour man – hour input used per hectare ranged from 2,172 (at the government central nursery) to a relatively high figure of 13,106 man – hours spent on the private – individual nursery scheme in Hunkuyi. On the contrary

total labour costs ranged from N285 for the private – individual nursery in Hunkuyi to a relatively high figure of N6,533 for the government managed nursery (see Table 2). Salaries paid to supervisory staff and higher wage rates paid by government to daily hired labour were some factors that contributed to the wide range of difference in total labour costs incurred between the privately managed nurseries and government central nursery scheme. Another significant factor was the difference between actual labour man-days worked and labour man – days paid for at the government managed nursery project (see Table 4). Instead of payment for 434.4 labour man – days put in or actually spent on the 0.2 hectare nursery cultivated during the 1975/76 dry season cropping, the government paid for 23,630.5 labour man – days. This meant an over – payment of 23,196 labour man – days or N1307 for the 0.2 hectare cultivated (see Table 6). Unlike commercial business concerns, where labour is priced and paid for based on the amount of work done, labour payments at the government central nursery was based on daily attendance at work rather than productive hours put in. This payment pattern definitely encouraged redundancy, both from the regular staff and the hired workers in particular, in a bid to secure another days pay packet.

At the village level on the other hand, farmers had no clocks or watches to record time spent^[14] but then daily labour payments made quite closely reflected the amount of work done^[12].

Again a more closer look at Tables 4 and 5 on labour distribution by operation, one observes that about 93% (or 21868 man – days) of the total labour man – days paid for at the government nursery, was for irrigation or watering of seedlings as against 192 man – days (or 44%) of actual or effective man – days spent. This finding highlights a situation of disguised employment at the government nursery project. With an efficiently managed and maintained irrigation pump (like the one stationed at the government nursery site during the 1975/76 dry season cropping) only about 960 labour man – days was probably required per hectare for the irrigation operation.

Apart from labour, cost of seeds also contributed a significant proportion to the total cost of production; ranging from 20% on the government nursery to about 69% on the private – individual nursery at Hunkuyi (see table 2). Table 3 however showed that the quantity of seeds used per hectare was higher at Garu nursery as compared to the other nursery schemes in the area. On possible reason for this is that, seeds were provided free of charge to farmers at Garu by the Ministry, as against the private – individual farmers at Tsugugi and Hunkuyi, who had to purchase their seeds either at the

local markets or at the Ministry of Agriculture. The group farmers at Hunkuyi also benefited from the free seed distribution programme before it opted out of the joint Cadbury – Ministry tomato project.

Though grass mulch did not contribute much to the total costs of raising seedlings (about 10%), the government managed nursery again paid more for a relatively smaller quantity of mulch. For 1050 bundles of mulch used (per hectare) at the government nursery N1053 was paid as against N243.41 paid by Tsugugi farmers for 4486 bundles. This situation unlike the labour case, could probably be due to one or more of these factors:

- (1) Imperfect market for the input (mulch)
- (2) Lack of information or reluctance on the part of the Ministry officials to check on prevailing prices in the surrounding markets or villages before making purchases; and/or
- (3) Attitude of sellers or contractors assigned to government project; many of whom believe the government treasury is a gold mine hence getting money out should be through inflated quotations.

Constraints to Seedling Production: On major constraint identified, was the insufficient stock of tomato seeds at the Ministry of Agriculture for farmers to buy. Many private farmers resorted in most cases to the purchases of seeds in local markets which may not be true improved seeds. Another constraint bothered on transport for the management of the government central nursery – both for raising the seedlings and the distribution to farmers at the various project sites. On some occasions work at the government nursery site was suspended for as much as a week due to lack of transport and some other occasions lack of fuel or lack of cash for labour wages. These delays, at was observed affected some of the seedlings at the site. On the distribution of seedlings to the project sites, the situation was similar. Atimes seedlings were supplied when some farmlands on which seedlings are ot be transplanted have not been cultivated or ridged; a problem attributed to poor extension network.

Summary and Conclusion: This study was undertaken to evaluate the justification for government direct participation in seedling production scheme for farmers with particular reference to the jointly managed Cadbury – Kaduna state government tomato seedling multiplication scheme under the integrated tomato processing project in Zaria area. This was assessed by comparing the total costs of raising seedlings at the farmers level and at the government (or Ministry) management level.

Table 1: Output/input Ratio for Plantations, Settlement, Smallholder Investment and Small Holder Improvement Schemes.

