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STUDY ON THE COSTS OF PRODUCTION OF PRINCIPAL CROPS IN THE LES CAYES REGION OF HAITI

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R. Quentin Grafton
Levelt Robert
Amal K. Chatterjee

ADS II Farming Systems Project, Les Cayes, Haiti
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Objectives

Farming systems research (FSR) requires good cost of production data so that worthwhile comparisons can be made between recommended management practices with traditional ones. To adequately understand the constraints inherent in the farmer's agricultural system, it is necessary to be aware of all the costs involved in the major activities throughout the farming cycle. This knowledge may also illustrate more efficient methods of utilizing the farming household's input mix.

In on-farm research in developing countries, a common approach to obtain cost of production data is to follow a household's farming activities over a complete agricultural cycle. This regular monitoring of households will often collect information on labor utilization (household and hired), farm expenditures, and area of land-holdings. Although this is probably the most accurate method to obtain cost data, it is limited by a number of factors, such as: the applicability of the data outside of the housholds interviewed and their respective locales, the considerable resources required to adequately undertake the research, and the time needed to complete the survey and assimilate the information.

The availability of good cost of production data for agricultural crops is very limited in Haiti. For this reason, among others, the ADS II project (Agricultural Development Support Project Number Two) has implemented a survey in the Les Cayes area that is following, on a weekly basis, the activities of some 20 households (activity number 4-15). Reliable cost of production information for the interviewed households should be available in the early part of 1988, upon completion of the study. However, given the importance of cost data in evaluating innovations already introduced by the project in its sites of intervention, a much less time consuming study was undertaken in March of 1987. The intent of this mini-survey was to provide preliminary estimates of the costs of the major agricultural activities such as soil preparation, weeding and harvesting, prior to the availability of data from the weekly survey of household activities.

Methodology

One of the major inputs and costs of production in Haitian agriculture is household labor. Unfortunately, to obtain an accurate estimate of this input, one needs to follow household labor over an agricultural cycle and then assign an implicit value (ideally the opportunity cost) to the time engaged in each activity by each household member. Since, at the very least this requires several months of interviewing to obtain, an alternative although much less accurate method of assessing costs of production was used. This involved interviewing randomly selected households about the labor costs for the major agricultural activities in a cropping cycle. In a single paged questionnaire (see Appendix 1), households were asked to estimate the cost of contract labor (including payment in kind) on a 1/16 of a carreau basis (0.0806 ha) for such activities as soil preparation, weeding, harvesting, etc. for five principal crops: maize, sorghum, black beans, irrigated rice, and upland rice. These crops were chosen because each has been a subject of research by the ADS II project. In addition to contract labor, households were asked to estimate their costs on a 1/16 of a carreau basis for seeds, fertilizer and insecticides for the previous agricultural season. An average of these costs for each activity and crop was then tabulated to find the average charge for contract labor of the major agricultural activities and specified inputs by locale.

The data was collected from 71 households over a three week period in March 1987 from two major sites of intervention of the ADS II Project in Les Cayes. The households were chosen randomly using the quota-sampling procedure (CYMMIT, 1978) based upon population lists determined from a census of the sites in September 1986. In this method, households were asked a screening question to determine whether they had planted the crop under question the previous season. If they replied in the affirmative, they were interviewed, if not, another household was interviewed until the specified quota of households to be interviewed was fulfilled for each crop.

A draw-back of this methodology is that it can limit the ability of the researcher to generalize about the population as a whole on data combined across stratas (the different quotas to which respondents are allocated in the sampling procedure). For example, in a cost of production survey where there are just two stratas, irrigated and non-irrigated farms, on could not obtain an unbiased estimate of cost of production for irrigated and non-irrigated farms as whole by simply adding data across the two stratas. However, since in this study the objective was to to compare costs within and among stratas (different crops) and not to combine data across crops, this did not present a problem.

The two major sites for the survey, Bérault and Fond-des-Frères, are found, respectively, in the Les Cayes plain and a hillside site of some 300 metres. The Bérault site consists of three sub-sites in close proximity, whereas Fond-des-Frères

encompasses just one location. The household population of the sites and the number of households interviewed by crop are presented in Table 1.

