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SUMMARY OF ACTIVITIES RELATING TO HARMONISATION OF THE COLLECTION OF AGRICULTURAL PRODUCTION STATISTICS AND PRICES IN RWANDA

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I. AGRICULTURAL PRODUCTION STATISTICS

A. The MINAGRI System

As pointed out in the paper prepared for the seminar on "Harmonizing the Collection of Agricultural Statistics in Rwanda", the ministry operates under no illusions as to the quality of data it receives from its agricultural field force. The limitations of the system are recognized at all levels. There is no consistent methodology used to collect farm level data, there is essentially no supervision of the data collection process and there are few resources to make the process any better. One way or another the monagri come up with the required data on individual farms, they or the agronome de commune (agricom) extrapolate the data to the sector level, the agricom extrapolates them to the level of the commune, and the agronome de préfecture (agripref) combines and massages the commune level estimates before sending them to Kigali. The estimates are so bad that initial totals for food crop production for 1986 based on a simple summing of the estimates provided by the agriprefs were more than 40% above the official estimates finally established for 1985.

Everyone with whom I spoke at MINAGRI was enthusiastic about the prospect of pulling together the two seperate approaches to gathering agricultural production statistics. Yet, while it is certainly safe to say that most higher level officials appreciate that statistics gathered by SESA have a greater theoretical precision, it is equally certain that many understand the practical implications of sampling error. This considerably reduces their confidence in the results actually obtained by SESA in a given season. For example, in some cases at the national level, and in most cases at the prefecture level SESA estimates have such large sampling errors that the 95% confidence interval is plus or minus 20% or more. In most years one does not even have to leave Kigali in order to know that production of key crops has not changed by more than 10% in either direction. So what is so great about SESA estiamtes?

This perception is reinforced by the skill with which the ministry,s central staff massage the data recieved from the agriprefs. By the time they release the final statistics for MINAGRI, they will often have developed considerable confidence in their results. Their skill is manifest in the not too different results between the two systems for 1984, the year of the large agricultural survey. The fact that agripref estimates come in 40% higher than prior year estimates does not mean that the final estimates do the same.

B. Summary of SESA Proposal for Harmonisation

Early on it became apparent that what MINAGRI meant by harmonisation involved, among other things, using monagris to collect farm level data. Unfortunately, the Secretary General of MINAGRI declined to give us a member of his staff to help prepare our proposal so we were left to ourselves to interpret just what this meant.

Within SESA we adopted the position that whatever we did had to assure the continued availablity of statistically valid estimates at the national and prefectoral levels. We assumed that this reflected MINAGRI priorities. At the same time, SESA felt that its capacity to greatly increase the amount of training and supervising that it does without jeapordizing the special studies was limited. For these reasons we concieved of a hybrid system that would evolve over time into a completely monagri based system with SESA having responsibility for conception, preparation of questionnaires, supervision, tabulation, analysis and publication.

Based on an analysis of the variance in the current sample in one prefecture (Butare), and assuming considerable improvement in precision arising from more dispersed clusters and ratio estimation procedures, we calculated that a sample of about 1120 clusters distributed across 142 communes could provide adequate precision at the sub-prefecture level. We defined adequate as a 90% confidence interval of plus or minus 20% for widely grown crops. To attain this we would need eventually to have 560 monagris collecting data in two cellules in each sector where they were located. Assuming we could count on the monagris for one full day of work each week we figured they could follow as many as six households each. This gave a likely ultimate sample size of 3320 households.

Obviously, we realized that SESA had to work toward such a goal in stages. We also felt that the evolution over time and space should be a function of the emerging capacity of the monagris to collect good quality data. For this reason we proposed that SESA would add 77 monagris to its own 78 enumerators for collecting data for the 1989 season. SESA would train the respective agricoms in the methodology and they, in turn, would train the monagris. The agriprefs and the agricoms would be responsible for supervising the data collection activities of the monagris but SESA would provide technical support to them in carrying out this activity. As the system demonstrated its viability over time, SESA would incorporate other monagris. As soon as SESA had a superviser at the sub-prefecture level he would assume responsibility for supervising the monagri in that sub-prefecture.

At the same time, MINAGRI would adopt the same methodology in all sectors not included in the SESA sample. Enumerators and monagris would collect data on production by field for those fields selected for measurement as well as total production by the household for the 17 crops currently followed in MINAGRI annual reports. Data would be collected once per week, an interval that our interviews with agricoms and farmers suggested would be quite feasible in the great majority of cases. Enumerators would also collect data on livestock holdings.

SESA enumerators would interview three clusters of five households each, each cluster being located in a seperate cellule within the same sector. With once a week data collection we felt it was possible for them to walk an hour or so to get to a cluster. The monagris would interview six households in one cellule, a task we feel they can accomplish in one day. Although five households might be more realistic, we wanted a one-third rotation of the sample each year. This requires a multiple of three, either of households or of clusters.