Types	Output/input* Output/government**	Ratio for the economy Input
1. Plantations	(1)	(2)
Oil – palm	2.3:1	2.3:1
Cocoa	1.7:1	1.7:1
Rubber	1.4:1	2.8:1
2. Farm Settlement Scheme		
Oil – palm	2.3:1	4:1
Rubber	2.3:1	6:1
3. Small-holder (Investment) Schemes (a)		
Oil – palm	7:1	26:1
Cocoa	2:1	27:1
Rubber	3:1	37:1
4. Small-holder (Improvement) Scheme (b)		
Yams	2.9:1	6.4:1
Cassava	3.8:1	6.4:1
Cocoa	2.9:1	6.4:1

Source: Fogg, D.C. “Economic and Social Factors Affecting the Development of Smallholder Agriculture in Eastern Nigeria” – Journal of Economic Development and Cultural Change, vol. XIII, No. 3, April 1965, pp. 281 – 282, (The University of Chicago Press, Chicago).

Foot-notes: *The output/input ratio for the economy in the column 1 on the table measures the benefit of each scheme to the economy as a whole and it can be used for evaluating alternative investment possibilities.

**output/government input ratio on the other, measures the addition to G.N.P. per unit of government expenditure on a given scheme.

Government input for all three schemes include the cost of extension services, planting stock, subsidized chemicals and fertilizers and cash compensations.

It is assumed the crop to be improved is already being planted by the farmer therefore the table output figure for the scheme are incremental output, that is, the value of the additional produce obtained by adopting new methods.

Table 2: Cost per Hectare for Raising Dry Season Tomato Seedlings in Zaria Area

Variable Specification	NURSERY MANAGEMENT ORGANISATIONS				
	Government Central Nursery	Private-Individual Nursery (17 farmers)	Private-group* Nursery (15 farmers)	Private-Individual Nursery (13 farmers)	Private-Group* Nursery (70 farmers)
	Galma	Tsugugi		Hunkuyi	Garu
Inputs					
Variable Cost (N)					
Labour	-				
(a) Family		1465.25	-	-	-
(b) Communal	-	165.06	1620.00	-	2311.14
(c) Hired	3856.75	427.65	-	28547	-
Seeds	2278.50	2277.32	1528.00	2321.56	3703.92
Fertilizer	368.35	96.64	291.07	272.46	270.68
Insecticide (Vetox 5)	-	42.74	-	-	-
Much (grass)	1053.75	243.41	166.67	366.67	343.88
Others	780.50	-	72.22	-	281.61
Interest on operating capital ⁽²⁾	333.51	188.72	147.12	129.84	276.45

Table 2: Continue

Sub – total	8671.36	4906.76	3825.08	3375.88	7187.68
Fixed Costs (N)					
Supervisory labour ⁽³⁾	2676.20	-	-	-	-
Depreciation and interest on irrigation equipment	160.00	-	16-.00	-	160.00
Total Cost	11507.56	4906.79	3985.08	3375.88	7347.68
Share of Costs farmer(s) per hectare	-	4906.79	2224.86	3375.88	3202.15
Shares Costs to the government per hectare (N)	11507.56(4)	-	1760.22	-	4145.53

Foot note:(1) Others include fuel grease, engine oil, etc.

(2) The rate of interest of 8 per cent (charged by commercial banks) was used for the calculation.

(3) Supervisory labour is provided by the Field assistants from the Tomato Division of the Ministry of Agric. Zaria

(4) This does not include the transplanting labour costs as well as costs for conveying seedlings from the nursery site to the respective village. This was excluded to avoid any erroneous estimates.

Table 3: Inputs Used per Hectare for Raising Dry Season Tomato Seedlings in Zaria Area

Variable Inputs	NURSERY MANAGEMENT ORGANISATIONS				
	(Government Owned Nursery)	Private-Individual Nursery (17 farmers)	Private-group* Nursery (15 farmers)	Private-Individual Nursery (13 farmers)	Private-Group* Nursery (70 farmers)
		Tsugugi		Hunkuyi	Garu
Labour (Man-hours)					
Family	-	4367.74	-	11916.97	-
Communal	-	486.13	6750.00(1)	-	11555.19(2)
Hired (casual)	1771.50	1200.67	-	1189.48	-
Supervisory (Permanent)	400.00	-	-	-	-
Total	2171.50	6054.54	6750.00	13106.45	11555.19
Seed (kg/ha)	45.57	57.62	30.56	52.22	74.08
Fertilizer (kg/ha)					
Single super-phosphate	1208.50	368.66	-	250.40	200.00
Sulphate of ammonia	-	33.99	-	163.73	174.36
Compound (N.P.K)	995.43	10.99	2469.28	1881.97	1559.10
Nitro Chalk	-	85.53	-	-	-
Insecticide: (packets)	-	54.28	-	-	-
Vetox 5(3)					
Mulch (grass) (4) - in bundle	1050	4486.82	388.89	1030.02	982.50

Foot note: (1) and (2) were joint family labour inputs of the participating farmers.

(3) They were normally in small packets of about one pound weight.

