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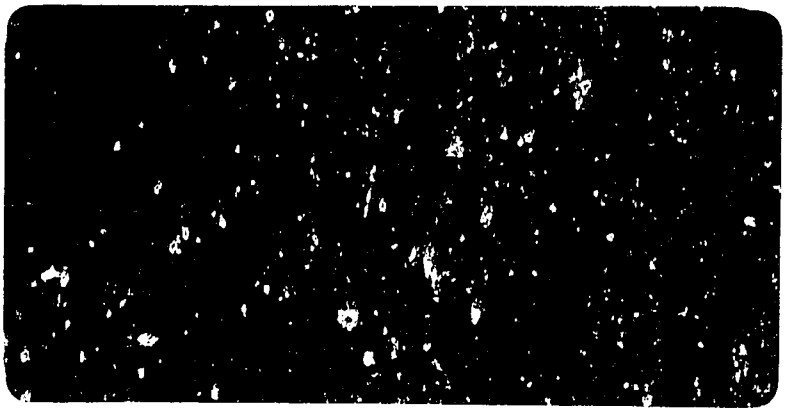

AGRICULTURAL DEVELOPMENT SUPPORT II
HAITI

University of Arkansas,
Fayetteville

PRELIMINARY RESULTS FOR [illegible]
SURVEY STATISTICS IN A [illegible]
OF [illegible]

PN-ABC-218

ADS-II
Agricultural Development Support II Project

PRELIMINARY RESULTS OF THE AGRICULTURAL SURVEY IN THE FOUR SOUTHERN DEPARTMENTS OF HAITI: SECOND AGRICULTURAL SEASON (AUGUST, 1986 - JANUARY, 1987)

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Report # 31
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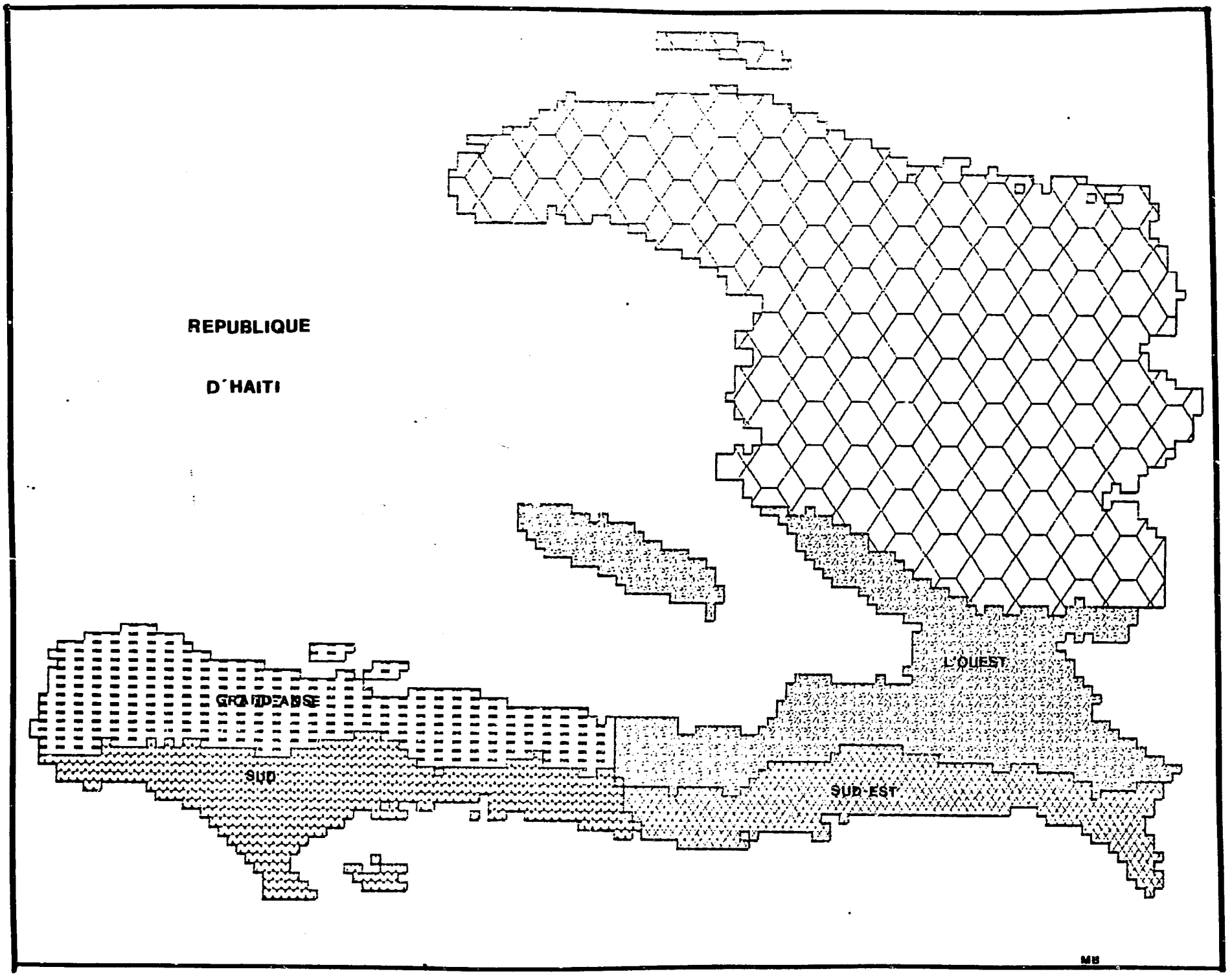
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ADS-II NATIONAL SURVEY PERSONNEL

ADS-II DIRECTOR
Guy Beaulieu

DIRECTOR STATISTICS
Ernest Dupont

NATIONAL SURVEY COORDINATOR
Gaspard Desriusseaux

EXTERNAL TECHNICAL ASSISTANCE
NATIONAL SURVEY ECONOMIST
Michael K. Bertelsen

CHIEF OF PARTY
Richard Swanson

STRATIFICATION TEAM
Osner Mervil
Ruddy Mentor
Jn. Mary Valaire

FIELD SUPERVISORS

Regional Supervisor - Sud
J. Claude Dimanche

Departement du Sud
Francois Georges - Departmental Supervisor
Arnel Perrin - Departmental Supervisor Adjoint

Department de la Grand-Anse
Jn Philippe Luc - Departmental Supervisor
Diogene Cange - Departmental Supervisor Adjoint

Regional Supervisor - Ouest
Arrod Jean-Baptiste

Departement de la Sud-Est
Jm Baptiste Laveaux - Departmental Supervisor
Jn Baptiste Jacques - Departmental Supervisor Adjoint

Departement de l'Ouest
Jn Denis Mardy - Departmental Supervisor
Jn Lionel Racine - Departmental Supervisor Adjoint

DATA ENTRY - ANALYSIS
Martine D. Cesar - Chief of Section
Sonia Pognon - Head keypunch operator

TRANSLATOR
Mary Rose Sam

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PRELIMINARY RESULTS OF THE AGRICULTURAL SURVEY IN THE FOUR SOUTHERN DEPARTMENTS OF HAITI: SECOND AGRICULTURAL SEASON (AUGUST, 1986 - JANUARY, 1987)

0.0 INTRODUCTION

The following tables and graphs present the preliminary results of the recurrent agricultural survey in the departments of the Sud, Grand-Anse, Sud-Est and L'Ouest. Currently, the survey is expanding its geographical coverage to all nine departments for the first agricultural season of 1987. Plans call for the survey to remain national in scope thereafter.

The user should exercise caution in interpreting the information which follows. In particular the results from the Grand-Anse, Sud-Est and L'Ouest should be interpreted with care since this represents the first reporting period for these departments. Consequently, the results reported for these departments represent the results of a pilot survey. Although measurements of sampling error for important variables in these departments generally fall within acceptable limits, non-sampling error is likey to be higher due to lesser degrees of experience with the survey methods and methodology for enumerators and supervisors alike. Adjustments in the frame for the Sud-Est and L'Ouest have already been made to improve sampling efficiency in the future. Similar adjustments are likely for the Grand-Anse as well. With such adjustments and the experience gained from this survey, the user can realistically expect better quality data for these areas in the future.

The user should also be aware of a number of other factors which have affected the estimates for the survey. These factors have consequences for both sampling and non-sampling error.

1). Supervision, enumerator and logistics problems resulted in the inability to conduct the survey in 8 segments of the Grand-Anse. Strata-level average estimates were used to estimate for these missing segments.

2). Continuing socio-political unrest resulted in the suspension of the survey in two segments each in the Sud and Sud-Est and four segments each in the L'Ouest and Grand-Anse. The unrest doubtlessly complicated enumerator-farmer relations in other segments.

3.) The results reported herein represent direct expansions of farmer responses to questions concerning their agricultural activities. No other adjustments to the data have been made. Consequently, in presenting these data it is assumed that no systematic bias exists in the farmer responses.

4.) The estimates have been rounded in most cases and totals may not add for this reason.

5.) Although it is felt that the open segment area frame has performed well for crops, animals and other variables or attributes commonly found in agricultural households, rare occurances such as large landholdings or crop plantations are not well represented in the sample. ADS-II is currently investigating alternative and complementary methods of estimating certain of these rare occurances. For example, the estimate for sugar cane in the Ouest has been supplemented by some 2500 additional hectares from large fields in the Cul-de-Sac plain derived from a recent landsat interpretation. It is likely this or similar methods may be used later to improve the sugar cane estimates in other plaines areas.

6.) The user should consult "The Pilot Agricultural Survey in the Departement du Sud: Methodology and Conclusions", ADS-II report No. 21, August, 1986, to become familiar with any additional problems of interpretation or inference occasioned by the methodology.

To facilitate comparisons and contrasts, rounded estimates and CV information for the second agricultural season in all four departments are presented in the following tables. A brief discussion of each table and set of graphs is also provided. The estimates for crop areas are presented first followed by animal number estimates, tree number estimates, and farm size and tenure estimates. Additional information from the survey will be reported at a later date. To assist the user in interpreting the data, a brief GIS (Geographic Information System) description and analysis for the four departments is presented in Appendix 1. A more comprehensive GIS profile of the Department du Sud is found in ADS-II Report #27.

Many people, both within and outside of ADS-II, have contributed to this overall effort. In particular, the support of Ministry and USAID personnel and the assistance of USDA/NASS consultants is gratefully acknowledged. Of course, the information in this report would not exist without the work of the enumerators and the cooperation of community leaders and hundreds of farmers throughout the four departments. A list of supervisory, managerial and related ADS-II personnel involved in the survey is presented on page ii.

1.0 CROP AREA ESTIMATES

Area estimates for some twenty-eight crops are presented in Tableau 1. The table is divided into sections for monoculture, association and combination (monoculture plus association) estimates. Area estimates and CV information for all four departments are presented.

Considerable differences in both total areas dedicated to field crops and individual crop areas among departments are apparent. This variability during the drier, second agricultural season may be explained to some extent by referring to the GIS department profiles in Appendix 1.

Sorghum, pois congo and maize dominate cultivated areas throughout the southern four departments during the second season (see Figure 1). Large percentages of most crops, particularly in the Grand-Anse, are planted in association. Given the large number of types of crop associations (see ADS-II Report # 22) and the variability in plant densities and yields this implies, care should be exercised in making inferences from association and total (combination) areas.