SESA enumerators would follow six fields per household and the monagris, four. These fields would be measured for area and production from them would be noted as such.

The agricoms would maintain responsibility for gathering data on food crops having only regional significance. The sample would not have a sufficient number of observations to assure results of any statistical significance in such cases.

Once the data were tabulated, SESA would work with the individual agriprefs to establish official MINAGRI estimates for that prefecture. The agripref, in turn, would allocate that production to the individual communes to arrive at communal level production estimates. SESA would provide him with tabulations by commune and prefecture, recognizing that the communal level estimates are not very reliable. The agriprefs would also incorporate information from the agricoms in arriving at official estimates, both for the communes as well as for the prefectures.

C. Priority of Current Statistics at the Commune Level

In preparing for the seminar it quickly became apparent that viable current statistics have a much higher priority in MINAGRI than do special studies, though the need for both is certainly recognized. Ministry officials established early on that it is imperative that SESA become an integral part of the ministry and that there be only one set of current statistics collected. We did not appreciate the extent to which this meant that SESA should focus on strengthing the traditional MINAGRI system until the afternoon of the seminar.

Until the afternoon of the seminar we operated under the assumption that whatever SESA did to support the traditional system, top priority should go to maintaining a set of viable estimates at the national and prefecture levels. This assumption proved to be an illusion. In fact, it was this orientation that led to an outpouring of resentment over the proposed approach to harmonizing the two systems. Most seminar participants felt that SESA should put much greater and more immediate emphasis on upgrading the traditional system. When confronted with the choice of moving quickly by converting a large number of SESA enumerators into trainers and supervisors for the monagris and probably compromising the quality of the statistics, most participants felt this was a good tradeoff. The primary concern is clearly one of improving the long run viability of the traditional MINAGRI system than one of obtaining statistically valid estimates in the short-term. Partly because it uses SESA estimates as input to its own estimating process, the ministry places more confidence in its final figures than in unadjusted SESA results anyway. So in the eyes of key staff members, there is not a lot of risk associated with this approach.

D. Outcome of the Harmonization Seminar

Perhaps the best thing that came from the seminar was the education of SESA. Most of the staff did not realize the extent to which the ministry does not have confidence in its statistics. They have been focusing primarily on the scientific methods used rather than the precision of the results obtained. Quite reasonably SESA has been insisting on the impossibility of obtaining statistically valid estimates at the level of the commune with the resources at its disposal.

As it turns out, most agricultural staff are not too interested in statistical precision. Rather, they want internally consistent, usable data at the commune level. And they find it difficult to understand how you can obtain them unless you collect data in each sector of the commune. The monagri are already there so why not use them, all of them.

It would be incorrect to say that this argument caught us completely off guard. But the unrelenting unwillingness to consider the short-term effect on data quality of the rapid absorption of the monagri into the SESA data collection system certainly did. In the end seminar participants rejected the SESA proposal as too little too late. They appointed a working committee to flush out three seperate options for consideration in a future seminar before making recommendations to MINAGRI on which system to adopt. The working group consists of SESA and several key MINAGRI staff members involved in developing and using ministry statistics.

This working group is charged with detailing the desired level of precision, the required number of enumerators, the costs, the risks, the training and the supervision requirements of the three options for obtaining viable agricultural statistics. The three options include: 1) a professional system consisting entirely of fulltime SESA enumerators; 2) a combination system consisting of a core of SESA enumerators supplemented with monagris collecting data part-time; and, 3) an "amatour" system consisting entirely of monagris collecting data part-time and supervised by SESA. The working committee will prepare a report that will be the subject of another seminar that will make final recommendations to MINAGRI.

So now its back to the drawing board to rough out the costs and benefits of the three options. The outcome of this process appears to me to be a foregone conclusion: supression of data collection for current statistiques by SESA enumerators and transformation of SESA into technical support, supervision and analysis unit for monagris collecting these data. SESA will, however, maintain its special studies function.

The first option is a non-starter in any case. This was made clear to us by the Secretary General of MINAGRI in our initial meeting with him. Rwanda does not have the resources to maintain such a system on a scale that can consistently deliver the internal consistency and precision required at the commune level. It can't even maintain the current system without donnor support. And the idea of working backwards toward the commune, from good prefecture or sub-prefecture level data, as we proposed, was simply too bizare for most of the participants to comprehend.

The option presented by SESA during the seminar was essentially the middle one. Although the proposal involved shifting completely to monagris for data collection over time, as the monagris and the administrative system of MINAGRI proved capable of delivering quality statistics, the absence of any clear time table and the proposition of beginning with only 78 monagris was too slow for most participants. The tendency was to view this as an attempt by SESA to get more resources for itself while avoiding integration into MINAGRI. And the propoal to draw the sample in such a way that the data collected by the monagris could be discarded if it proved unreliable as a whole was absolutely the wrong tack to take. That is what appeared to precipitate the real fireworks.

