African Studies Centre
University of Leiden
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Applied Research Unit
Ministry of Local Government
and Lands
Republic of Botswana

RESEARCH PROJECT: 'THE GROWTH OF URBAN SOCIETY IN FRANCISTOWN'

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A PRELIMINARY QUANTITATIVE ANALYSIS OF PLOT 'OWNERS' IN THE PWD SQUATTER AREA, FRANCISTOWN, 1989

first draft

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1. INTRODUCTION

1.1. PWD in Francistown

In 1988 Mrs. Lungie Molamu of the Applied Research Unit (ARU), Ministry of Local Government and Lands, Republic of Botswana, carried out the Francistown Phase IV Development Area Study, commissioned by the Francistown Town Council, and aimed at assessing the socio-economic conditions and particularly the affordability levels of the people who, (as squatters on urban land, or as inhabitants of upgraded urban areas) are to form the bulk of the inhabitants of the new Phase IV Development of Francistown. During a preparatory visit in May 1988, on which Wim van Binsbergen was fortunate to accompany Mrs. Molamu, the Francistown Principal Housing Officer Mr. M. Maje drew our attention to the PWD squatter area. In that connexion the area's striking features already were brought out clearly: with its twenty-odd years one of the oldest of Francistown, adjacent to the Government Camp area where many governmental and municipal services are concentrated, perched against the southwestern slopes of the Nyangabwe Hill that dominates the skyline of the town, with high levels of overcrowding, but also with a remarkably stable and rather well-employed population, including an original core of people who came to the town in the 1960s not as job seekers but as employees of various government departments, outstanding among which was the Public Works Department (PWD) from which the squatter area borrowed its name. In Mrs. Molamu's first draft report[1] considerable attention is paid to PWD, set within the context of a large number of other Francistown areas, and skillfully analysed within the overall context of the history of growth and planning of the town and of the many economic, policy and engineering dilemmas which presented themselves in the process. However, out of a total sample of 500 Mrs. Molamu's survey could inevitably cover only a limited number (c. 30) of inhabitants of PWD, and her empirical pronouncements on that squatter area were therefore unlikely to be meant to be conclusive.

When in the course of 1988 Wim van Binsbergen became an associated researcher with the Applied Research Unit, with a specific sociological research project on 'the growth of urban society in

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[1] L. L. Molamu, First Draft Report on Francistown Phase IV Development Area Study, Gaborone: Applied Research Unit, 1989, 84 pp. We are grateful to the author for making this report available to us at an early stage.

Francistown', PWD continued to attract the attention of his project, largely because the striking and possibly unique sociological features of that squatter area were likely to disappear soon. The area was due for rationalization in early 1989. No unanimity had yet been attained among the various parties involved (the Francistown Town Council, the Department of Town and Regional Planning, the Applied Research Unit, the inhabitants of PWD and its Ward Development Committee, and the Councillor for Government Camp in whose ward PWD finds itself — Mr. Suping Poifo). Yet is was clear that the apparently closely-knit social system of PWD, as it had established itself over more than twenty years, would be effectively uprooted by whatever form the rationalization exercise would take. In her draft report, Mrs. Molamu acknowledged that

> 'The upgrading of PWD and Masemenyenga[2] have always been controversial as the areas are cliff hangers because the influence the sizes of political wards.' (Molamu p. 21f)

This however did not deter her from stating, at considerable length and convincingly, the case against any extensive upgrading of PWD as a residential area, laying particular stress on the rocky soil conditions, steep gradients and hydrological position of the area (its being adjacent to the Inchwe river, a tributary to the Tati river) which would mean that any acceptable upgrading of this area would be far more expensive (from the point of view of public finance, that is; the costs, for the individual residents, of being removed are a different matter) than moving the fast majority of its present population to the new plots envisaged in the Phase IV Development (Molamu p. x-xii). For the future of PWD she sees a number of non-residential alternatives: a park, small-scale industries, or a school.

Qualitative research by the present writers in 1988-89 revealed that these and similar official views, however well-founded, do not reflect the perceptions and preferences of all inhabitants of PWD, nor could this expected to be the case. People (especially those 50% who have lived in PWD for 6.5 years or more) are attached to their area, identify with it, find it conveniently located near their places of work and central urban services, and are loath to move to a new site unless the latter is located very near the present site of PWD. On the other hand, many welcome the opportunity of acquiring a more secure plot, and those having invested in their present mized and especially

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[2] Another squatter area at the southwest periphery of Francistown.

permanent structures in PWD cherish expectations of compensation for their eventual demolishment.