TABLEAU 1.0: COMPARAISON DES CULTURES PRATIQUEES DANS QUATRE DEPARTEMENTS
(2eme Saison, 1986)

A: MONOCULTURE (en hectare)

CULTURE	DEPARTEMENT DU SUD	CV	DEPARTEMENT DE LA GRAND-ANSE	CV	DEPARTEMENT DE LA SUD-EST	CV	DEPARTEMENT DE L'OUEST	CV	TOTAL	CV
MAIS	8100	0.15	2400	0.18	1600	0.13	1900	0.15	14000	0.09
SORGHO	23600	0.15	1800	0.18	1000	0.16	4400	0.13	30800	0.12
RIZ	6000	0.28	1100	0.13	100	0.52	6600	0.31	13800	0.19
HARICOT	200	0.49	200	0.16	300	0.37	300	0.23	1100	0.17
POIS CONGO	1200	0.16	2500	0.40	300	0.16	3100	0.32	7000	0.20
POIS INCONNU	*	0.40	*	0.48	*	0.52	200	0.24	300	0.19
POIS NOIR	3400	0.27	2500	0.36	700	0.46	200	0.45	6700	0.20
POIS BLANC	8	n.d.	100	0.36	*	0.52	100	0.27	200	0.25
POIS SINISTRE	*	0.70	100	0.36	100	0.35	*	0.53	200	0.22
ARACHIDE	500	0.20	100	0.28	*	0.47	400	0.25	1000	0.14
MANIOC AMER	1400	0.15	900	0.33	100	0.38	800	0.17	3200	0.12
MANIOC DOUX	400	0.23	600	0.17	100	0.39	500	0.22	1600	0.11
PATATE	5700	0.16	1700	0.20	400	0.18	3300	0.18	11100	0.10
IGNAME	600	0.32	2000	0.36	*	0.43	*	0.50	2600	0.28
POMME DE TERRE	*	n.d.	*	0.50	*	0.35	400	0.40	400	0.36
MALANGA	300	0.24	1600	0.50	100	0.50	*	n.d.	2000	0.41
MAZUMREL	300	0.23	500	0.17	*	0.69	200	0.53	900	0.14
CANNE A SUCRE	4600	0.21	1900	0.30	*	0.62	10200	0.22	17700	0.14
TABAC	500	0.37	100	0.33	*	0.70	*	0.53	700	0.29
VETIVER	400	0.27	*	0.37	*	n.d.	*	n.d.	400	0.26
COTON	100	0.44	*	n.d.	*	n.d.	*	n.d.	100	0.44
SISAL	100	0.45	*	0.55	300	0.70	100	0.41	400	0.43
GIROMON	*	n.d.	*	0.36	*	0.47	*	0.50	100	0.26
TOMATE	100	0.39	200	0.44	*	0.69	900	0.29	1300	0.23
CHOUX	*	0.45	200	0.34	*	0.47	100	0.40	400	0.23
CAFE	1000	0.19	3100	0.37	800	0.20	300	0.31	5300	0.22
ANANAS	*	n.d.	*	n.d.	*	n.d.	*	0.41	*	0.41
FIGUE-BANANE	100	0.28	*	0.36	*	n.d.	400	0.26	500	0.20
BANANE	3100	0.18	3600	0.09	200	0.20	3300	0.22	10200	0.09
AUTRE	200	0.32	*	n.d.	*	n.d.	200	0.27	400	0.22
TOTAL - MONOCULTURE	62100		27200		6100		38100		131300	

B: ASSOCIATION (en hectare)

CULTURE	DEPARTEMENT DU SUD	CV	DEPARTEMENT DE LA GRAND-ANSE	CV	DEPARTEMENT DE LA SUD-EST	CV	DEPARTEMENT DE L'OUEST	CV	TOTAL	CV
MAIS	15500	0.14	32200	0.15	8600	0.12	5800	0.13	62200	0.09
SORGHO	22900	0.16	33800	0.15	6800	0.12	8000	0.11	71500	0.09
RIZ	1100	0.30	4300	0.15	*	n.d.	400	0.44	5800	0.13
HARICOT	1000	0.29	1200	0.18	500	0.15	700	0.37	3400	0.13
POIS CONGO	21400	0.11	44400	0.11	5700	0.15	9000	0.18	80500	0.07
POIS INCONNU	400	0.30	1600	0.21	600	0.13	900	0.24	3600	0.12
POIS NOIR	6300	0.23	13000	0.17	2600	0.22	100	0.24	22000	0.12
POIS BLANC	*	0.42	500	0.37	100	0.25	*	n.d.	700	0.28
POIS SINISTRE	100	0.31	500	0.29	200	0.34	*	n.d.	900	0.20
ARACHIDE	2000	0.31	1900	0.21	100	0.51	1800	0.20	5800	0.14
MANIOC AMER	9600	0.14	18600	0.11	1800	0.17	7900	0.15	37900	0.07
MANIOC DOUX	3200	0.21	8400	0.27	1400	0.19	600	0.22	13700	0.18
PATATE	11700	0.19	14800	0.11	3000	0.15	5300	0.14	34700	0.08
IGNAME	10900	0.15	10400	0.08	2900	0.20	100	0.34	24400	0.08
POMME DE TERRE	*	n.d.	*	0.27	100	0.20	300	0.40	500	0.25
MALANGA	5300	0.25	9500	0.14	300	0.24	*	0.57	15200	0.13
MAZUMBEL	1200	0.25	2400	0.13	300	0.32	*	0.57	3900	0.11
CANNE A SUCRE	500	0.17	1600	0.27	800	0.20	1000	0.28	3900	0.14
TABAC	*	0.41	100	0.52	*	0.64	*	n.d.	100	0.40
VETIVER	*	0.56	100	0.37	*	0.37	*	n.d.	200	0.29
COTON	100	0.40	100	0.17	*	0.38	*	0.69	100	0.19
SISAL	100	0.39	*	0.70	*	0.47	*	n.d.	100	0.31
GIROMON	300	0.37	4600	0.21	100	0.18	100	0.30	5100	0.19
TOMATE	*	0.70	400	0.38	*	0.25	*	0.49	500	0.30
CHOUX	*	n.d.	900	0.27	100	0.27	100	0.40	1200	0.22
CAFE	7900	0.29	12100	0.14	4600	0.09	100	0.40	24800	0.12
ANANAS	300	0.41	*	0.37	*	0.25	*	n.d.	300	0.37
FIGUE-BANANE	3200	0.23	2600	0.16	200	0.36	2300	0.30	8400	0.13
BANANE	13700	0.19	15100	0.12	4800	0.10	1600	0.16	35200	0.09
AUTRE	300	0.29	200	0.24	600	0.25	200	0.33	1300	0.15

C: COMBINAISON (en hectare)

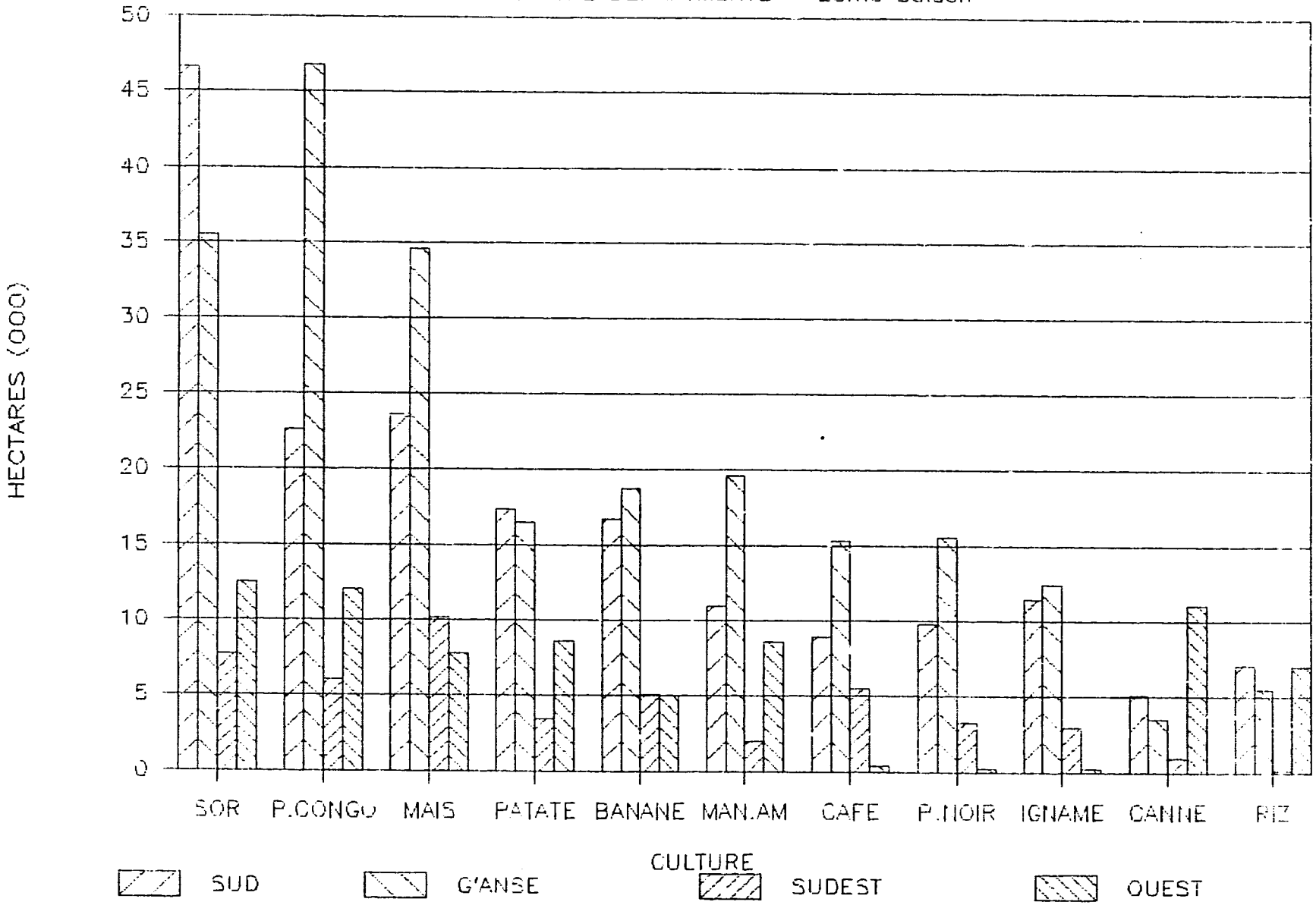
CULTURE	DEPARTEMENT DU SUD	CV	DEPARTEMENT DE LA GRAND-ANSE	CV	DEPARTEMENT DE LA SUD-EST	CV	DEPARTEMENT DE L'OUEST	CV	TOTAL	CV
MAIS	23600	0.10	34600	0.14	10200	0.10	7800	0.10	76200	0.07
SORGHO	46600	0.11	35500	0.14	7700	0.10	12500	0.08	102300	0.07
RIZ	7100	0.24	5500	0.12	100	n.d.	7000	0.30	19600	0.14
HARICOT	1300	0.26	1400	0.15	800	0.17	1100	0.26	4600	0.11
POIS CONGO	22600	0.11	46600	0.10	6000	0.14	12000	0.15	87500	0.07
POIS INCONNU	500	0.28	1700	0.21	600	0.12	1100	0.20	3900	0.11
POIS NOIR	9800	0.18	15500	0.15	3200	0.20	200	0.35	28700	0.10
POIS BLANC	*	n.d.	700	0.30	200	0.23	100	n.d.	900	0.22
POIS SINISTRE	100	0.29	600	0.26	300	0.27	*	n.d.	1100	0.17
ARACHIDE	2500	0.25	2000	0.20	100	0.38	2200	0.16	6800	0.12
MANIOC AMER	11000	0.12	19600	0.11	2000	0.16	8600	0.14	41100	0.07
MANIOC DOUX	3600	0.19	9100	0.26	1500	0.18	1200	0.16	15300	0.16
PATATE	17400	0.14	16500	0.10	3400	0.13	8600	0.11	45900	0.07
IGNAME	11500	0.14	12400	0.09	2900	0.20	200	0.30	26900	0.08
POMME DE TERRE	*	n.d.	100	0.24	200	0.17	700	0.29	900	0.21
MALANGA	5600	0.24	11100	0.14	400	0.22	*	n.d.	17200	0.12
MAZUMBEL	1400	0.20	2800	0.11	300	0.32	200	0.44	4800	0.10
CANNE A SUCRE	5100	0.19	3500	0.20	900	0.20	11100	0.20	20600	0.12
TABAC	500	0.36	200	0.29	*	0.49	*	n.d.	800	0.26
VETIVER	500	0.25	200	0.32	*	n.d.	*	n.d.	600	0.20
COTON	200	0.32	100	n.d.	*	n.d.	*	n.d.	200	0.23
SISAL	200	0.33	0	0.44	300	0.67	100	ERR	500	0.37
GIROMON	300	n.d.	4700	0.21	100	0.17	100	0.26	5200	0.19
TOMATE	100	0.35	600	0.29	*	0.25	1000	0.28	1700	0.19
CHOUX	*	n.d.	1100	0.23	200	0.24	300	0.28	1600	0.18
CAFE	8900	0.26	15300	0.14	5500	0.08	400	0.24	30100	0.10
ANANAS	300	n.d.	*	n.d.	*	n.d.	*	n.d.	400	0.36
FIGUE-BANANE	3400	0.22	2600	0.15	200	n.d.	2700	0.26	8900	0.12
BANANE	16700	0.15	18700	0.10	5100	0.09	5000	0.16	45400	0.07
AUTRE	600	0.21	200	n.d.	600	n.d.	300	0.21	1700	0.13