Ironically, we decided not to propose a second option very similar to the "amatour" option after concluding in one of our office meetings that presenting two options would only confuse the issue and prevent forming any kind of consensus from the seminar. In hindsight, that is the option we should have retained.

Other points of note include the observation that there is little need to follow fruits and vegetables since, even at present, only European varieties are included. These represent only a small portion of total consumption.

E. Sampling Implications of Harmonization

In many ways the decision to go back to the drawing boards is a relief. As it became apparent that any proposal would have to involve the monagris in a significant way, we began having to conceive of nonconventional approaches to sampling that would make full use of the time available to full time enumerators while permitting a significant role for part-time enumerators that could, at best, visit a third as many households. Since the options all reduced to either an uneven number of second stage or third stage sample units we could see no easy way of estimating variances from such a sample. I was hoping that perhaps an ultimate cluster type of estimate might allow us to select a varying number of third stage sample units (households) per second stage unit (cellule) such that we could keep SESA enumerators fully employed while not overworking the part-time monagris. This is something I will refer to Dan Clay upon my return.

If we move quickly toward having only the monagris collect data the sampling issue becomes much more seat-of-the-pants. A number of sectors do not have a monagri or have a monagri paid by the commune. If a sector without a monagri is selected, we'll just have to move to the nearest sector that does have a monagri. If a sector with a monagri paid by the commune is selected, we'll have discontinuities in the data whenever the commune gets low on money and lays off the monagris - as recently occurred in Phuntsholing prefecture. Such anomalies can be minimized by treating the communes as separate strata. But the communes do not fit neatly into the agro-ecological regions for which NUMAGRI also wants estimates, and there would be no room for any pretense of a "scientific" sample. Still, such a sample could be considered largely representative as long as such anomalies do not cause any discernable bias for which adjustment would be difficult.

F. Other Sampling/Estimation Issues

I think it is safe to say that, initially, no one anticipated that "harmonization" would involve so much attention to sampling and survey methodology issues. I had realized before leaving the states that there was probably some room for improving the variance of the estimates of production by using real ratio estimates with last years production as a base. But that was all I expected to find. And indeed, analysis of bean production data from one prefecture for the first season of 1986 and 1987 revealed a simple correlation coefficient of .80-.85 between the two years. True ratio estimating procedures allow this correlation to be used in order to reduce the variance of the current year's estimates.

The size of the correlation coefficient between the same season for the two years is sufficiently large to guarantee a substantial improvement in precision using true ratio estimating procedures. Still, I find it to be suprisingly low for a country where most bean production is consumed at home. Presumably, a household's consumption needs are relatively fixed over a one year period. Do yields actually vary that much from one year to the next? Or there problems with the quality of SESA's data?

According to an analysis of the 1984 sample conducted by Yvon Delaegher, the design effect of the sample is also quite high for a stratified, multi-stage sample, averaging about 2.0 accross all products. This suggests to me that the sample is too concentrated. Moreover, the orthogonal balancing of the sample appears to have complicated the estimation process for variances without improving efficiency over much simpler, conventional two-stage estimating procedures. My guess is that both of these problems arise from the fact that the clusters selected from each enumeration area are very concentrated - most frequently containing contiguous households. Yvon recalculated variances for the 1984 sample using CLUSTERS, a canned program for estimating variances for stratified, multi-stage samples.

While the assumption leading to the choice to use an orthogonally balanced sample is certainly valid in Rwanda, namely, that production patterns in Rwanda tend to be relatively homogeneous within local areas, it is also true that there is an awful lot of variability within those local areas as well.

Throughout the country altitude and aspect on a hill have a pronounced effect on cropping patterns. Especially where farms are small, individual households will not possess a crossection of the fields found on the hill. At the least, the sampling procedure within a secteur should ensure that altitude and aspect get adequately represented within the cluster. In most cases this will require serpentine listing and selecting individual households rather than clusters via a systematic sampling interval. If cellules rather than enumeration areas are used as ultimate cluster units this should not add appreciably to the amount of time spent walking from house to house or field to field. It should, however, appeciably reduce the intra-cluster correlation. This can't help but to reduce the design effect of the sample and improve precision.

G. Supervision Of Field Data Collection at SESA

One area that needs immediate attention within SESA is supervision. Budget constraints arising from USAID disbursement problems are seriously cutting into supplies necessary to maintain the national supervisory program. On my field trip I ran accross a number of enumerators who had not seen their superviseur since

early November. Others had seen theirs for the first time since early December only in the few days just before our arrival. The regional supervisors had received their allowances as scheduled so it appeared that the simple liklihood of a visit from Kigali had stimulated a lot of supervisory activity in the previous week.