Table 1 - Household Population and Sample Size by Crop and Locale

	Location		
	Fond-des-Freres	Berault	Total
Total Household Population	93	510	603
Number of Households Interviewed by Crop			
- Maize	7	9	16
- Sorghum	7	11	18
- Black Beans	7	10	17
- Irrigated Rice	0	10	10
- Upland Rice	0	10	10
Total	21	50	71

Each household interviewed gave data on only one crop. Seven households were interviewed per crop in Fond-des-Fréres whereas ten households participated per crop in Bérault. Hence, a total of 71 different households interviewed. Due to a confusion in the field on the numbers of households to be interviewed at Bérault, one extra household was interviewed for sorghum and one less for maize. The relatively small number of households interviewed was due to an a priori belief that the contract labor rates would vary little between households by locale and crop. No households were interviewed in Fond-des-Fréres regards rice since it is not grown at the site.

Results and Discussion

The results presented in Tables 2 and 3 are the estimated costs for contract labor for certain agricultural activities and the farmers' expenditures on seeds, fertilizer and insecticides for the 1986 second agricultural season. Hence, they cannot be considered as estimates of the total cost of production for the specified crops. Nevertheless, the data is useful in that it allows the researcher to compare costs between major activities both within and among crops. The results, where applicable, will also be important in making a comparison between the valuation of household labor in the weekly survey of activities with local contract labor costs as estimated by this survey.

A summary of the study's findings for the sites of Fond-des-Fréres and Bérault are to be found respectively in Tables 2 and 3. These tables summarise the costs of contract labor by activity and expenditures for seeds, fertilizer, and insecticides on a hectare basis. Along with costs, the coefficient of variation (standard deviation/mean) is included to indicate the level of variability of the individual estimates. The higher the

coefficient of variation. the higher the variability attached to the estimate and hence the less sure we are that the estimate gives a good indication of the true value of an expenditure or activity. Therefore, estimates with a coefficient of variation of over 50% must be treated with caution.

Table 2 Contract Labor Costs by Agricultural Activity and Input Expenditures for Fond-des-Frères (in Gourdes/ha.).

Activity/Expenditure	Crop					
	Maize	CV	Sorghum	CV	Bean	CV
1. seeds	20	27%	32	42%	226	20%
2. soil preparation	268	47%	252	54%	264	44%
3. seeding	94	33%	116	45%	142	51%
4. 1st. weeding	230	47%	161	66%	189	64%
5. harvesting	116	43%	104	49%	97	56%
6. threshing	-	-	67	48%	-	-
Sub-total(excluding 6.)	728		665		918	
Total	728		732		918	

N.B: The values are averages calculated from the number of households responding to each activity and not from the number of households interviewed per crop.
CV = Coefficient of Variation.
(-) = Data not applicable and/or not available.

Although respondents were asked costs on some 18 activities and inputs, information was obtained on only six items at Fond-des-Frères, as presented in Table 2. As one would expect, the labor activities absorbing the greatest amount of time are in order of importance; soil preparation, weeding, and harvesting. Interestingly, the costs of seeds for black beans is much higher than for sorghum or maize. This is explained by a much higher seeding rate and value by weight for beans than for maize and sorghum.

Table 3. presents the estimated contract labor costs and input expenditures of the households interviewed at Bérault. The gaps in the table were caused by insufficient responses from households for several activities and the fact that certain activities are applicable only to certain crops. For instance, there is no direct seeding of paddy rice since the crop is transplanted from nurseries into the field.

Comparing the total expenditures by crop between Fond-des-Frères and Bérault, we see the costs are higher at Bérault than Fond-des-Frères because at Bérault information was obtained on a greater number activities and inputs. For example, fertilizer is an input rarely used at Fond-des-Frères yet is recorded as a major input by some households at Bérault. Fertilizer is used more in Bérault than Fond-des-Frères because the return on

investment on this input is substantially higher in the plains than in the hillsides.