* = moins de 50 hectares
n.d. = non disponible

Figure 1

LES CULTURES LES PLUS COMMUNES

DANS QUATRE DEPARTMENTS — 2eme Saison



2.0 ANIMAL ESTIMATES

Tableau 2 presents rounded animal number estimates and CV information for common animals in the four departments for the second agricultural season. An estimate of the disappearance or loss to the household from all causes (disparu) which occurred over the last six months from the date of the survey and a sex and age breakdown (expressed as a percentage of the total estimate) is provided for selected animals. An estimate of the percentage of total agricultural households on which the different types of animals are found and an estimate of percentages of total animals "recu en gardiennage" is also presented in the table.

As indicated in the table and illustrated in the following Figure 2, a relatively consistant pattern of cattle, goats, ass and horse numbers exits among the four departments. Relatively more sheep are found in households of the Department du Sud and more swine in the Sud and Ouest.

In general, the age and sex breakdown for the selected animals are very consistent over all departments. The number of households which practice particular types of animal husbandry is also consistent. More variablity is found in the percent of animals "récu en gardiennage" and the numbers which disappeared during the last six months due to disease, accident, consumption, sales and other causes.

TABLEAU 2.0: ESTIMATION DU NOMBRE D'ANIMAUX DANS QUATRE DEPARTEMENTS
(2eme Saison,1986)

	DEPARTEMENT DU SUD	CV	DEPARTEMENT DE LA GRAND-ANSE	CV	DEPARTEMENT DE LA SUD-EST	CV	DEPARTEMENT DE L'OUEST	CV	TOTAL	CV
VOLAILLES	853000	0.10	1147000	0.15	417000	0.08	567000	0.09	2985000	0.07
DISPARUES	1011000	0.10	611000	0.11	220000	0.07	270000	0.06	2112000	0.06
Pourcentage:										
COQ	21.32	0.11	22.75	0.16	23.82	0.08	19.78	0.11	21.92	0.07
POULE	34.75	0.08	36.17	0.16	35.66	0.08	33.63	0.09	35.21	0.07
POUSSIN	38.78	0.11	37.90	0.12	39.33	0.09	44.95	0.10	39.69	0.06
EN GARDIENNAGE	3.16	0.17	6.03	0.12	6.72	0.10	10.78	0.17	6.21	0.08
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	73.22	0.08	74.46	0.07	67.74	0.06	59.71	0.08	69.50	0.04
BOVINS	138000	0.09	178000	0.13	49000	0.0[illegible]	116000	0.10	482000	0.06
DISPARUS	48000	0.14	33000	0.12	14000	0.11	15000	0.09	110000	0.07
Pourcentage:										
VEAU	20.39	0.11	18.83	0.09	22.47	0.11	27.52	0.08	21.75	0.05
TAUREAU	23.65	0.09	24.95	0.16	26.81	0.12	22.23	0.15	24.11	0.07
VACHE	55.68	0.09	56.27	0.15	49.56	0.08	49.23	0.09	53.72	0.07
EN GARDIENNAGE	15.84	0.10	16.01	0.09	32.46	0.18	24.86	0.10	19.78	0.06
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	48.10	0.07	55.69	0.09	37.95	0.07	42.52	0.07	47.77	0.04
CAPRINS	254000	0.11	371000	0.14	15[illegible]00	0.11	203000	0.08	980000	0.07
DISPARUS	203000	0.09	146000	0.10	76000	0.10	86000	0.06	510000	0.05
Pourcentage:										
CHEVREAUX	24.57	0.15	29.72	0.19	25.71	0.12	28.92	0.09	27.60	0.09
CABRIS	24.14	0.14	26.64	0.16	28.97	0.12	26.22	0.09	26.26	0.08
CHEVRES	51.20	0.09	43.65	0.11	45.28	0.10	44.92	0.08	46.12	0.05
EN GARDIENNAGE	10.49	0.15	10.26	0.08	22.15	0.17	18.71	0.11	13.90	0.06
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	52.43	0.08	60.80	0.07	56.91	0.06	47.71	0.07	54.16	0.04
OVINS	105000	0.18	64000	0.33	3000	0.33	15000	0.21	187000	0.15
DISPARUS	67000	0.12	11000	0.32	1000	0.25	4000	0.20	84000	0.10
Pourcentage:										
AGNEAUX	24.58	0.22	22.99	0.31	21.36	0.35	29.74	0.21	24.39	0.16
MOUTONS	24.39	0.25	40.94	0.41	33.62	0.31	29.68	0.20	30.59	0.22
BREBIS	50.60	0.14	36.07	0.28	45.02	0.35	40.14	0.22	44.74	0.12
EN GARDIENNAGE	17.23	0.21	5.68	0.17	6.35	0.52	9.35	0.24	12.51	0.17
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	20.95	0.12	16.28	0.22	2.49	0.29	3.25	0.22	12.98	0.10
PORCS	33000	0.20	12000	0.14	8000	0.34	36000	0.17	89000	0.11
DISPARUS	13000	0.34	3000	0.40	1000	0.31	10000	0.26	27000	0.20
Pourcentage:										
PORCELETS	32.14	0.33	38.38	0.23	30.25	0.45	34.92	0.17	33.94	0.14
PORCS	24.46	0.19	18.01	0.12	24.24	0.36	25.83	0.17	24.14	0.11
TRUIES	43.21	0.17	43.61	0.13	45.52	0.27	39.25	0.18	41.85	0.10
EN GARDIENNAGE	4.63	0.25	5.26	0.18	4.31	0.29	12.02	0.33	7.69	0.22
MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	2.30	0.17	0.84	0.17	2.12	0.36	3.09	0.24	2.06	0.12

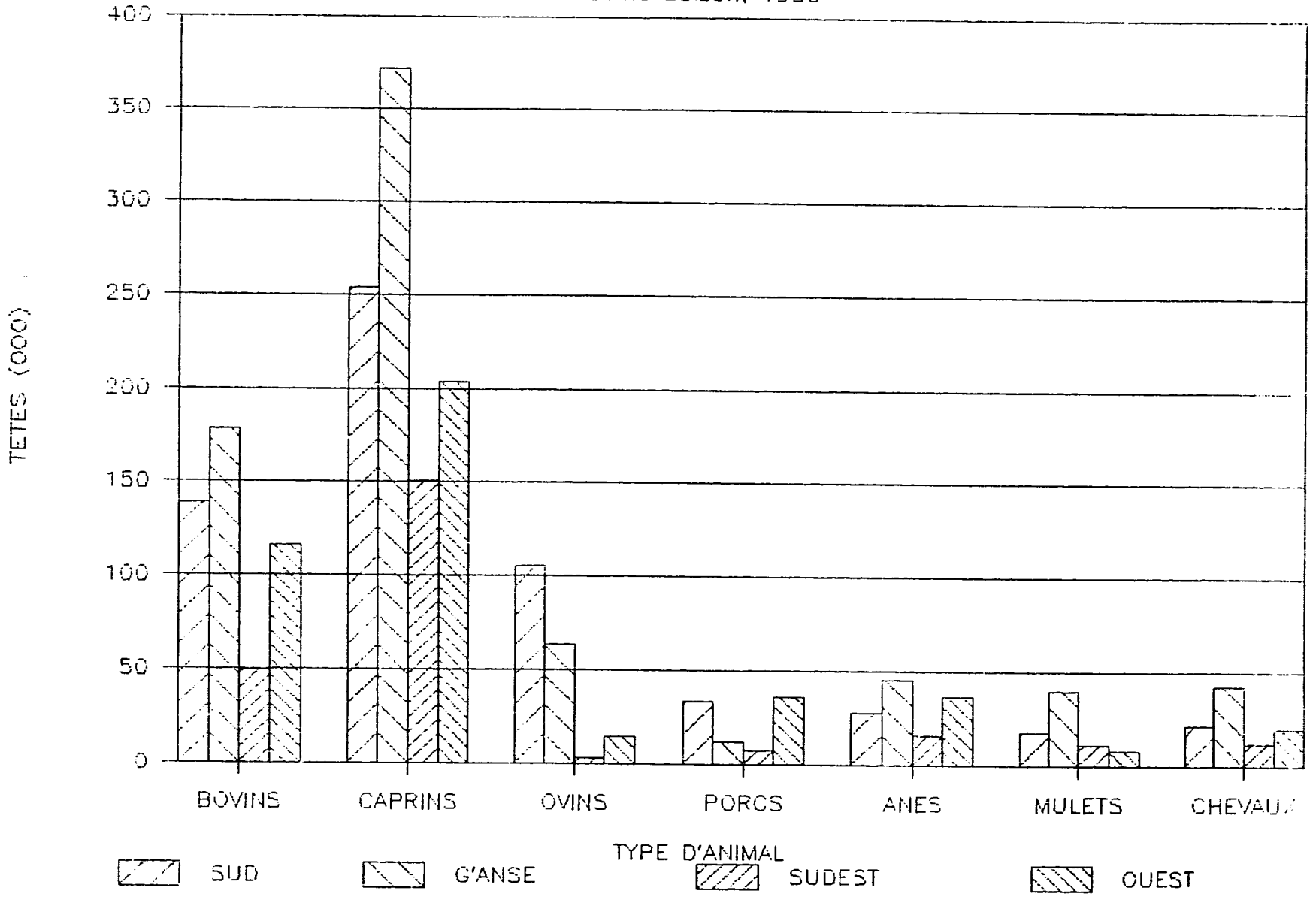
TABLEAU 2.0 (SUITE)

	DEPARTEMENT DU SUD	CV	DEPARTEMENT DE LA GRAND-ANSE	CV	DEPARTEMENT DE LA SUD-EST	CV	DEPARTEMENT DE L'OUEST	CV	TOTAL	CV
ANES	28000	0.10	46000	0.30	16000	0.10	37000	0.11	126000	0.1
Pourcentage MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	19.54	0.13	24.68	0.22	24.96	0.10	23.58	0.11	22.69	0.0
MULETS	17000	0.15	40000	0.20	11000	0.09	8000	0.14	76000	0.1
Pourcentage MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	11.04	0.11	21.03	0.19	19.37	0.08	7.15	0.15	13.89	0.0
CHEVAUX	21000	0.14	43000	0.18	12000	0.11	20000	0.10	96000	0.0
Pourcentage MENAGES AGRICOLES QUI PRATIQUE L'ELEVAGE	1.10	0.19	3.83	0.33	1.65	0.15	1.59	0.14	2.09	0.1
LAPINS	5000	0.21	300	0.37	3000	0.24	66000	0.46	74000	0.4

Figure 2

NOMBRE D'ANIMAUX - QUATRE DEPARTEMENTS

2eme Saison, 1986



3.0 ESTIMATES OF TREE NUMBERS

Tableau 3 presents estimates of numbers of selected tree types in the four departments for the second agricultural season. CV information and estimates of percentages of trees found in association are also presented.