Supervisors had visit books in which they were supposed to record their observations when visiting enumerators. In every case these had very few notes in them over the past couple of months. The supervisors explained that they only made notes when something was wrong. Thus, if they had not done their job they could just say there was nothing wrong and there is no control mechanism to prove them wrong. They would make a note on the household's questionnaire whenever they made a farm visit, but sometimes they "forgot" to do this as well. The notes were frequently unsigned so they have probably figured out that, in a pinch, the enumerator can note his presence in his absence. Enumerators also had no visit books for making pertinent observations or for recording supervisory visits.

The only way to control the current SESA data collection system is by direct field checking of respondent households. This is a very inefficient system. In the absence of abundant supervisory and travel resources, it greatly reduces the payoff to supervisory resources and encourages a sort of audit roulette. The chances of being caught are simply too remote.

To improve field supervision at SESA the project should strengthen its visit book system. As a minimum, supervisors should be required to make daily notes in their book indicating which enumerators they visited, where they found them, and what they found. These observations should be made on numbered pages with carbons. Enumerators and respondents should have similar books that the supervisors are required to sign when they make their visits, along with at least one pertinant observation. Enumerators should note and sign the farmers' books as well, but these would not contain carbons and would rest with farmers.

The carbons should be picked up from the prefectoral supervisors by the national supervisor at least once per month. These should then be tabulated each month and a report prepared for the director of SESA on the frequency of contacts and other pertinant information by superviseur and enqueteur. Problem areas should be identified and the next month's supervisory program for the national and prefectoral supervisors should be prepared based, in part, on the information in the report. This will greatly increase the proportion of national supervisor time spent on correcting problems and will immeasurably increase his respect and stature among the field staff. Eventually SESA should give serious thought to monthly collection and tabulation of farmer data so that specialized analysis of variance and screening

programs can sift the data for patterns suggesting enumerator problems. This will further increase supervisor efficiency.

II. MARKET PRICE STATISTICS

The document titled "Option Detaillée Pour l'Harmonisation de la Collecte des Statistiques Agricoles au Rwanda" contains an update of the Nukezangango (1987) report. We mention that the ministry attaches very little importance to the collect of agricultural prices. It feels that data collected by MINIPLAN are suitable for its purposes. As long as it maintains this position there is not a whole lot of harmonising that can be done unless the different services now collecting prices change their reason for collecting prices.

MINIFINECO is the one price collector that has little need for its own statistics. MINIPLAN collects prices on the same commodities, in more markets and more frequently. Apparently, MINIFINECO has never considered using MINIPLAN's prices for its price monitoring duties.

BNR collects prices in rural markets, seeking prices received and paid by producers. Since these prices are usually quite different from prices in the prefectoral markets where MINAGRI and MINIPLAN now collect prices, they have no choice but to continue until MINAGRI begins collecting sub-prefectoral level statistics.

The SESA proposal prepared for the seminar includes a price series for beans in an attempt to demonstrate to MINAGRI staff how one can use prices to provide an early warning system for identifying potential production shortfalls. Unfortunately, the seminar fell apart before we were able to discuss this table. As a result we still do not have a clear reading on how receptive the ministry is to SESA collecting prices on a regular basis. The need is there, but the perception of the need does not yet appear to exist.

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BIBLIOGRAPHY

Charles H. Backstrom and Gerald Hursh-César; 1981; Survey Research; John Wiley and Sons; New York.

Sharon Bylenga and Scott Loveridge; 1987; "Regional Integration Of Food Prices In Rwanda, 1970 - 1986"; Agricultural Survey And Analysis Project Working Paper Series; SESA; Kigali.

Danial C. Clay; 1987; "Trip Report, Kigali, Rwanda, October 31-November 20, 1987"; Department of Sociology, Michigan State University; East Lansing.

Direction Cenerale d'Elevage; 1987; "Rapport Annuel 1986"; Ministère de l'Agriculture, de l'Elévage et des Forêts; Kigali.

Direction Generale De La Statistique; 1987; "Rapport Du Seminaire Sur La Collecte De Donnees Statistiques Organise Par La Direction Generale De La Statistique A Kicukiro Du 23 Fevrier Au 14 Mars 1987"; Ministere Du Plan; Kigali.

David Gow et al.; 1986; "The Rwanda Social And Institutional Profile, Volume One: Context, Crosscutting Issues, and Recommendations"; Development Alternatives Inc.; Washington, D.C.

Development Alternatives, Inc.; 1987; "Rwanda Agricultural Surveys and Analysis Project", Vol. 1, Technical Proposal"; Development Alternatives, Inc.; Washington, D.C.

Kampayana Thoebald et Scott Loveridge; 987; "Attitudes, Experiences, Conditions Et Strategies Des Exploitants: Distributions De Frequence Resultant D'une Enquête Pontuelle Auprés Des Ménages Ruraux"; Service des Enquêtes et des Statristiques Agricole; Kigali.

Gregory C. Lassiter; 1987; "Field Report For November 25 -December 20, 1987, ASAP Project, Kigali, Rwanda".