With the national elections being scheduled for October 7, 1989, the rationalization exercise of the area has been limited, so far, to the conspicuous numbering of all plots and the detailed registration (called 'squatter inventory PWD') of all plot 'owners', i.e. squatters.[3] This exercise was undertaken in end April - begin June 1989, by the officers of the Monarch[4]-based SHHA (Self Help Housing Agency) office, which resorts under the Housing Department of the Francistown Town Council. In the process, some twenty plots which were deemed to be of too recent occupancy by the officers were not numbered, their owners not registered, and (check) the structures in question destroyed. Subsequently an additional number of structures (perhaps another twenty) were destroyed around June-August 1989, in the course of an exercise which in principle has nothing to do with the rationalization of the area: the digging of deep trenches right through the built-up area of PWD, in order to accommodate a new pipe line for drinking water leading from the central reservoir on Nyangabwe into Monarch township.

The extent to which people see the imminent rationalization of PWD as a means to secure a COR[5] plot elsewhere in Francistown is clear from the observation that as late as March 1989, when the numbering of the structures in PWD had been duly announced, a number of 'Potyemkin'[6]-like structures could be seen to be erected along the highest slopes of PWD: cheap, ephemeral and badly built, but out of would-be durable materials including zinc roofing so that the result might qualify at least as a 'mixed' structure if not as a permanent one.

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[3] In order to avoid awkward phrasing, henceforth the term 'plot owner' will be used indiscriminately to denote owners of structures squatting on the PWD land, regardless of the legal imprecision such a term implies.

[4] Another Francistown housing area, to the northwest of PWD, across the Inchwe stream.

[5] COR = Certificate of Rights, a specific form of extensive and secure use right on residential plots, as developed in the context of SHHA.

[6] The name of a boat which, through cunning application of cardboard structures, was to look as an ironclad man of war, in Eisenstein's classic film of the same name.

Some small contractors are reputed to specialize in this type of 'Potyemkin' housing, to be built virtually overnight.

1.2. the present research and report

So far the imminence of the national elections have delayed the hour of truth for PWD, for a sufficient time to enable Ellen Krijnen, an M.A. student from the Netherlands, to join her supervisor Wim van Binsbergen, under an extension of his association with the Applied Research Unit, for three months, with the specific task of studying the history and social organization of PWD largely on qualitative lines, through open-ended interviews. She will report on her qualitative findings elsewhere. Meanwhile her contacts with the Monarch SHHA office have given us access to the survey which the SHHA officers undertook among all (but twenty) plot owners of PWD in April-June 1989. In a search for quantitatively-assessed patterns whose assessment was to guide Miss Krijnen's subsequent qualitative explorations, the present report offers a statistical analysis of this survey, which so far was left unanalysed by the SHHA personnel.

The division of labour towards this report was as follows. The original raw data were collected by SHHA officers and made available through Miss Krijnen, who also ascertained the methodological principles on which the enumerators had selected their respondents and on which they had scored the original data. Likewise, Miss Krijnen completed the tedious task of locating all 260 plots in the data set onto a finely-meshed grid, a condition for the spatial projection of the variables as part of the analysis. Data entry was done by both authors, while the devising of a data entry structure, the programming of the data manipulation particularly with regard to the spatial analysis, the statistical analysis itself, and the writing-up, was the contribution of Wim van Binsbergen, partly on the basis of ideas which developed between the authors as the work progressed.

In this report our aim is to assess quantitatively some salient sociological characteristics of PWD such as it presented itself in April-June 1989. Whatever the future of the social system that constitutes PWD, we feel it is relevant to record these characteristics, particularly since they may turn out to disappear soon. It is not our intention to mix in the debate concerning the policy alternatives proposed for PWD. Yet the presentation, in this report, of empirical data not generally known and not immediately obvious from a cursory visit to or qualitative analysis of the area, might contribute elements to the discussion which will enrich it and make its final outcome all

the more acceptable to all concerned.

The present version does not pretend to be more than it is called: a first draft. The analysis is still in an inchoate state, and many of our formulations bear on the one hand the mark of haste, on the other manifest only too clearly that we are still groping to make sense of our data. But that is how a first draft should be, inviting comment from colleagues so as to improve further, ultimately publishable versions.