The table and following graph indicate that cacao, due to the large estimate for the Grand-Anse, is the most common tree reported over all four departments followed by arbre veritable, mango and avocato. High percentages of all trees are grown in association.

TABLEAU 3.0: NOMBRE D'ARBRES RELEVE POUR QUATRE DEPARTEMENTS
(2eme Saison. 1986)

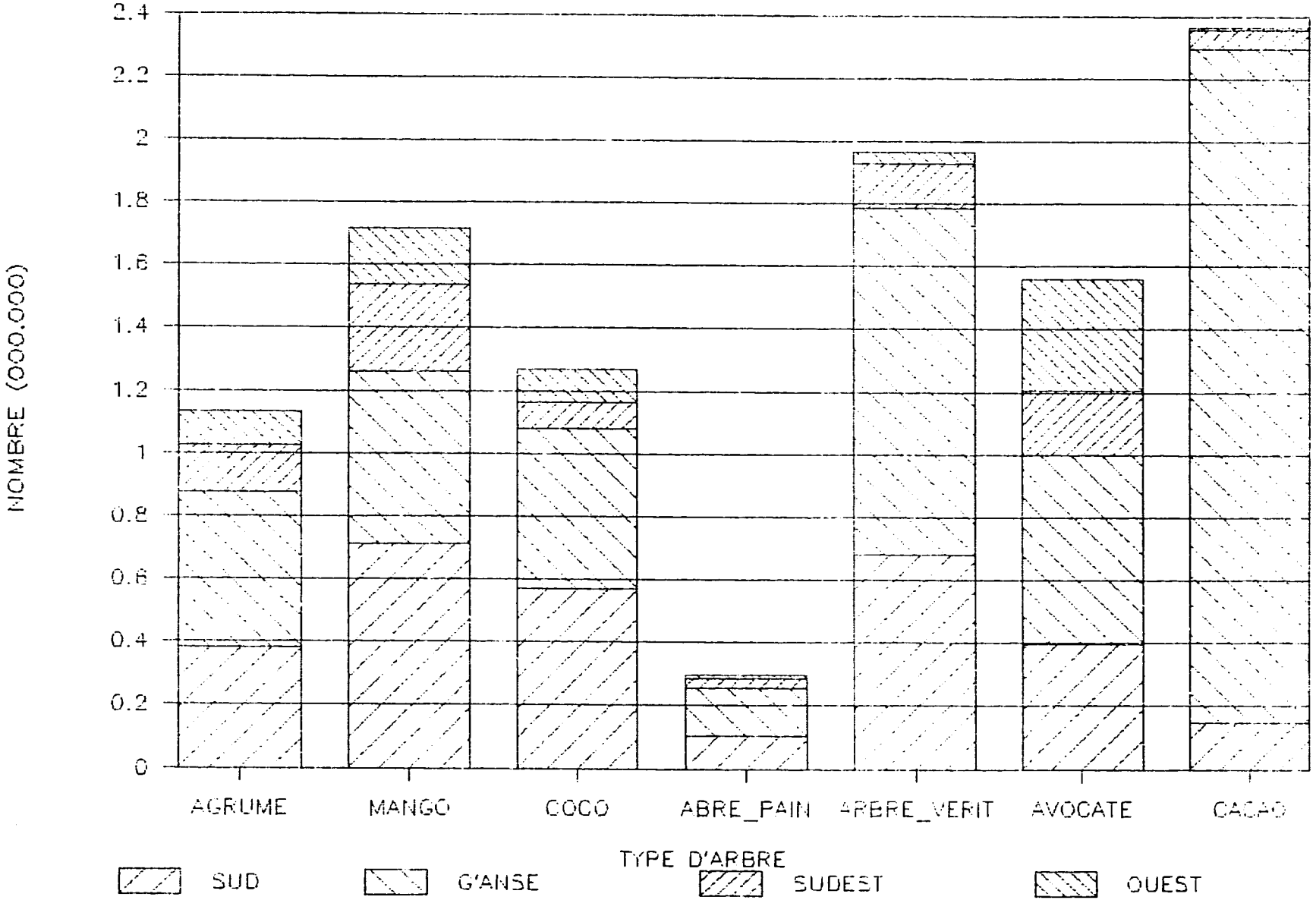
	DEPARTEMENT DU SUD			DEPARTEMENT DE LA GRAND-ANSE			DEPARTEMENT DE LA SUD-EST		
	TOTAL	CV	POURCENTAGE EN ASSOCIATION	TOTAL	CV	POURCENTAGE EN ASSOCIATION	TOTAL	CV	POURCENTAGE EN ASSOCIATION
AGRUME	383,000	0.10	100.00	493,000	0.11	62.97	150,000	0.16	100.00
MANGUIER	711,000	0.15	100.00	549,000	0.07	100.00	278,000	0.10	100.00
COCOTIER	570,000	0.11	80.77	509,000	0.25	100.00	82,000	0.11	98.84
ABRE A PAIN	104,000	0.15	100.00	152,000	0.38	100.00	28,000	0.18	100.00
ARBRE VERITABLE	679,000	0.17	84.38	1,105,000	0.11	100.00	143,000	0.12	100.00
AVOCATIER	396,000	0.18	100.00	601,000	0.07	100.00	208,000	0.10	100.00
CACAOYERS	148,000	0.28	75.44	2,148,000	0.10	100.00	59,000	0.22	100.00

	DEPARTEMENT DE L'OUEST			TOTAL		
	TOTAL	CV	POURCENTAGE EN ASSOCIATION	TOTAL	CV	POURCENTAGE EN ASSOCIATION
AGRUME	108,000	0.13	100.00	1,133,000	0.06	86.88
MANGUIER	179,000	0.09	79.97	1,718,000	0.07	97.69
COCOTIER	105,000	0.11	74.76	1,266,000	0.11	87.38
ABRE A PAIN	12,000	0.13	100.00	296,000	0.20	100.00
ARBRE VERITABLE	38,000	0.16	84.26	1,964,000	0.09	95.29
AVOCATIER	352,000	0.30	100.00	1,557,000	0.09	100.00
CACAOYERS	9,000	0.48	100.00	2,364,000	0.10	99.15

Figure 3

NOMBRE D'ARBES

QUATRE DEPARTEMENTS



4.0 FARM NUMBERS BY SIZE CATEGORIES

Tableau 4 presents estimates of total numbers of farm families in each department followed by a breakdown of percentages of farm numbers by size category in the four departments for the second agricultural season. CV information is also presented.

Figure 4 presents a graph illustrating the relationship between the cummulative percentages of farm families in each department and the average over all four departments farming different amounts of land. The figure indicates, for example, that the percentage of families farming one carroux (1.29 hectares) or less varies from 63% in the Grand-Anse to 89% in the Sud-Est. The average over all four departments is around 76%. Around 95% of farm families in all four departments farm 3.55 hectares or less.

TABLEAU 4.0: ESTIMATION DES SUPERFICIES CULTIVEES PAR LES MENAGES AGRICOLES PAR CATEGORIE
LES DEPARTEMENTS DU SUD, GRAND ANSE, SUDEST ET L'OUEST
(2eme Saison, 1986)

	DEPARTEMENT DU SUD		DEPARTEMENT DE LA GRAND ANSE		DEPARTEMENT DE LA SUDEST	
NOMBRE DE MENAGES AGRICOLES	113000		98000		37000	
CV	0.08		0.05		0.04	
SUPERFICIE EN HECTARE PAR CATEGORIE	POUR-CENTAGE	CV	POUR-CENTAGE	CV	POUR-CENTAGE	CV
0.00 - 0.32	26.14	0.10	17.81	0.10	35.99	0.08
0.33 - 0.65	20.52	0.10	19.51	0.09	27.10	0.06
0.66 - 0.97	14.69	0.12	13.02	0.07	12.77	0.09
0.98 - 1.29	11.50	0.08	12.43	0.06	13.06	0.08
1 CX						
1.30 - 1.61	6.39	0.08	7.06	0.07	3.19	0.16
1.62 - 1.94	5.71	0.10	10.41	0.13	2.85	0.21
1.95 - 2.26	3.05	0.16	3.25	0.08	1.11	0.23
2.27 - 2.58	3.02	0.15	6.10	0.17	1.78	0.30
2 CX						
2.59 - 2.90	1.76	0.11	3.29	0.39	0.48	0.41
2.91 - 3.23	1.28	0.15	1.96	0.14	1.03	0.30
3.24 - 3.55	0.74	0.21	0.34	0.22	0.00	n.d.
3.56 - 3.87	1.60	0.23	1.33	0.26	0.25	0.70
3 CX						
3.88 - 4.19	0.46	0.20	0.70	0.12	0.13	0.62
4.20 - 4.52	0.67	0.22	0.59	0.18	0.13	0.62
4.53 - 4.84	0.25	0.22	0.24	0.29	0.00	n.d.
4.85 - 5.16	0.34	0.22	0.49	0.30	0.08	0.70
4 CX						
5.17 - 5.48	0.26	0.26	0.02	0.69	0.03	0.68
5.49 - 5.81	0.22	0.25	0.32	0.24	0.00	n.d.
5.82 - 6.13	0.06	0.44	0.08	0.37	0.00	n.d.
6.14 - 6.45	0.18	0.22	0.36	0.20	0.00	n.d.
5 CX						
) 6.45	1.17	0.14	0.69	0.19	0.00	n.d.