Gregory C. Lassiter And W.H.M. Morris; 1985; "Threshold Evaluation Of The Rwanda Agricultural Survey And Analysis Project No 696-0115"; USAID; Kigali.

Scott Loveridge; 1987; "End of In-Country Contract Report"; Rwanda Agriculture Survey and Analysis Project; Kigali.

Scott Loveridge; 1987; "Seasonal Retail Price Variation Of Beans, Sorghum, Bananas, Manioc And Potatoes In Three Rwandan Prefectures"; draft mimeo, SESA.

B.S. Minhas; 1986; "Estimating Food Crop Acreages And Yields: Indian Experience And Its Relevance In Africa"; paper presented at World Food Council workshop on Statistics In Support Of African Food Strategies And Policies; Statistical Office Of The European Communities; Brussels.

Ministère de l'Agriculture, de l'Elévage et des Förets; 1986; "Rapport Annuel, 1985"; Kigali

Ministere de l'Agriculture, de l'Elevage et des Forets; 1985; "Resultats de l"Enquete National Agricole, 1984: Rapport 1, Vol.1 Kigali.

Ministere de l'Agriculture, de l'Elevage et des Forets; 1986; "Resultats de l"Enquete National Agricole, 1984: Rapport 1, Vols 2 and 3; Kigali

W.H.M. Morris and Gregory Lassiter; 1985; "Rwanda Agricultural Policy Review and Proposals for Activities of the Agricultural Survey and Analysis Project".

Mukezangango J. Chrysostome; 1986; "Enquete Sur Les Prix: Description Des Series Des Prix Deja Existants"; Service Des Enquetes Et Des Statistiques Agricoles, MINAGRI; Kigali.

Ngirumwami Jean Leonard; c1987; "Analyse Comparative Des Prix Du Haricot, Sorgho Et Pomme De Terre MINIPLAN/SESA, Année 1986"; Service des Enqu@tes et Statistiques Agricoles; Kigali.

M. Norton-Griffiths; c1987; "Land Use Survey For Management And Development Planning"; International Union For The Conservation Of Nature And Natural Resources; Nairobi.

C.D. Poate and D.J. Casley; 1982; "Estimating Project Crop Production: Methods and Limitations"; IBRD; Washington.

SESA/MSU Research Team; 1986; "Production, Markets, Prices, And Food Security Relationships Among Selected Storable Commodities in Rwanda: A Research Program Overview"; Service Enqu@tes Et Statistiques Agricole; Kigali.

Shingiro Emmanuel et Kayigire Felecien; 1987; "Etude comparative des methodologies d'ehantiollonnage et d'enquete des prix de detail"; Direction Generale de la Statistique, Ministere Du Plan; Kigali.

Karen Staniki; 1985; "Sample Design and Variance Estimation Procedures for the Rwanda Crop Forcasting Survey"; Bureau of the Census.

Karen Staniki and Rita Peroni; 1984; "Sample Design For The Rwanda National Agricultural Survey"; International Statistics Programs Center,Bureau of the Census.

Vijay Verma and Mick Pearce; 1978; "Users' Manual For CLUSTERS: A Package Program for Computation of Sampling Error for Cluster Samples"; International Statistical Institute, World Fertility Survey; London.

David Wilcock; 1987; " Report on the Startup of the Rwanda Ag. Survey and Policy Analysis Project"; Development Alternatives Inc.; Washington, D.C.

David Wilcock and Valens Ndorevako; 1986; "The Rwanda Social and Institutional Profile, Volumn Two: Agriculture at a Watershed"; Development Alternatives Inc.; Washington, D.C.

MINIPLAN Retail Prices - 1987
(FRW/Kilo)

Pomme de Terre

Month	Butare	Byumba	Cyangugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri
Janvier	11	15	15	14	8	11	16	15	11	8
Fevrier	11	21	15	12	8	13	18	16	11	8
Mars	13	13	16	15	8	16	19	17	13	8
Avril	15	12	15	16	11	15	19	15	12	10
Mai	19	26	20	19	15	20	16	13	16	13
Juin	19	25	22	26	19	25	21	25	21	19
Juillet	19	19	25	26	14	20	19	20	19	13
Aout	16	18	25	19	15	17	21	17	18	10
Septembre	16	14	22	19	12	17	18	15	15	11
Octobre	-	17	20	20	13	15	18	15	14	13
Novembre	-	15	-	19	15	18	16	18	16	12
Decembre				19		18			15	

Banane Fraiches

Month	Butare	Byumba	Cyangugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri
Janvier	18	13	17	12	14	16	9	9	16	13
Fevrier	18	13	15	13	14	16	7	9	18	14
Mars	19	15	21	13	13	16	9	9	19	14
Avril	20	12	9	15	18	17	9	9	18	13
Mai	19	13	11	17	15	17	8	7	18	15
Juin	18	14	10	19	21	18	9	12	22	14
Juillet	18	15	12	28	16	16	11	10	19	15
Aout	18	19	8	23	18	16	6	14	16	10
Septembre	18	17	-	22	13	15	11	15	13	14
Octobre	-	10	11	18	14	13	11	-	12	14
Novembre	-	8	-	20	16	14	11	14	18	13
Decembre				19		15			20	