1.3. acknowledgments

Meanwhile we would like to register our indebtedness to the Ministry of Local Government and Lands, and specifically its Applied Research Unit, for accommodating us as researchers; ARU's Mrs. Lungie Molamu for enthusiastically sharing her insights in Francistown urban development and PWD in particular; to the Francistown Town Council and particularly the Principal Housing Officer and his co-workers within SHHA for untiring assistance and advice; to the African Studies Centre, Leiden, and the DSO organization, the respective sponsors, in the Netherlands, of the authors' research; to the people of PWD, their Councillor and their WDC, for patience and trust; to Miss Kakale Godie for assistance in interpreting; to Patricia van Binsbergen for creating, in the midst of a SHHA housing area, favourable domestic conditions for our statistical explorations; to Apple Computers, Jasmine and Northwestern University, USA, for giving us, in SYSTAT, an amazingly flexible and flawless statistics programme on Macintosh and Jasmine Megadrive, capable of handling relatively large data sets and of braving the dust storms and incidental power cuts of Francistown; and to Rudo Niemeijer for suggesting and partly providing this combination of computer tools.

2. THE SURVEY

The circumstances under which the data were collected have been described above. The data set consists of 260 cases. This includes the plots structures on which were subsequently destroyed for the construction of the pipe line, but excludes about 20 plots with the most recent structures. There was no way of adding, a posteriori, the latter cases to the data set.

The respondents in the target group of the SHHA officers were

— 1. heads of households residing in PWD and claiming to be 'owners' of

their plots, or
— 2. people claiming to be the owner of a plot in PWD, not themselves residing in PWD but renting out their structures in PWD to others.

There is good reason to assume that virtually the entire target population was actually covered by the survey: first because of the commendable zeal of the SHHA officers, but also because of the obvious interests of the plot owners involved: in the latter’s eyes, inclusion in the PWD squatter inventory meant a likely chance to acquire a SHHA plot (one of the most coveted objectives in urban live in Botswana today), and possibly also compensation for structures to be demolished in the course of the upgrading exercise.

The data, in other words, were not in the first place collected to get an adequate sociological insight in the actual population of heads of households in PWD, including tenants, but was more administratively orientated: it sought to identify those people who, as plot ‘owners’ in PWD, whether actually residing there or not, would have to be considered for the allocation of a residential plot and perhaps for compensation when the PWD structures would be demolished.

As a result the 260 respondents in the data set do not form one totally consistent category: the vast majority would be actual inhabitants of PWD, but a small minority would be absentee landlords dwelling elsewhere in Francistown. Unfortunately the data do not allow us to ascertain who were the absentee landlords and in which other township than PWD they were residing. There is some slight indication that those few plot owners claiming to derive part of their income from rent are the absentee

landlords.[7] Qualitative impressions from PWD suggest that the number of absentee landlords is not entirely negligible but does not exceed as few percent of the actual plots. This is at variance with Molamu's claim (Molamu 1989: 13) of PWD as a township characterized by absentee landlords, and renting. Our view to the contrary is in line with the finding, in the present data set, that only very few people claim to rent out their structures to others;. In other words, the data set is not an entirely reliable reflection of the set of heads of households actually dwelling in PWD: a few PWD tenants find themselves excluded from the data set, a few absentee landlords outside PWD find themselves included. Considering however the large number of respondents, and the great consistency in the data set which intensive statistical analysis has revealed, we suggest that this relative contamination of the data set is comparatively unimportant. The picture which emerges from our quantitative analysis is very likely to be a rather adequate, albeit not totally reliable, reflection of the actual socio-economic patterns of heads of households in PWD.

The administrative orientation of the data collection meant that obvious sociological questions, such as concerning family composition, marital status, ethnic affiliation, educational level, etc., were not included at first. Our data set does not reveal anything about the non-heads of household, both adults and youths, living in PWD. That marital status was not recorded does not seem to be such a regrettable omission, since from other experiences and discussions[8] we have

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[7] A Mann-Whitney U test was done on the total income (TOTINCO) with income from rent or not (FORENT) as a grouping variable, and the landlords turned out to have a significantly higher income, which might suggest a different socio-economic milieu and by extrapolation perhaps another township.

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group   count    rank sum          average rank
                 of total income   of total income
1         8       1445.5           180.69          income from rent claimed
2       247      31194.5           126.29          no such income claimed

5 missing cases
Mann-Whitney U = 1409; p = .04, assuming chi square distribution with df
= 1.
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[8] E.g. W. van Binsbergen, Housing procedures and urban social patterns: A preliminary statistical analysis of applications for site-&-service (SHHA) plots in Francistown in the years 1984–1988, draft report, ARU/ASC, Francistown, 1989, 75 pp.; espec. p. 10f.

reason to assume that the many shadings of conjugal and sexual relationships in urban Botswana are not likely to be adequately recorded in an administrative context. Ethnic affiliation and village home ties will turn out to play a very major role in the social structure of PWD. Fortunately, although the respondents ethnic affiliation was not explicitly recorded, his or her village home was, and despite the increasing ethnic heterogeneity of rural communities in Botswana due to migration (particularly the influx of formal-sector employees from all over the country), we considered it admissible to conjecture a respondent's ethnic affiliation from the village home according to the details given in appendix table 8.2.