TABLEAU 4.0 (SUITE)

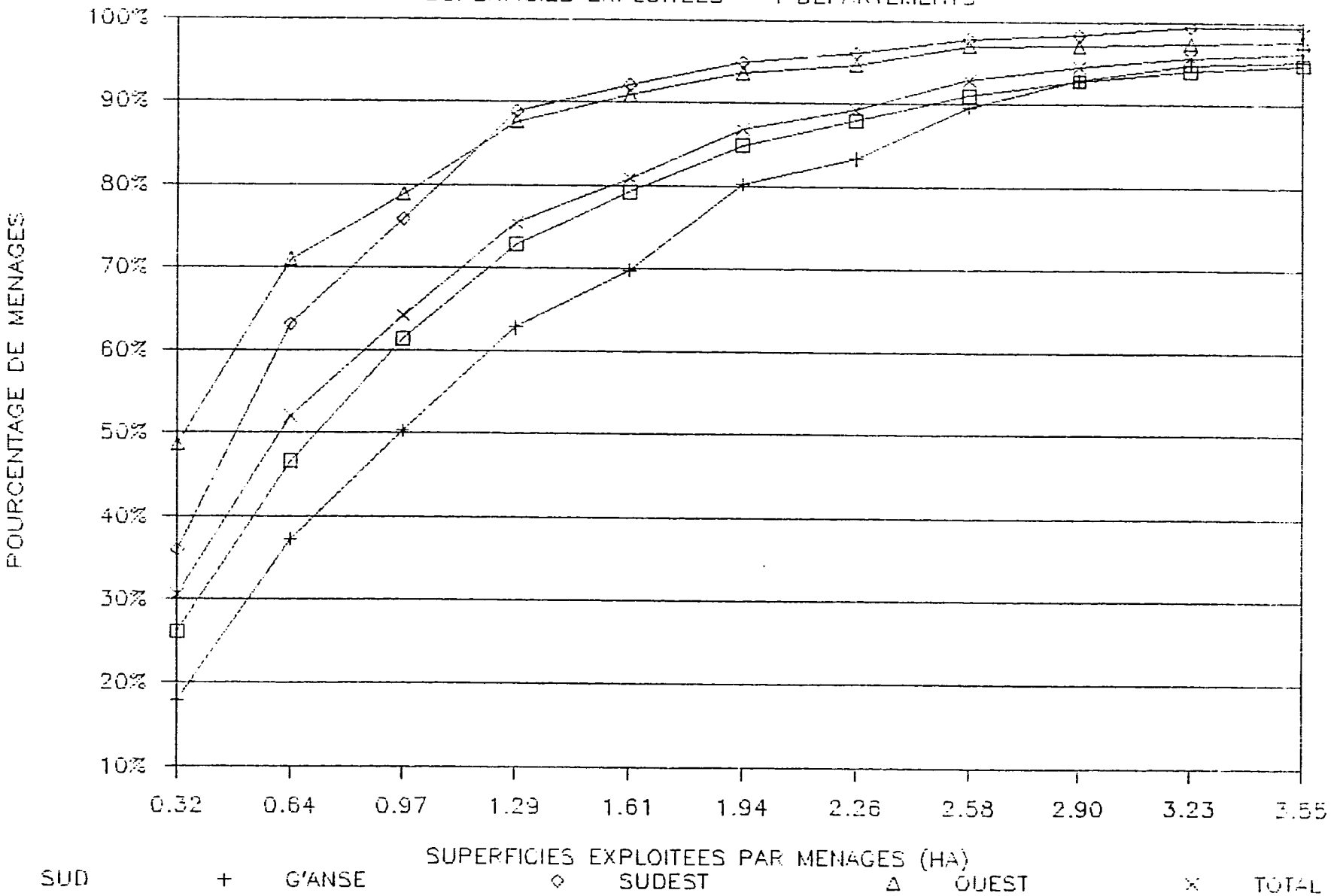
		DEPARTEMENT DE L'OUEST		TOTAL	
	NOMBRE DE MENAGES AGRICOLES		86000		334000
	CV		0.08		0.04
	SUPERFICIE EN HECTARE PAR CATEGORIE	POUR-CENTAGE	CV	POUR-CENTAGE	CV
	0.00 - 0.32	48.62	0.14	30.58	0.06
	0.33 - 0.65	22.38	0.12	21.43	0.05
	0.66 - 0.97	7.84	0.08	12.22	0.06
	0.98 - 1.29	8.82	0.15	11.25	0.05
1 CX					
	1.30 - 1.61	3.20	0.11	5.41	0.05
	1.62 - 1.94	2.74	0.13	6.01	0.08
	1.95 - 2.26	1.02	0.12	2.37	0.08
	2.27 - 2.58	2.31	0.15	3.61	0.10
2 CX					
	2.59 - 2.90	0.09	0.41	1.64	0.23
	2.91 - 3.23	0.36	0.26	1.21	0.09
	3.24 - 3.55	0.34	0.29	0.44	0.14
	3.56 - 3.87	0.58	0.18	1.11	0.15
3 CX					
	3.88 - 4.19	0.00	n.d.	0.37	0.11
	4.20 - 4.52	0.18	0.28	0.46	0.13
	4.53 - 4.84	0.22	0.41	0.21	0.17
	4.85 - 5.16	0.18	0.41	0.31	0.17
4 CX					
	5.17 - 5.48	0.07	0.50	0.12	0.22
	5.49 - 5.81	0.09	0.40	0.19	0.16
	5.82 - 6.13	0.00	n.d.	0.04	0.29
	6.14 - 6.45	0.14	0.57	0.20	0.16
5 CX					
	>6.45	0.79	0.34	0.80	0.12

1 CX (Carroux) = 1.29 hectares
n.d. = non disponible

Figure 4

DISTRIBUTION DES TERRES EN FONCTION DES

SUPERFICIES EXPLOITEES — 4 DEPARTEMENTS



5.0 DISTRIBUTION OF LAND TENURE

Tableau 5 and Figures 5 and 6 present the estimated total numbers and areas of gardens farmed in the four departments along with a percentage breakdown of land tenure classifications for the second agricultural season. CV information is also presented.

As illustrated in Figure 5 and 6, the percentage of families farming their land in the various tenure classes is fairly consistent over all departments. Metayage is relatively less important in the Grand-Anse while Location de l'Etat is relatively more important in the Grand-Anse and Sud-Est.

TABLEAU 4.1: ESTIMATION DU MODE DE TENURE DANS LES DEPARTEMENTS
DE LE SUD, GRAND ANSE, SUDEST ET L'OUEST
(2eme Saison, 1986)

	SUD				GRAND-ANSE				SUD-EST			
SUPERFICIE TOTALE DES JARDINS			140000		133000				27000			
NOMBRE TOTAL DE JARDINS			219000		190000				53000			
MODE DE TENURE (POURCENTAGE)												
	SUPERFICIE	CV	NOMBRE	CV	SUPERFICIE	CV	NOMBRE	CV	SUPERFICIE	CV	NOMBRE	CV
PROPRIETE	58.22	0.11	53.30	0.09	59.63	0.09	53.87	0.09	58.66	0.09	56.53	0.
METAYAGE	14.98	0.10	22.32	0.10	6.21	0.14	10.12	0.17	12.08	0.15	14.07	0.
LOUE DE PARTICULIER	11.76	0.17	9.05	0.11	8.05	0.12	10.23	0.10	8.58	0.19	10.32	0.
LOUE DE L'ETAT	1.36	0.16	0.83	0.13	12.03	0.27	8.37	0.15	8.78	0.24	7.20	0.
SANS TITRE	0.83	0.20	1.41	0.26	2.08	0.11	2.60	0.11	1.65	0.16	2.22	0.
HERITAGE	12.70	0.12	12.93	0.10	11.29	0.11	13.76	0.11	10.05	0.08	9.48	0.
AUTRE	0.15	0.51	0.16	0.40	0.71	0.20	1.05	0.17	0.20	0.39	0.18	0.

	L'OUEST				TOTAL			
SUPERFICIE TOTALE DES JARDINS			63000		363000			
NOMBRE TOTAL DE JARDINS			105000		567000			
MODE DE TENURE (POURCENTAGE)								
	SUPERFICIE	CV	NOMBRE	CV	SUPERFICIE	CV	NOMBRE	CV
PROPRIETE	61.19	0.10	56.62	0.09	59.29	0.06	54.41	0.05
METAYAGE	15.99	0.07	20.88	0.13	11.72	0.06	17.19	0.07
LOUE DE PARTICULIER	6.12	0.17	8.18	0.21	9.18	0.10	9.40	0.07
LOUE DE L'ETAT	0.27	0.33	0.50	0.33	5.64	0.22	3.90	0.11
SANS TITRE	3.55	0.23	2.30	0.18	1.82	0.10	2.05	0.09
HERITAGE	12.33	0.21	10.94	0.15	11.92	0.07	12.52	0.06
AUTRE	0.55	0.35	0.58	0.27	0.43	0.16	0.54	0.13