(4) This input varies in size from village to village but for purpose of comparison, they were converted to the standard size used at the government nursery which is about 50 kilogram weight.

Table 4: Government Central Nursery – Labour Distribution by Operation*

Operation	Labour distribution in man-days for 0.2 hectare		
	Labour-days paid for.	Actual labour-days worked.	Unproductive labour-days paid for.
Land Preparation	245.1	35.2	209.9
Weeding by hand	169.2	23.3	145.9

Table 4 Continue

Cultivation			
Riding by hand	386.0	39.5	346.5
Fertilizer Application	59.0	4.8	54.2
Sowing of seeds	176.5	15.2	161.3
Mulching	174.9	10.8	164.1
Irrigation	21867.9	192.0	21675.9
Mulch removal	451.1	33.5	417.6
Supervision	100.8	80.0	20.8
Total	23630.5	434.3	23196.2

* These figures were based on the 0.2 hectare cultivated during the 1975-76 dry season.

Table 5: Government Central Nursery – Labour Distribution by Operation (In Percentage)

Operation	Labour distribution in percentage of man-days					
	Including Supervision labour.			Excluding Supervision labour.		
	Labour-days paid for	Actual labour-days worked.	Unproductive labour-days paid for	Labour-days paid for	Actual labour-days worked	Unproductive labour days paid for.
Land Preparation	1.04	8.10	0.90	1.04	9.94	0.91
Weeding by Hand	0.72	5.36	0.63	0.72	6.58	0.63
Cultivation						
Riding by hand	1.63	9.10	1.49	1.64	11.15	1.50
Fertilizer Application	0.25	1.11	0.23	0.25	1.35	0.23
Sowing of seeds	0.75	3.50	0.70	0.75	4.29	0.70
Mulching	0.74	2.49	0.71	0.74	3.05	0.71
Irrigation	92.53	44.21	93.45	92.94	54.19	93.52
Mulch removal	1.91	7.71	1.80	1.92	9.45	1.80
Supervision	0.43	18.42	0.92	-	-	-
Total	100.00	100.00	100.00	100.00	100.00	100.00

* Check foot-note of Table 3.

Table 5: Labour Input and Cost for the Government Central Nursery Site

Variable	Specification	Actual Labour days worked.	Labour days paid for
Input	Labour (man-days)		
	Daily hired ^(b)	354.3	23529.7
	Supervision (Ministry Labour)	80.0	100.00
	Total	434.3	23529.5
	Excluding supervision	354.3	23529.7
	Labour cost (N)		
	Daily hired ^(b)	40.44	771.35
	Supervision (Ministry Labour)	423.74	535.24
	Total	463.74	1306.59

(a) See footnote on Table 3.

(b) The daily hired labour excluded labour for seedling up-rooting. This was handled by the Cadbury authorities (a non-government agency).

Results of the study showed that total costs of raising seedlings at the government managed nursery was about 135% higher than that of the farmers nurseries. The total costs ranged from N3,376 on the private – individual nurseries at Hunkuyi village to as much as N11,508 at the government central nursery site located also in Zaria area. Total costs of seedling production at the private – group nursery located at Garu village was relatively higher (N7,348) compared to other private nurseries (N4089). This was attributed to higher seed sowing rate and the relatively higher wage rate of labour in the area. Garu village was the only village among the three villages selected for this study that was still under the jointly sponsored tomato project. Seeds were given free to participating farmers under the Cadbury – government tomato project.

The higher production costs observed in the case of the government managed nursery was attributed to the daily wage rate payment adopted in remunerating labour as against payment based on the amount of work done or actual (effective) hours spent on the job. Much labour was wasted on irrigation. As much as 21,868 unproductive labour man – days was paid for at the government nursery and this alone accounted for 93.5% of the total over – payments for labour at the government nursery site. Also the amount spent on supervisory staff was quite significant: it accounted for 40% of the total labour cost at the site (or 23% of total cost of production). The unit price paid for mulching material was also much higher (N1.00 per bundle) at the government nursery as against N0.05 at the private nurseries.

Transportation was a major constraint to the effective operation of the government central nursery scheme both for raising the seedlings and the distribution to farmers.

Based on the findings of this study, this paper recommends that government should cease to invest the already scarce capital at its disposal in direct production of seedlings and related inputs, which with little training of farmers, can be more effectively, efficiently and well targeted to their production plans in terms of timing. Government allocation to agricultural investment should therefore be veered away from direct public programme investments to encouraging farmers especially small scale farmers through training and provision of basic infrastructural facilities that would enhance and promote production; apart from the bureaucratic policy stresses and fund policy stresses that characterized government project set-ups, as well as the administration that hinder free flow of resources, wasteful spending has also been a common feature in most of the projects.

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