As usual, the raw data as entered contained many omissions resulting in missing values on the variables concerned, and occasional inconsistencies. One somewhat recurrent inconsistency, reflecting the respondents' and/or interviewers' lack of skill in mental arithmetic, was that for respondents who claimed to have lived elsewhere in Francistown prior to settling in PWD, the total number of years of claimed residence in Francistown was less than the sum of the number of years of claimed residence in the previous township and the number of years of claimed residence in PWD.[9] In those cases we have adjusted the raw data to the effect that

RESFTOWN = PREVRES + RESPWD.

In all cases the alteration seemed to make sense and amounted to only a few years anyway.

The enumerators used a simple open-ended list of questions for entering the raw data. The questions were not pre-coded. Therefore our first task was to devise a pre-coded data entry form as in Appendix 8.1. Adapting and expanding the form and the coding values as the data were entered into the computer, the final version as presented here reflects all the different values of the variables as found in the data set. On one point, however, we decided to reduce the number of different values as found in the data set: the raw data specified each individual employer, which led to over thirty different categories, most of which occurred too sparsely to make statistical analysis meaningful. Instead, the

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[9] In terms of the abbreviated variable names used in statistical analysis:

RESFTOWN < PREVRES + RESPWD

following division of employers was imposed:
— central government
— Francistown Town Council
— private formal sector (industry, commerce, services)
— domestic labour.

Of course the data were thoroughly checked and cleaned. manually after entry and before analysis.

3. OVERVIEW OF THE VARIABLES IN THE DATA SET

3.1. variable PLOTNO

(respondent's plot number as assigned by SHHA officers in the course of the PWD squatter inventory exercise, April-June 1989).

This variable is self-evident. It mainly served for the identification of cases. In the factor analysis (chapter 5) we shall see that the numerical value pf the plot number has a considerable time aspect, in other words it correlates with the length of residence in PWD. Why this should be so we cannot say: spatial projection of length of residence (see below, section 4.2) does not reveal a clear-cut pattern — apart from the old central core of the township one cannot identify any section, in its entirety, as older or more recent. For later immigration has been more on an individual basis, and new arrivals have inserted themselves here and there without giving rise to clearly marked growth areas within the township.

3.2. variable SEX

(gender of respondent)

COUNT	CUM COUNT	PCT	CUM PCT	SEX (code)	
143	143	55.0	55.0	1	male
117	260	45.0	100.0	2	female

N.B.: CUM = CUMULATIVE

There were no missing cases. It is remarkable that the majority of plot owners should be male (55%) rather than female. Both the 1981 census and Mrs. Molamu's data on Francistown claim a preponderance of women among heads of households. It is unlikely, however, that our present finding is an artifact. Rather, we would interpret it as the outcome of a combination of factors:
— First, the slight male preponderance can be interpreted in the light of the special history of PWD as primarily the makeshift dwelling place of male government workers involved in manual or skilled labour for such departments as Public Works, Water Affairs, etc. — many of whom would spend weeks at a stretch on assignments in the field outside Francistown and therefore might not qualify for institutional housing nor be inclined to invest in more than the minimum housing requirement for the limited periods of their stay in Francistown itself. The high

preponderance of people in salaried employment also points to a male preponderance in the township, as we shall see.
— Secondly, it is possible that the shift from female to male plot ownership, as an effect of inter-gender manipulation or intimation (cf. Molamu 1989: p.) can be seen at work here, in other words: that plots actually occupied and built-up by a woman are yet, in the squatter inventory registration, claimed to be 'owned' by men associated with these women as either sexual/conjugal partners or close male relatives;
— Finally, there may be some slight effect from the contamination of the sample with absentee landlords; we have no means of ascertaining how many of those will be male.

3.3. variable VILLHOME

(village home of respondent)

among the 260 respondents, 76 different village homes were recorded; the information was missing in 8 cases. Of the 76 different village homes, 42 occurred only once. The ten most frequently recorded place names were:

COUNT	VILLHOME (code)	NAME
6	2	Borolong
6	82	Senyave
7	16	Kalamare
7	96	Tlokweng
8	1	Bobonong
10	47	Mochudi
16	28	Mahalapye
17	40	Mathangwane
23	83	Serowe
34	98	Tonota

Most PWD heads of households hail from the Central District (156 cases or 62%). Follows the North East District with 84 cases (33%). Smaller numbers originate from Kgatleng (10 cases or 4%), South East (8 cases or 3%), Southern (5 cases or 2%), Ngamiland (3 cases or 1%), Ghanzi (2 cases or 1%), Kalahari (2 cases or 1%) and Kweneng (1 case or 0.4%).