Figure 5

MODE DE TENURE

SUPERFICIES DE JARDINS

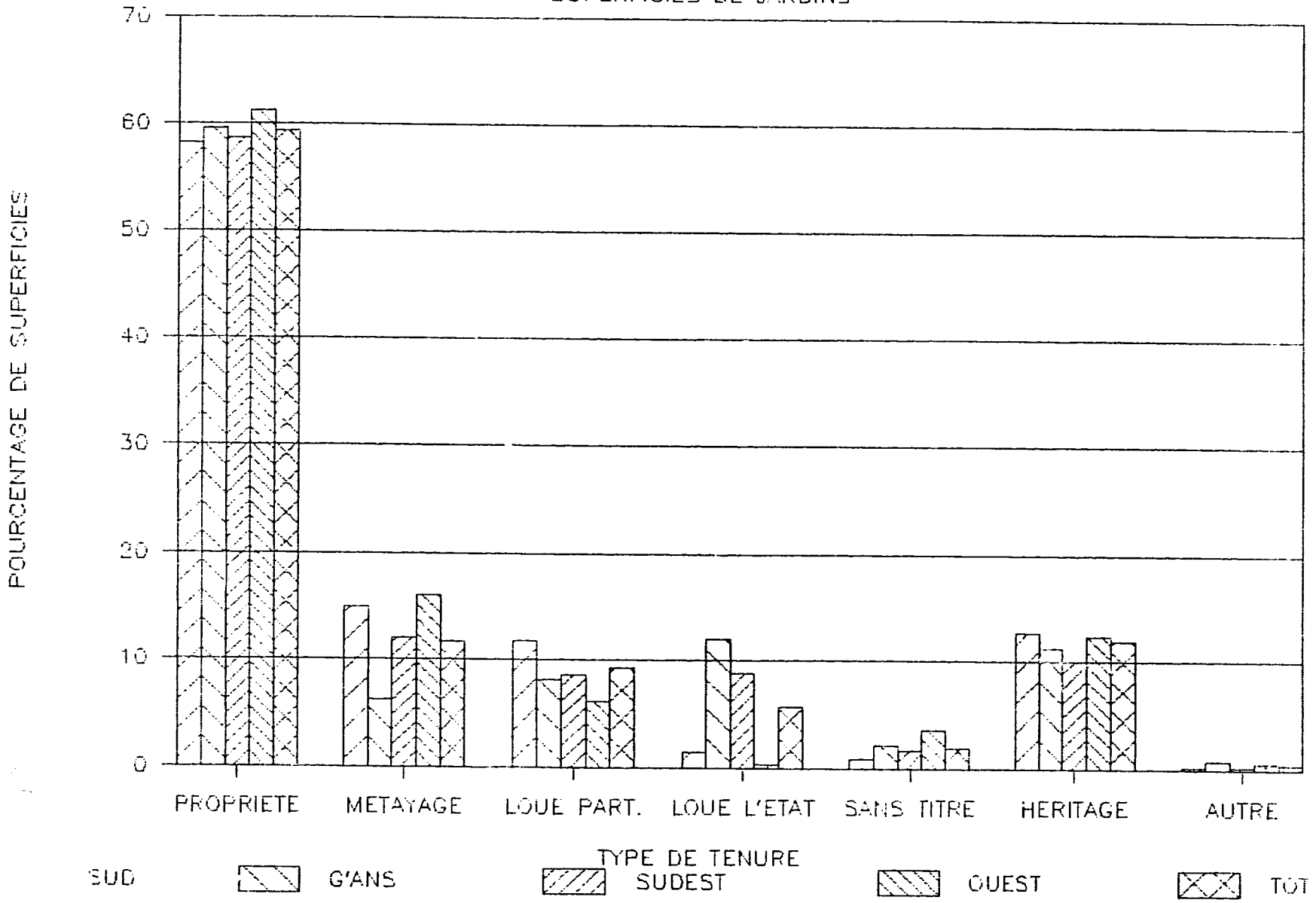
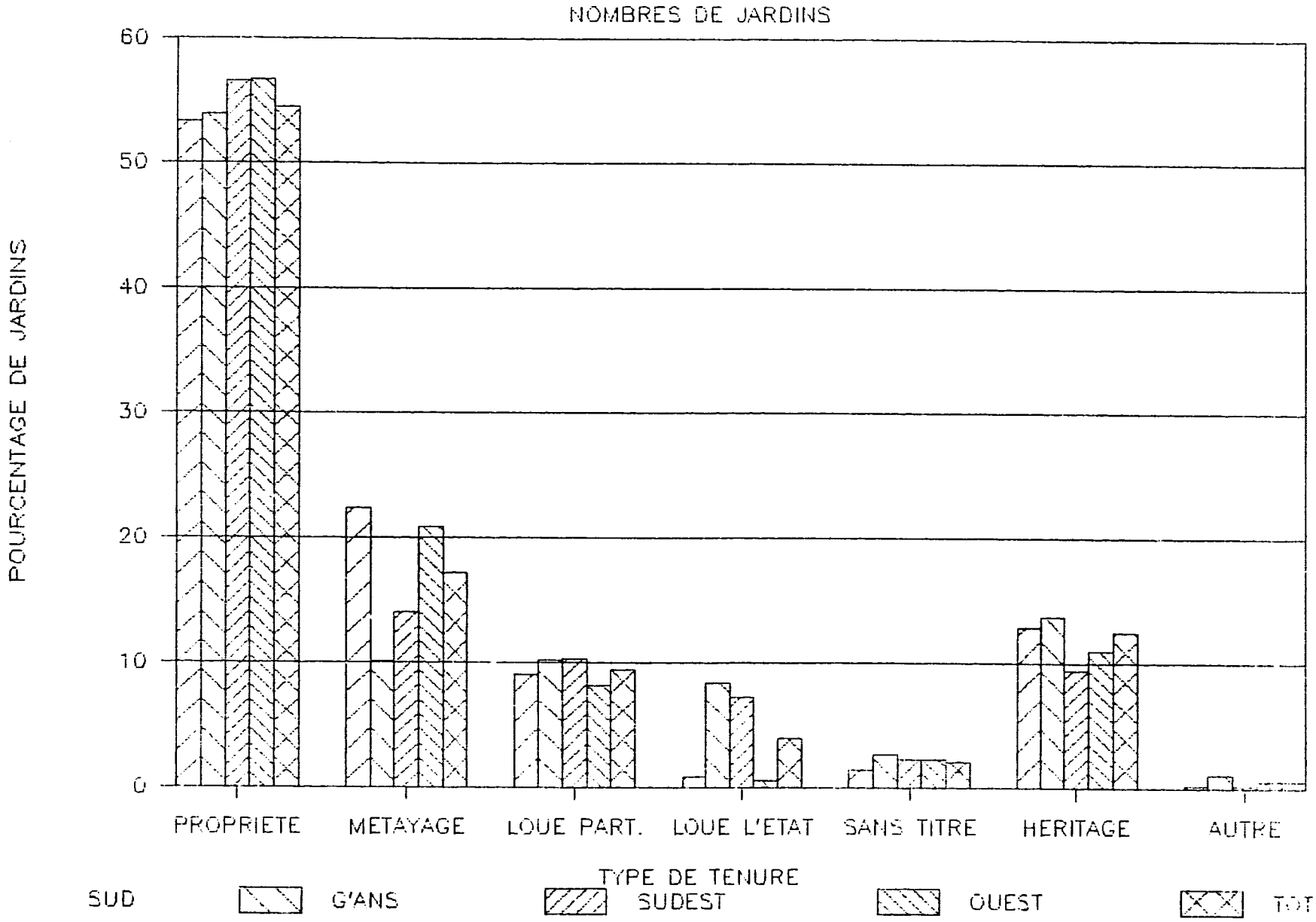


Figure 6

MODE DE TENURE



APPENDIX 1: A GIS PROFILE OF THE FOUR DEPARTMENTS

An area's natural resource base defines the possiblities and imposes limits on agricultural activites. Information concerning the pattern and extent of agricultural activites in the four departments is found above. The information presented below, which is derived from the ADS-II GIS should help the user to better understand and interpret the survey information. The user should be aware that although the picture of the resource base that evolves from studying the graphs for each department is representative of the land area within the departments, the survey information results from the open segment approach. Consequently, the survey information is repesentative of the agricultural households residing within the departments, irregardless of where they may have their land or animals. Although most farmers conduct their agricultural activities near their residence, the GIS and survey department definitions are not strictly consistent in this regard.

The development of the GIS data base is described in ADS-II Report #17, with a detailed example of it's application given in ADS-II Report #25. A small subset of the GIS data was selected for this illustration, including; land use, Holdridge Life Zones and soil potential.

DESCRIPTION OF THE NATURAL RESOURCE DATA BASE

Potentialite des Sols: The information presented was derived from the 1:250,000 BDPA map published in 1982. A description of the of the 19 categories is presented in Tableau A3 followed by a graphic description of the occurance of these categories in the four departments.

Occupation de L'espace: The information provided was derived from the 1:250,000 thematic map developed by the French firm BDPA in 1982. A description of the 51 categories is given in Tableau A1, followed by a graphic description of the occurance of these categories in the four departments.

Holdridge Life Zones: The Holdridge zones were digitized from the 1:250,000 OAS (Organization of American States) map produced in 1973. A description of the Holdridge codes is presented in Tableau A2, followed by a graphic description of the occurance of these categories in the four departments.

DISCUSSION

The agricultural statistics presented above have indicated that the Sud and Grand-Anse account for a very large percentage of all second season agricultural activities found within the four departments. GIS information and analysis is helpful in explaining why this is so. The graphs which accompany the resource variable descriptions describe the total and relative resource endowments

of the various departments. The overall size of the departments range from 4,741 square kilometers in the Ouest to 3,198 square kilometers in the Grand-Anse, 2,574 square kilometers in the Sud and 2,165 square kilometers in the Sud-Est.

Soil potential is one of the most important explanatory variables of agricultural activity. Figure A1 indicates that all departments have large total and relative amounts of erroded, errodable and limited lands. In absolute if not relative terms, the Ouest department has more good to excellent soils while the Sud-Est is the least well endowed.

Land use indicates how the land resources, whatever they may be, are put to use. Figure A2 indicates that in all departments, intensive agricultural uses are common. Of particular interest in this graph are the relative amounts of land dedicated to rice, sugar cane and irrigated agriculture. The extent to which these uses exist and predominate indicates a probable absence of water-stress problems for agricultural crops. The graph indicates that the Sud and Ouest have more of these land uses.

Holdridge Life Zones indicate the general agricultural climates of a region. Rainfall and altitude are the primary classification determinants. The relative and absolute distibution of the Holdridge zones among the four departments in presented in Figure A3. Since rainfall is the most significant constraint to agricultural production during the drier, second agricultural season, the relative endowments of rainforest and, to a lesser extent, very humid zones is of interest. The graph indicates that the Ouest and the Grand-Anse predominate in the rainforest zones while the Grand-Anse and Sud predominate in the very humid zones.

While the above information is necessary for comparing the relative resource bases of the four departments as they relate to agriculture, it is not sufficient by itself to explain differences in levels of agricultural activities among the departments. For example, the GIS profile presented above seems to indicate that more agricultural activity should be present in the Ouest department during the second agricultural season than in any of the other three departments. The statistics presented earlier indicate that the Sud and the Grand-Anse both have much more agricultural activity.

A combined analysis of the resource is required to explain levels of agricultural activities in the four departments. Since it is not the individual layers of information which determine levels of agricultural activity but rather the co-incidence of all three layers. During the drier, second agricultural season, more agricultural activities would be expected in the departments where more good to excellent (or at least, mediocre) soils overlap with sufficient rainfall. The irrigated or other lands not subject to water-stress in the departments should be added to this total to determine the relative areas of "good" agricultural zones.

The GIS software facilitates this type of analysis. Figure A4 and the map on the succeeding page present the results of this analysis and the spatial distribution of the agricultural zones, respectively. The number of hectares in each zone is presented along the Y-axis in Figure A4. The "good" agricultural zones are presented along the X-axis. The zones are defined qualitatively by soil potential and rainfall. Thus, the first zone, (BONNE/BONNE) describes the areas found in each department which possess good to excellent soil potential and good to excellent rainfall (rainforest Holdridge classifications). BONNE/MEDIOCRE describes good to excellent soil potential areas having very humid Holdridge classifications. MEDIOCRE/BONNE are those areas which possess average or mediocre soils and good to excellent rainfall (Holdridge rainforest classifications). MEDIOCRE/MEDIOCRE are those areas having average or mediocre soil potentials and very humid Holdridge classifications. The final IRRIGUEE grouping defines the amounts of irrigated lands and other areas not subject to water-stress derived from the land use GIS file.

The combined analysis presents a more comprehensive comparison of the departments' agricultural resources which is consistant with the statistical information presented earlier. Summing all land areas represented by the agricultural zones in the graph indicates that the Sud is first with some 26,460 hectares, followed by the Grand-Anse (24,300), the Sud-Est (20,300) and the Ouest (17,970).

The map on the page following Figure A4 indicates more highly productive agricultural zones and a greater dispersion throughout the Sud and Grand-Anse. The agricultural zones for the Ouest and Sud-Est are more localized and, in most cases, more isolated thus suggesting another constraint to agricultural activities in these departments.

If only prime agricultural land areas, defined as areas falling into the first, second or last category presented in Figure A4 are considered, the GIS analysis is even more consistent with the statistical results: prime land areas range from 22,300 hectares in the Sud to 18,860 in the Grand-Anse, 13,640 in the Ouest and 4,280 in the Sud-Est. Using these figures as a relative scale of agricultural activity, the GIS analysis supports or at least does not conflict with, the second season survey results.