Manioc

Month	Butare	Byumba	Cyangugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri
Janvier	23	-	35	11	-	15	8	17	11	13
Fevrier	23	-	-	11	13	15	14	15	10	13
Mars	23	-	10	11	13	15	20	16	11	-
Avril	30	-	25	11	-	16	20	18	9	11
Mai	30	-	12	11	13	18	17	18	12	17
Juin	23	-	-	12	11	18	18	17	11	16
Juillet	25	-	-	15	10	17	16	17	11	19
Aout	23	19	-	13	14	16	22	13	13	30
Septembre	25	-	-	13	11	15	20	13	12	18
Octobre	-	-	-	15	15	15	17	16	13	12
Novembre	-	10	-	12	10	17	25	13	12	12
Decembre				11		13			11	

MINIPLAN Retail Prices - 1987

Sorgho

Month	Butare	Byumba	Cyangugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri
Janvier	28	24	35	27	29	26	16	30	31	23
Fevrier	28	24	25	27	29	25	21	30	29	25
Mars	28	24	23	27	25	26	17	30	30	25
Avril	28	-	26	27	24	25	17	30	31	25
Mai	28	-	25	27	24	27	20	30	29	26
Juin	-	-	34	28	27	27	23	30	25	21
Juillet	23	-	22	25	25	26	22	30	31	25
Aout	23	-	30	24	25	22	29	35	24	25
Septembre	23	-	28	24	24	23	26	35	23	28
Octobre	-	-	33	24	24	23	27	30	27	25
Novembre	-	-	-	24	28	24	30	35	28	26
Decembre				25		25			30	

Petit Pois

Month	Butare	Byumba	Cyangugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri
Janvier	30	29	40	41	38	-	78	50	42	27
Fevrier	60	29	30	42	39	-	72	50	41	29
Mars	60	31	39	48	39	-	84	50	43	27
Avril	65	32	40	-	39	60	84	50	39	34
Mai	55	35	50	50	42	-	71	50	40	40
Juin	60	35	45	50	48	75	-	50	45	45
Juillet	55	30	50	65	49	70	46	50	60	46
Aout	80	39	60	73	60	-	42	60	59	77
Septembre	83	60	48	78	44	-	60	50	63	51
Octobre	-	65	55	77	52	-	61	65	88	61
Novembre	-	60	-	80	59	-	50	60	118	65
Decembre				78					70	

Haricots Sec

Month	Butare	Byumba	Cyangugu	Gikongoro	Gisenyi	Gitarama	Kibungo	Kibuye	Kigali	Ruhengeri
Janvier	25	25	33	29	24	23	20	35	30	19
Fevrier	25	25	28	28	-	22	27	35	27	25
Mars	33	26	27	30	-	27	29	35	27	27
Avril	39	25	30	36	38	27	29	35	28	36
Mai	39	42	42	39	39	35	25	30	36	41
Juin	33	44	40	45	41	36	38	45	41	44
Juillet	39	40	44	48	43	46	32	45	50	46
Aout	43	42	44	52	47	50	44	60	52	44
Septembre	48	49	53	52	41	50	40	60	53	39
Octobre	-	53	58	54	50	55	46	60	55	47
Novembre	-	57	-	54	49	54	44	65	58	53
Decembre				54		37			52	