3.4. variable EMPLOYME

(respondent's employment status)

COUNT	CUM COUNT	PCT	CUM PCT	EMPLOYME (code)	
30	30	11.5	11.5	1	unemployed
56	86	21.5	33.1	2	self-employed
169	255	65.0	98.1	3	employed
5	260	1.9	100.0	4	employed+self-employed

There were no missing cases. It is remarkable that the majority of cases (174 or 66.9%) was in salaried employment, while only 30, or 11.5%, where neither employed nor self-employed. The PWD heads of households, by and large, certainly do not lack a source of stable if modest income. The popular stereotype of squatters as unemployed (and hence prone to be involved in illegal forms of income generation) is not confirmed; this same seterotype was likewise rebuked by Molamu (1989).

3.5. variable EMPLOYER

(respondent's employer)

COUNT	CUM COUNT	PCT	CUM PCT	EMPLOYER (code)	
88	88	52.4	52.4	1	government
8	96	4.8	57.1	2	Francistown Town Council
49	145	29.2	86.3	3	private formal sector
23	168	13.7	100.0	4	domestic labour

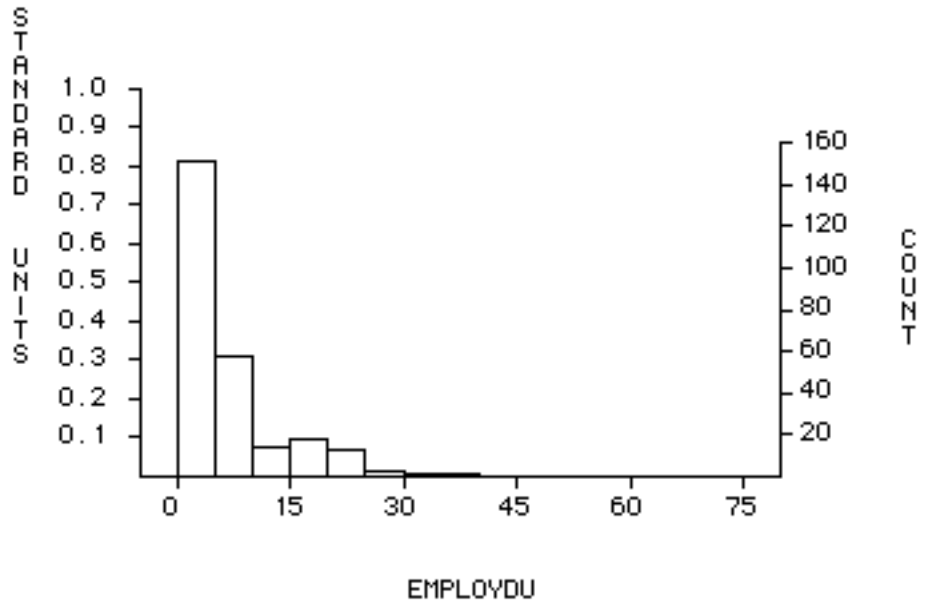
92 missing cases, mainly cases where the EMPLOYER variable was not applicable: people who were not employed and therefore had no employer. The high preponderance of government workers (88 or 52.4% of the employed PWD population), to which again has to be added the number of Council employees (8 or 4.8% of those employed) points again at the history of PWD as originally a makeshift dwelling place of government workers. At the same time it is clear that other categories of employment have been attracted in considerable numbers: private formal sector (49 or 29.2%) and domestic labour (23 or 13.7%).

3.6. Variable EMPLOYDU

(respondent's duration of employment)[10]

[10] The raw data give both years and months of employment; the months were converted by a simple formula to be added to the

There were 4 cases missing. The duration of employment was 0 years in 82 cases: these are the unemployed and the self-employed. The histogram shows the distribution of this continuous variable:



X-AXIS IN YEARS; 4 CASES WITH MISSING VALUES EXCLUDED FROM PLOT[11]

3.7. variable INCOME

(respondent's claimed monthly income from salaried employment)

There were no missing cases. As many as 84 cases claimed to have no income from employment. The histogram shows the distribution of this continuous variable