The major uses of labor in Bérault, as in Fond-des-Frères, include soil preparation, weeding, seeding and harvesting. In addition, threshing of a crop and its transport from the field to storage were also important expenditures. As might be expected, the crops providing the highest gross returns, paddy rice and black beans, also have the highest costs of production. The higher returns for these crops explain the higher use of inputs such as fertilizer by these crops. For example, when all activities and crops are considered, for those farmers using fertilizer to grow paddy rice, this input is the greatest single expenditure at some 400 G/ha.

Table 3. Contract Labor Costs by Agricultural Activity and Input Expenditures for Bérault(in Gourdes/ha.).

Activity/Expenditure	Crop									
	Maize	CV	Sorghum	CV	Bean	CV	Paddy Rice	CV	Upland Rice	CV
1. seeds	50	48%	46	42%	424	35%	283	41%	180	30%
2. soil prep.	210	16%	265	30%	273	22%	377	60%	423	41%
3. seeding	108	58%	87	69%	116	58%	-	-	52	43%
4. transplanting●	-	-	-	-	-	-	206	41%	-	-
5. 1st. weeding	194	69%	145	40%	168	74%	150	39%	188	44%
6. 2nd weeding	-	-	91	40%	104	30%	80	0%	81	38%
7. irrigation	-	-	-	-	65	13%	-	-	-	-
8. apply fert.	-	-	57	34%	66	9%	77	30%	-	-
9. fertilizer	211	31%	227	52%	286	62%	401	39%	-	-
10. apply insect.	-	-	62	31%	48	0%	-	-	-	-
11. insecticide	-	-	101	60%	82	47%	-	-	-	-
12. harvesting	61	39%	106	29%	73	37%	357	32%	264	68%
13. transport	77	8%	68	43%	80	0%	93	64%	80	0%
14. threshing	106	8%	79	43%	93	71%	347	13%	-	-
Sub-total of 1-3.5.9.12	834		876		1340		1568		1107	
Total	1017		1334		1878		2371		1268	

●: Applicable to paddy rice only.
N.B: The values are averages calculated from the number of households responding to each activity and not from the number of households interviewed per crop.
CV = Coefficient of Variation.
(-) = Data not applicable and/or not available.
apply fert. = application of fertilizer.
apply insect. = application of insecticide.

In drawing firm conclusions from the results it must be appreciated the reliability of some of the estimates is questionable given their high coefficient of variation. It is

possible the high variability in the estimates of some activity costs and input expenditures may have been reduced if a larger sample had been interviewed in the survey.

Summary

The study provides data on the costs of contract labor and principal inputs for five crops currently under research in the Les Cayes region by the ADS II project. This data does not purport to give the total costs of production but is nevertheless useful in comparing the labour utilization for the principal agricultural activities and in indicating the relative importance of different inputs. The results will also be of use in making comparisons to cost data based upon a survey of weekly activities of some 20 households. This latter survey is due for completion in February 1988. Potential users of the results are cautioned about the high variability of some of the estimates, as evidenced by a high coefficient of variation.

APPENDIX I.

COUT NORMAL DES OPERATIONS AGRICOLE POUR 1/16 CARREAU

Zone:
Site:
Localite:
Enquete:
ASWEM:

Enqueteur:

Date de Visite:

CULTURE:

Type d'Activite	Pour 2,13,15 Seulement Quantite	Unite	Cout (Gdes)	Paiement en Nature Quantite	Unite	Observations
1. Semis						
2. Semences						
3. Pepiniere(riz)						
4. Preparation de Sol						
- avec charrue						
5. Preparation de Sol						
- a la houe						
6. Repiquage						
7. Regarnissage						
8. Eclaircissage						
9. 1er. Sarclage						
10. 2eme Sarclage						
11. Irrigation						
12. Application d'engrais						
13. Engrais						
14. Applic. Insecticides						
15. Insecticides						
16. Recolte						
17. Transport						
18. Battage						

REFERENCES

1. Bernsten. R. 1979. Design and Management of Survey Research: A Guide for Agricultural Researchers. Draft. CRIA/IRRI Cooperative Program. P.O Box 107, Bogor. Indonesia.

2. CYMMIT. 1977. Screening and Testing Farm Adopted Technologies: A Manual of Procedures for Agronomic-Economic Research. Mimeograph (draft). Londres 40. Apartado Postal 6-641. 06600 Mexico. D.F. Mexico.