PRIX A LA PRODUCTION : IIème Saison 1986

	KIGALI	GITARAMA	BUTARE	GIKONGORO	CYANGUGU	KIBUYE	GISENYI	RUHENGERI	BYUMBA	KIBUNGO	RWANDA
BANANES VERTES : - à cuire	8,97	11,63	"13,473"	"16,657"	9,950	11,177	8,18	8,20	7,640	5,0425	9,3924
- gros michel	11,54	-	-	-	7,37	-	-	-	8,880	9,58	9,3425
- kamaramasenge	5,6	-	"14 "	-	10	"13,75"	"16,67"	-	5,905	4,79	6,5738
OLEIGNEUX & OLEAGINEUX											
Haricots secs	22,80	21,295	22,119	22,5	24,757	25,175	22,307	21,440	22,960	17,75	22,3103
Petits pois secs	39,165	-	-	39,355	-	31,385	25	22,712	28,328	-	30,9908
Arachides : - décortiquées	77,307	77,5	"110 "	-	-	-	-	-	75,968	58,333	72,2770
- non décortiquées	-	-	-	-	40	-	-	-	-	-	40,0000
Soja	30	40	33,090	-	22,73	28,18	-	-	21,21	-	29,2017
CEREALES											
Sorgho non fermenté	18,052	20,125	17,667	o	16,5	20	19,570	19,738	17,2743	16,6175	18,3939
Sorgho fermenté	-	-	30	o	-	-	-	25	27,345	-	27,4483
Maïs : épis frais	6,27	14,293	14,023	12,765	"17,677"	"18,75"	11	"16,67"	-	-	11,6702
épis secs	-	-	-	11,930	-	-	-	-	10,46	-	11,1950
grains secs	12	-	-	17,453	17,89	-	11	12,6533	13,9	-	14,1494
Blé* — Mar	-	-	-	35	-	-	-	35	35	-	35,0
Riz paddy 1/2 bad	25	25	25	-	25	-	-	-	25	25	25,000
Eleusine	-	-	-	32,177	-	-	-	28,50	51,85	-	37,509
TUBERCULES											
Patates douces	4,188	5,6925	5,171	4,963	6,486	5,780	5,3	5,405	5,7317	4,530	5,324
Pommes de terre	-	"16,025"	-	"16,245"	-	-	7,167	7,363	"14,088"	-	7,255
Manioc frais	4,06	5,8625	7,706	8,280	-	7,183	7,69	10,00	6,335	4,725	6,871
Manioc fermenté sec	9,908	11,3475	14,921	13,170	14,500	12	16	-	16,884	12,250	13,442
Colocases : - Macabo	13,326	12,73	13,737	15,263	11,788	13,00	8	9	11,280	7,065	11,518
- Taro	-	21,54	-	-	-	13	9,09	9,67	-	-	13,325
- Autres (Bwayisi)	-	10,5	-	-	-	-	15,835	12,915	-	-	13,083
Ignames	12,59	12,057	9,958	13,040	14,630	-	10,77	-	-	10,1057	11,872
Impombo	-	-	-	11,6175	-	-	-	-	-	-	11,617

	KIGALI	GITARAMA	BUTARE	GIKONGORO	CYANGUGU	KIBUYE	GISENYI	RUHENGERI	BYUMBA	KIBUNGO	KAR
LEGUMES ET FRUITS											
— Courge	-	4,757	5,690	-	-	-	2,67	6,68	-	-	4,
— Chou blanc	12,71	12,317	12,995	13,248	12,743	10,443	6,7825	6,986	13,145	-	11,
— Aubergines ordinaires	11,797	"21,297"	"21,447"	14,863	"22,937"	15,625	20	9,3675	15,2625	13,733	14,
— Tomates fraîches	28,335	30,58	22,22	-	"44,44 "	-	-	-	16,49	-	24,
— Poireaux	"85,31"	10	-	"20,100"	-	-	5,50	12	"33,33"	-	9,
— Oignons rouges	"63,75"	46,463	29,195	38,4075	36,823	33,33	-	25	"93,33"	-	34,
— Carottes	25	-	-	-	-	28,57	-	-	32	-	28,
Oranges	-	21,265	20	26,67	13,335	-	-	-	-	-	20,
— Avocats	"26,667"	"18,697"	10,162	16,800	14,545	6,67	-	-	"22,22"	-	12,
— Ananas	-	18,865	-	22,73	-	10,59	-	-	20	12	16,
TABAC (en feuilles)	-	-	-	-	-	-	1,19	2,5	-	-	1,
PRODUCTION DE RAPPORT											
Café parche*	125	125	125	125	125	125	125	125	125	125	125,
Thé vert	-	-	-	15,0000	15,0000	15,0000	15,0000	15,0000	15,0000	-	15,
Pyrèthre — fleurs fraîches	-	-	-	-	-	-	17,0000	17,0000	-	-	17,
Pyrèthre — fleurs sèches	-	-	-	-	-	-	-	121,2	-	-	121,
Quinquina (écorces)	0:60 M:35	-	-	-	0:60 :35	-	-	-	-	-	47,
PRODUCTION MANUFACTURE ET ARTISANALE											
— Sucre	70	-	-	-	-	-	-	-	-	-	70,
— Riz blanc	75	75	-	-	75	-	-	-	75	-	75,
— Allumettes	-	-	3,744	-	-	-	-	-	-	-	3,
Jus de maracoudja	-	-	-	-	275,0000	-	-	-	-	-	275,

.../...