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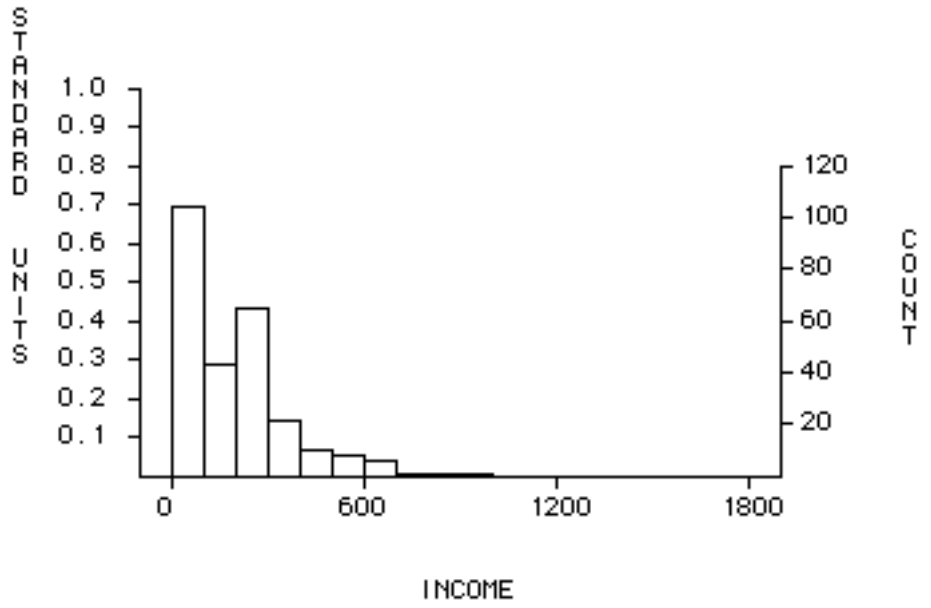
years:

LET EMPLOYDU = EMPLOYDU +(MOEMP)/12

where MOEMP is the number of month in employment. The same operation was performed for the other duration variables to be discussed below: RESFTOWN, PREVRES, and RESPWD.

[11] The first bar to the left is, of course, inflated with 82 unemployed cases where EMPLOYDU = 0. In a later version a new plot could be presented omitting these 82 cases.



X-AXIS IN PULA/MONTH; 0 CASES WITH MISSING VALUES EXCLUDED FROM PLOT[12]

Another way of looking at the income from salaried employment variable is by dichotomizing it: those who have, and those who do not have, such employment. This is the variable FORMINC, with the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	FORMINC (code)	
176	176	67.7	67.7	1	yes, formal sector income
84	260	32.3	100.0	2	no formal sector income

Of the cases, 40% earns less than P100 from salaried employment; 24.2% earns between P100 and P200; 22% between P200 and P300; 11.1% between P300 and P600; and finally 1.2% between P600 and P925. In other words, 60% earns more than P100 from salaried employment alone. The level of poverty in PWD is relatively low and does not confirm the popular stereotype of squatter areas as conglomerates of destitutes. The distribution of income from salaried employment is fairly smooth, with however a peak of 22% between P200 and P300. This is remarkable since the legal minimal wage in Francistown (which is very popular among the local employers) stands

[12] The first bar to the left is, of course, inflated with more than eighty unemployed cases where EMPLOYDU = 0. In a later version a new plot could be presented omitting these cases.

only at P160 per month. In fact, 26.2% of the heads of households have what we could call a medium-range income of between P100 and P300. The peak therefore could be explained by a combination of the employees' age, years of service, and accumulated skills. Again, PWD situates itself not at the bottom of the social structure of Francistown, but at some intermediate layer.

3.8. Variable INCOSO

(respondent's claimed monthly income from other sources, not including employment, rent or self-employment).

These sources of income will be remittances from migrant workers, other financial contributions from relatives, and proceeds from the respondent's share in agricultural assets located in the rural areas.

COUNT	CUM COUNT	PCT	CUM PCT	INCOSO (Pula)
242	242	94.9	94.9	0.00
1	243	.4	95.3	30.00
3	246	1.2	96.5	40.00
2	248	.8	97.3	50.00
1	249	.4	97.6	90.00
3	252	1.2	98.8	100.00
2	254	.8	99.6	200.00
1	255	.4	100.0	680.00

So 242 respondents did not claim such other sources of income, while the information was missing for 5 cases. For the other 13 cases, income from other sources ranged from P30 to P680 per month. The latter figure appears to be an exaggeration. The limited number of those heads of households in PWD claiming such income from other sources is remarkable.