TABLEAU A1: POTENTIALITE DES SOLS

1	Lacs et Rivieres
2	Excellentes
3	Tres Bonnes
4	Bonnes
5	Moyennes
6	Mediocres
7	Faibles (Erodes)
8	Faibles (Inondables)
9	Limitees (Erodables)
10	Limitees (Sols Salins)
11	Tres Limitees (Forets)
12	Tres Limitees (Sols Salins)
13	Tres Limitees (Rocheux)
14	Excellentes (Plaines)
15	Moyennes (Marecages)
16	Excellentes (Marecages)
17	Tres Bonnes (Collines)
18	Urbaine
19	Unclassified

Figure A1

POTENTIALITE DES SOLS

QUATRE DEPARTMENTS

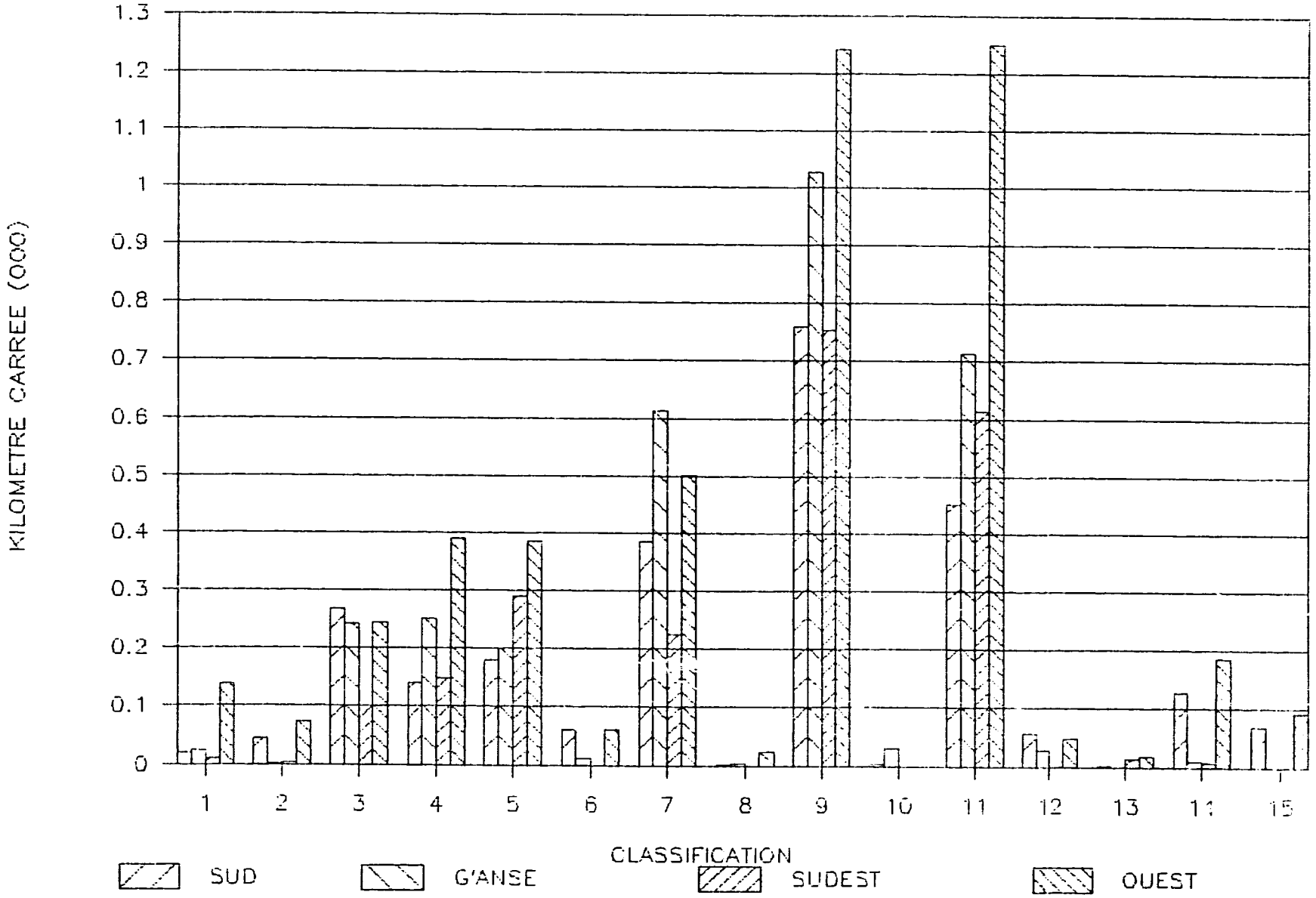


TABLEAU A2: OCCUPATION DE L'ESPACE

1 Lacs et Rivieres
2 Riz
3 Canne a Sucre
4 Cultures Annuelles Irriguees
5 Bannane
6 Sisal
7 Vetyver
8 Cocotier
9 Cultures Arborees Dominates
10 Cultures Arborees Claires
11 Cultures Vivrieres Denses
12 Cultures Vivrieres Moyennement Denses
13 Cultures Vivrieres Dispersees
14 Pasturage Extensifs Dominants
15 Rack Bois
16 Savanes Arbustives Denses
17 Savanes Arbustives Claires
18 Savanes Arbustives Tres Claires
19 Feuillus Denses
20 Feuillus Clairs
21 Feuillus Tres Clairs
22 Pins Denses
23 Pins Clairs
24 Pins Tres Clairs
25 Salins
26 Lits De Rivieres, Alluvions Grossieres
27 Zones Steriles De Bord De Mer, Sols a Nu
28 Afflevrements Rocheux
29 Mangroves On Marais
30 Cultures Arborees Dominates et Feuillus Tres Clairs
31 Ville
32 Cultures Arborees Dominates et Feuillus Clairs
33 Cultures Arborees Claires et Feuillus Tres Claires
34 Cultures Arborees Claires et Pasturage Extensifs Dominants
35 Cultures Arborees Claires et Cultures Vivrieres Dispersees
36 Cultures Vivrieres Moyennement Denses et Savanes Arbustives Tres Claires
37 Cultures Vivrieres Moyennement Denses et Zones Steriles De Bord De Mer, Sols a Nu
38 Cultures Vivrieres Moyennement Denses et Rack Bois
39 Cultures Vivrieres Dispersees et Rack Bois
40 Cultures Vivrieres Dispersees et Feuillus Clairs
41 Cultures Vivrieres Dispersees et Feuillus Tres Clairs
42 Cultures Vivrieres Dispersees et Savanes Arbustives Tres Clairs
43 Cultures Arborees Claires et Feuillus Clairs
44 Cultures Vivrieres Moyennement Denses et Pins Tres Clairs
45 Cultures Vivrieres Moyennement Denses et Savanes Arbustives Clairs
46 Cultures Vivrieres Moyennement Denses et Pins Tres Clairs
47 Savanes Arbustives Denses et Feuillus Tres Clairs
48 Feuillus Clairs et Pins Clairs
49 Cultures Arborees Claires et Savanes Arbustives Clairs
50 Cultures Vivrieres Denses et Savanes Arbustives Clairs
51 Cultures Vivrieres Dispersees et Savanes Arbustives Clairs