	KIGALI	GITARAMA	BUTARE	GIKONGORO	CYANGUGU	KIBUYE	GISENYI	RUHENGERI	BYUMBA	KIBUNGO	
Vin OVIBAR : - ordinaire (0,300 l)	45,5000	-	-	-	-	-	-	-	-	-	45
- S.M.C. (0,325 l)	144,3000	-	-	-	-	-	-	-	-	-	144
- liqueur (0,325 l)	489,0000	-	-	-	-	-	-	-	-	-	489
Pyrèthre : - extrait brut (P.M.)	-	-	-	-	-	-	-	2113	-	-	211
..... - extrait raffiné (P.M.)	-	-	-	-	-	-	-	3264	-	-	326
.....											
.....											
Farine de manioc	30,625	30	20	26,190	28,333	26,67	-	26,11	40	-	2
.....											
.....											
.....											
.....											
Bière de banane	26	-	-	-	19,993	-	-	-	25	13,3333	2
Viandes :											
..... - de porc	130	-	125	-	-	120	-	-	-	-	12
..... - de boeufs avec os	137,5	130	120	130	140	120	120	125	113,33	121,0267	12
..... - " sans os	153,333	155	150	-	175	-	140	-	150	-	15
..... - oeufs	8	9	8,5	7,5	-	-	-	10	8,5	-	
.....											
.....											
Animaux sur pieds (Bovins)	-	-	-	-	-	-	-	-	42,0000	-	4
.....											
.....											
.....											
.....											
.....											
.....											
Charbon de bois (1 sac)	325	-	-	-	-	230	-	-	325	270	287
.....											
.....											
.....											
.....											
.....											
.....											
.....											

Prix de revi[illegible] - Extrait brut de pyrèthre : 5093,31
Extrait raffiné " : 542[illegible]
- Fleurs sèches de " : 13[illegible],53

Les prix entre " " n'interviennent pas dans le [illegible] cause de la rareté ou bien dans la région ou [illegible] des pr[illegible] observés.

Element de Cout/Detail	Base d'Estimation	Actuel	1ere Phase	Drnier Phs
Taille de l'Echantillion:				
Nombres des Secteurs		78	155	56
Nombres des Grappes		156	311	112
Nombres des Menages		1092	1632	336
Nombres de Cadres:				
SESA:				
Cadres Nationaux Admin.		6	6	
Cadres Nationaux Tech.		3	4	
Superviseur National		1	1	
Superviseurs Regionals		0	0	
Superviseurs Prefectoraux		10	10	
Superviseurs Sous-Prefect.		0	0	3
Enqueteurs		78	78	
Traiteurs des Donnes		4	4	
MINAGRI:				
Monagris		0	77	56
Agricoms		0	77	
Agriprefs		0	10	
Salaires:				
SESA:				
Cadres Nationaux Admin.	.5 temps, d'office	500000	500000	50000
Cadres Nationaux Tech.	.75 temps @ 250.000 FRW/An	562500	750000	93750
Superviseur National	@ 240.000 FRW/An	240000	240000	24000
Superviseurs Reg/Pref.	.8 temps @ 190.000 FRW/An	1520000	1520000	45600
Superviseurs Sous-Prefect.	.8 temps @ 180.000 FRW/An	0	0	547200
Enqueteurs	.8 temps @ 140.000 FRW/An	8736000	8736000	
Traiteurs des Donnes	.75 temps @ 140.000 FRW/An	420000	420000	63000
Sous-total		11978500	12166000	823550
MINAGRI:				
Monagris	.2 temps @ 140.000 FRW/An	0	2156000	1568000
Agricoms	.1 temps @ 190.000 FRW/An	0	1463000	
Agriprefs	.05 temps @ 300.000 FRW/An	0	150000	
Sous-total		0	3769000	1568000
Deplacements/Kilometrage:				
SESA:				
Supervsr Sous-Prefectoraux	.8 temps @ 13,000/mo	0	0	474240
Supervsr Prefectoraux	.8 temps @ 17000/mo	1632000	1632000	
Supervsr Reg/Nat	.8 temps @ 10jr/mo @ 2500 FRW	240000	240000	96000
Cadres Nationaux Tech.	.8 temps @ 2jr/mo @ 2500 FRW	144000	192000	24000
Sous-total		2016000	2064000	594240
MINAGRI:				
Agricoms	75 km/mo/monagri @ 20 FRW	0	1386000	
Agriprefs	1 jour/mo @ 1250 FRW	0	150000	
Sous-total		0	1536000	

Element de Cout/Detail	Base d'Estimation	Actuel	1ere Phase	Dnier Phs
Autres Frais:				
SESA:				
Equipement d'enqueteur	10,000 FRW/An/Agent	780000	780000	
Seaus Plastiques	300 RFW/menage	327600	0	
Corbeilles Standardises	200 FRW/menage	0	326400	67200
Questionaires	500 FRW/menages	546000	816000	168000
Publications		500000	500000	50000
Vehicules	2 @ 20,000 Km/an @ 40 FRW/km	1600000	1600000	160000
Formation		1000000	1000000	100000
Materiel de bureax	4000 FRW/an/menage	4500000	6000000	800000
Divers		1500000	1500000	150000
Sous-total		10753600	12522400	1495200
MINAGRI				
Equipement des Monagris	10,000 FRW/An/Agent	0	770000	560000
Vehicules	150 km/mo/agripref @ 40 FRW/km	0	720000	
Formation	2000 FRW/monagri/an	0	154000	
Sous-totals		0	1644000	560000
Totals:				
SESA		24748100	26752400	2912990
MINAGRI		0	6949000	2128000
Grand Total		24748100	33701400	5040990