Another way of looking at the income from other sources variable is by dichotomizing it: those who have, and those who do not have, such sources of income. This is the variable FOROSO, with the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	FOROSO (code)	
13	13	5.1	5.1	1	yes, income from other sources
242	255	94.9	100.0	2	no income from other sources

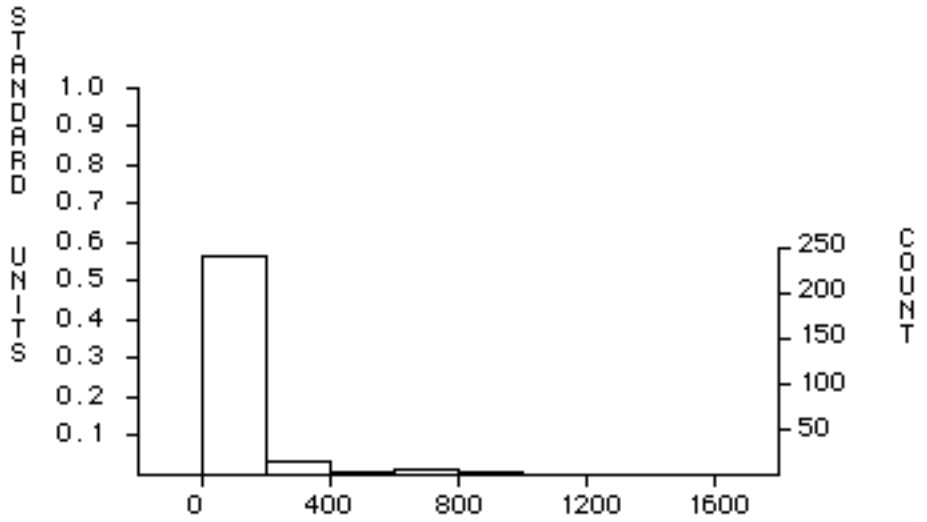
Of the cases, 94.9% claims to have no income from 'other sources'. This implies a relative independence, among these heads of household, from relatives and (in the case of female-headed households) from husband or male sexual partners in general. Such independence also reflects on the nature and quality of the ties between these heads of household, and their home village: while the quantitative data analysed here do not allow us to go into detail, the paucity of fiancial support from relatives and from rural sources suggests that, among the majority of the heads of households of PWD the ties with the home village have lessened, leading to an increasingly urban identity.

This however does not mean that ethnic chains of mobilization and support have deteriorated; we shall see them at operation elsewhere in this report. However, these ethnic patterns serve goals defined in the modern urban economy and society rather than referring back to the village: they revolve on people's differential access to residential and employment opportunities in Francistown.

3.9. variable INCOSELF

(respondent’s claimed monthly income from self-employment)

200 cases did not claim any income from self-employment. There were no missing cases. For the remaining 60 cases, claimed income from self-employment ranged from P5 to P900 per month. The histogram shows the distribution of this continuous variable. Again, the left-hand bar of the histogram is inflated, now with even 200 cases of valu 0; i a later version a new plot cold be presented omitting these cases.



Another way of looking at the income from self-employment variable is by dichotomizing it: those who engage, and those who do not engage, in self-employment. This is the variable FORSELF, with the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	FORSELF (code)	
60	60	23.1	23.1	1	yes, income from self-employment
200	260	76.9	100.0	2	no income from self-employment

Of the cases, 23.1% claimed an income from self-employment. The majority of these cases earn only between P5 and P100 from this

source of income. For women, self-employment opportunities in PWD consist primarily of the selling of chibuku[13] and sewing. For men, self–employment mainly consists in construction work, for which there is an expanding market in Francistown.

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13 A manufactured brew emulating traditional beer, and sold in one-liter cartons. For the individual sellers, profit margins on each carton are only a few thebe (P1 = 100 thebe), and the number of beer sellers is so large that the majority only derive a very marginal source of income from it.

3.10. variable INCORENT

(respondent's claimed monthly income from rent)

COUNT	CUM COUNT	PCT	CUM PCT	INCORENT (Pula)
251	251	96.5	96.5	0.00
1	252	.4	96.9	20.00
1	253	.4	97.3	50.00
1	254	.4	97.7	55.00
1	255	.4	98.1	60.00
1	256	.4	98.5	70.00
1	257	.4	98.8	75.00
1	258	.4	99.2	90.00
1	259	.4	99.6	95.00
1	260	.4	100.0	180.00

There were no missing cases. Only 9 cases claimed to have income from rent, ranging from P20 to P180 per month. Perhaps these are largely the absentee landlords but we cannot be sure of this.