Figure A2

L'OCCUPATION DE L'ESPACE

QUATRE DEPARTEMENTS

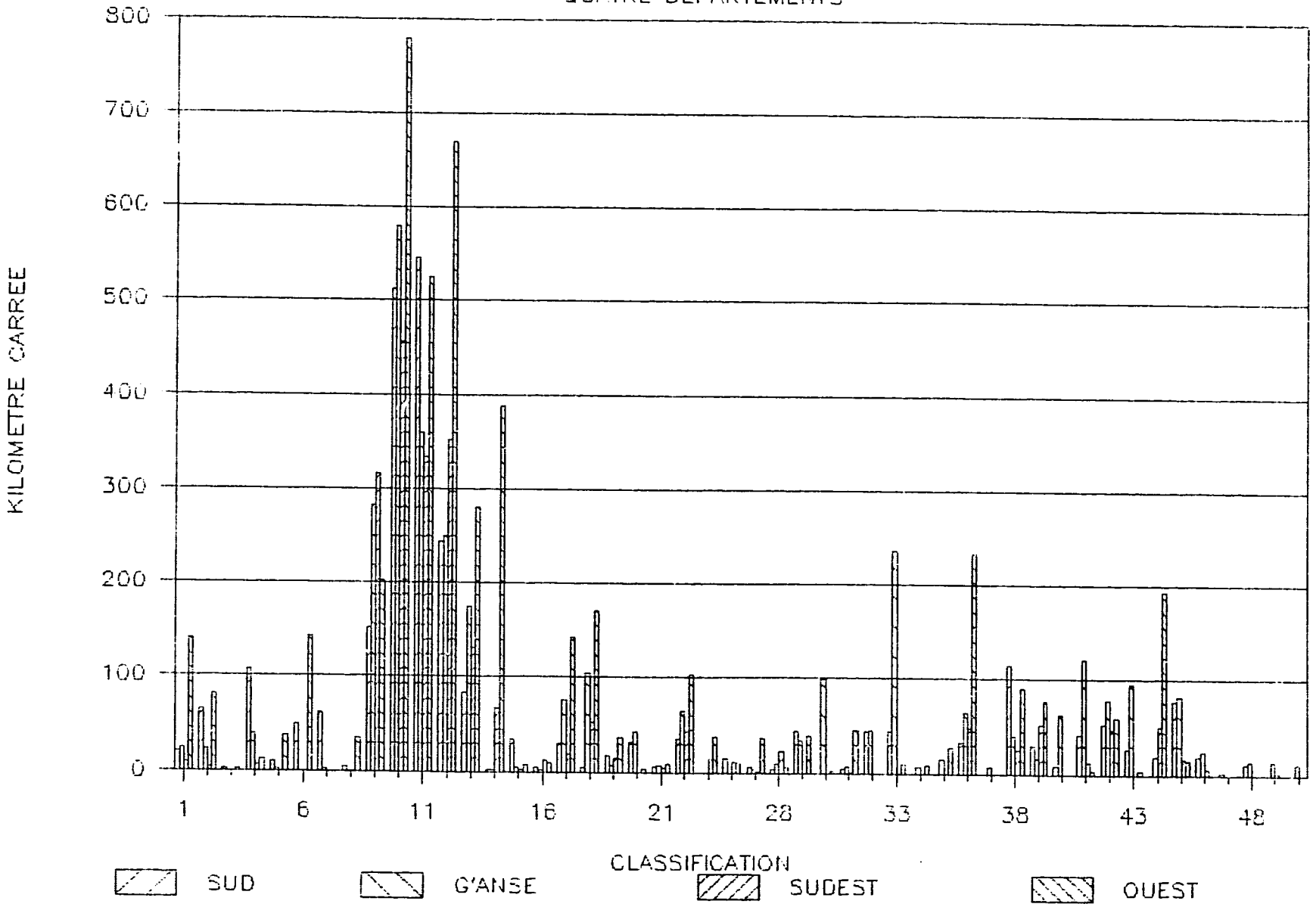


TABLEAU A3: CLASSIFICATION AGRO-ECOLOGIQUE DE HOLDRIDGE

1 Haute altitude, zone montagneuse très humide. Plus de 2000 mètres, forêts de pins.

2 Basse altitude, zone montagneuse, forestière, pluviale.

3 Basse altitude, zone montagneuse, forestière, pluviale 800-2000 mètres.

4 Basse altitude, zone montagneuse, humide, forestière entre 800 et 2000 mètres.

5 Zone forestière, pluviale, sous-tropicale.

6 Très humide, zone forestière sous-tropicale.

7 Humide, zone forestière sous-tropicale.

8 Forêt séeche, sous-tropicale, basse altitude, gènèralement au-dessous de 400 mètre. Diverses variètes de cactus.

9 Tempête sous-tropicale, zone forestière. Partie très restreinte et la plus aride du pays. Près de Gonaives.

Figure A3

ZONES AGRO-ECOLOGIQUES DE HOLDRIDGE

QUATRE DEPARTMENTS

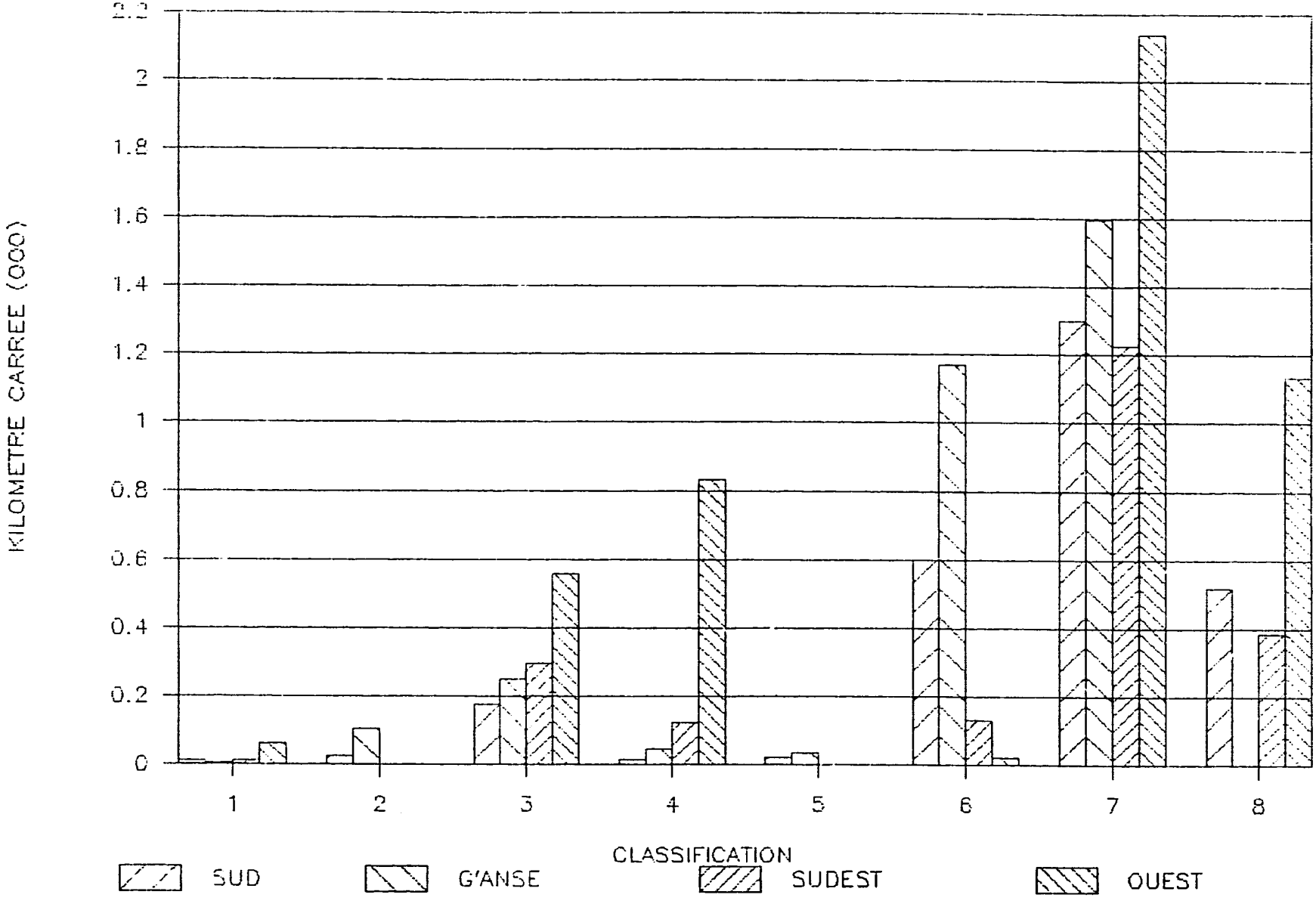
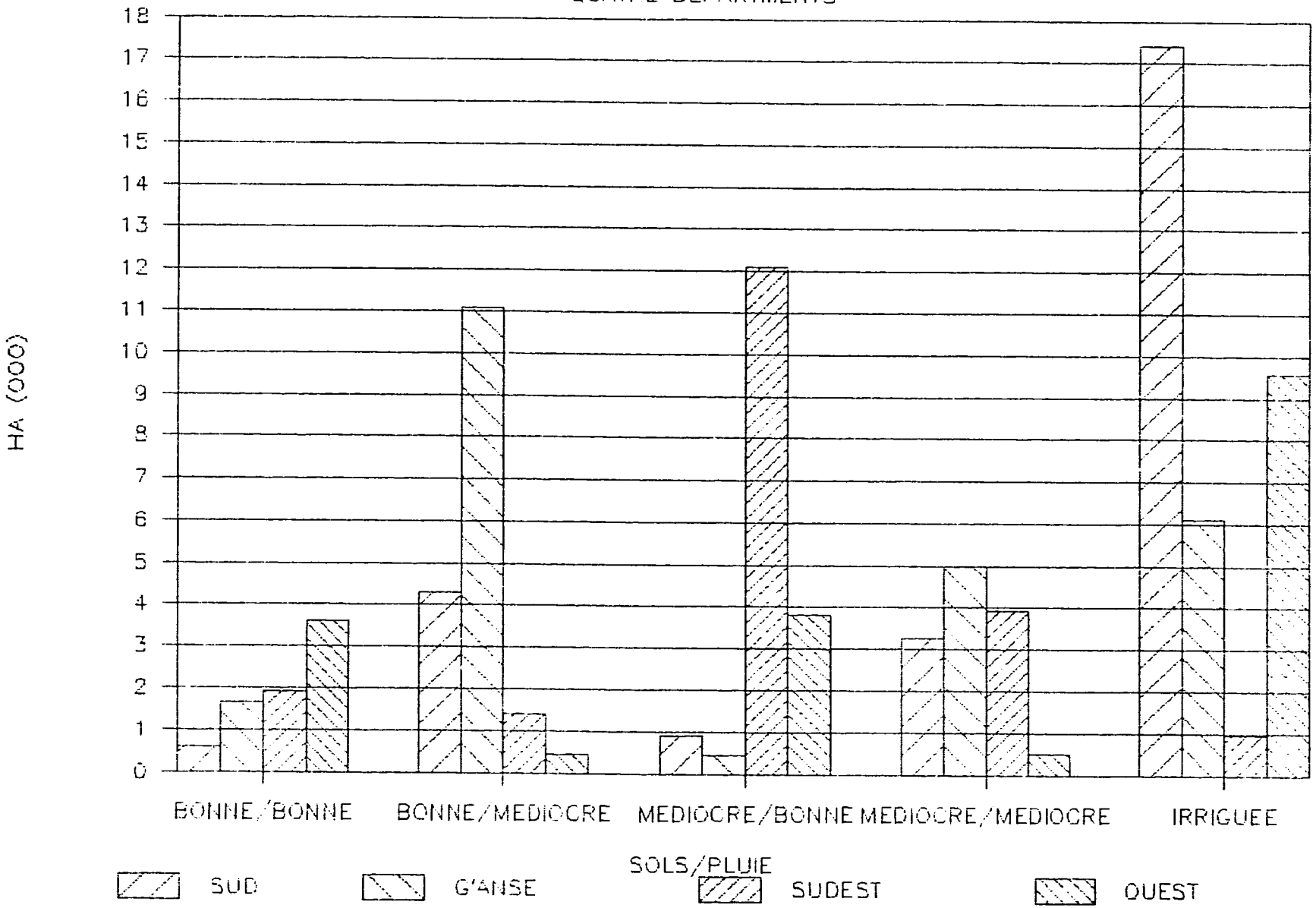
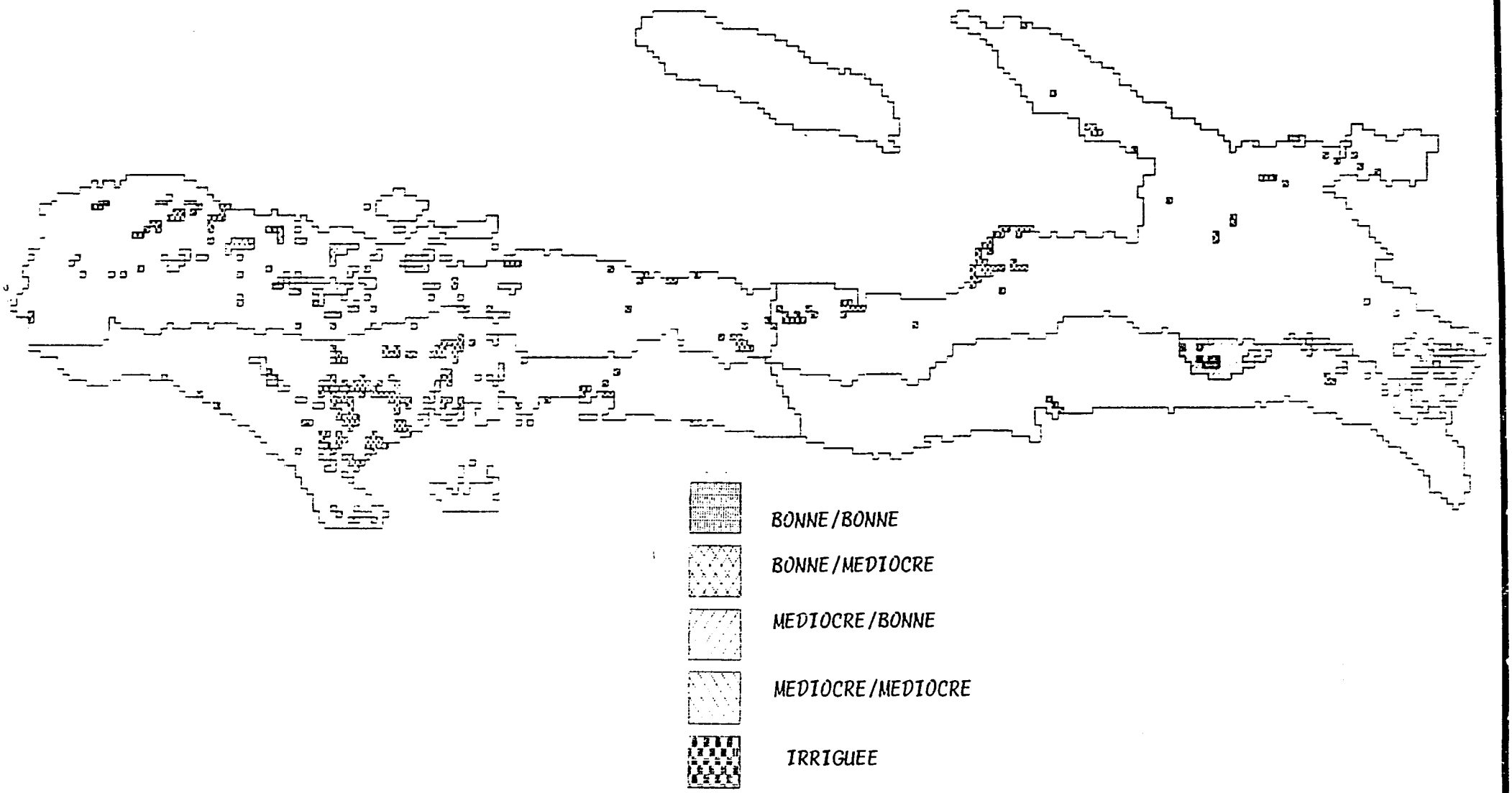


Figure A4

COMPARAISON DE ZONES AGRICOLES

QUATRE DEPARTMENTS



ZONES AGRICOLES