Another way of looking at the income from self-employment variable is by dichotomizing it: those who engage, and those who do not engage, in self-employment. This is the variable FORSELF, with the following distribution:

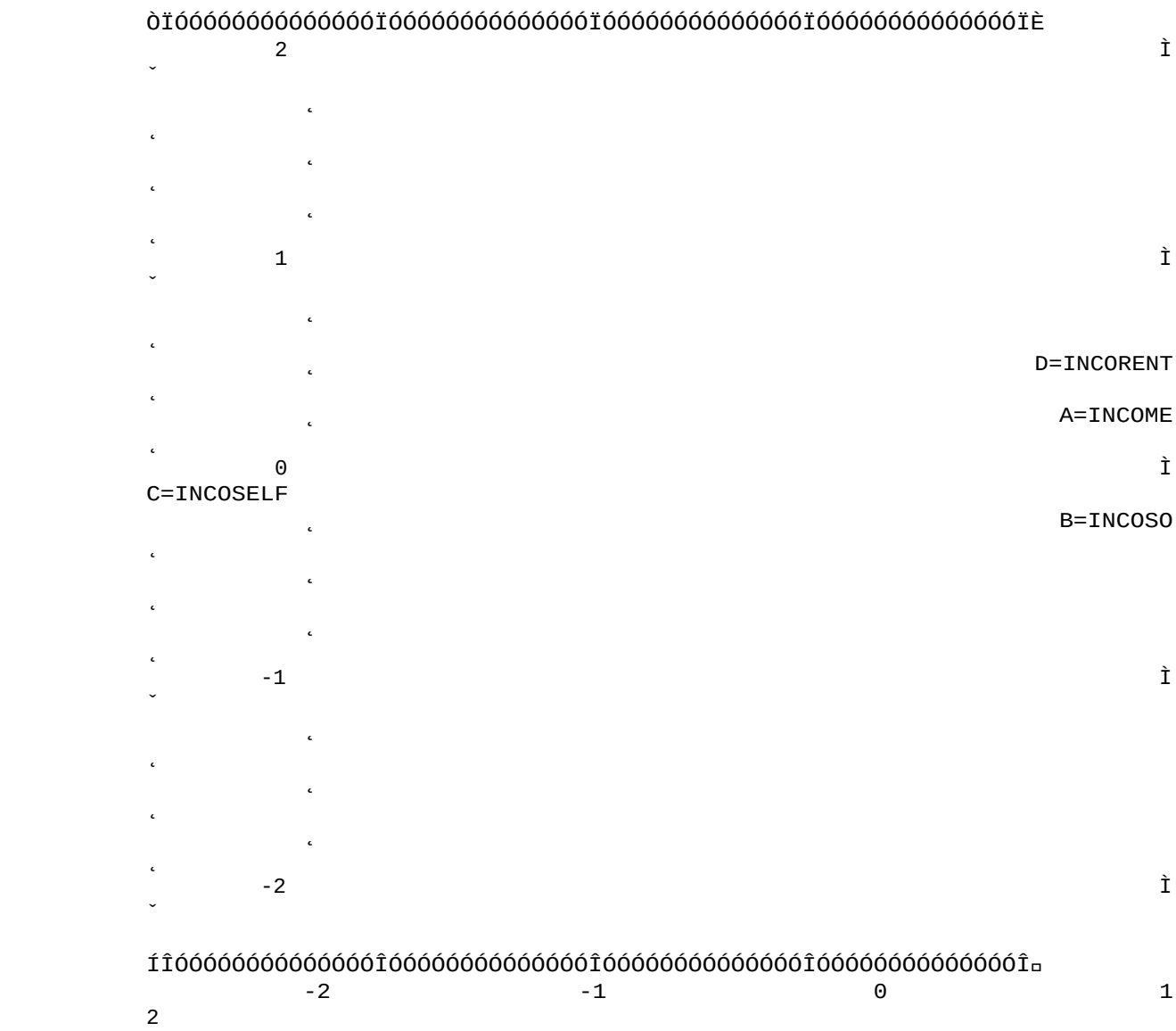
COUNT	CUM COUNT	PCT	CUM PCT	FORENT code)	
9	9	3.5	3.5	1	yes, income from rent
251	260	96.5	100.0	2	no income from rent

3.11. The variable TOTINCO

From the above income variables a new variable TOTINCO was constructed:

the respondent's total claimed monthly income.[14] Classified in P200

[14] Although it makes sense to add the various forms of monthly income together, Guttman scale analysis of the four income variables makes clear that they do not form one nice linear scale. The following diagram of variable dimensions after 9 iterations (final stress = 0) illustrates this (the position of the letters A-D indicate the coordinates of each variable):

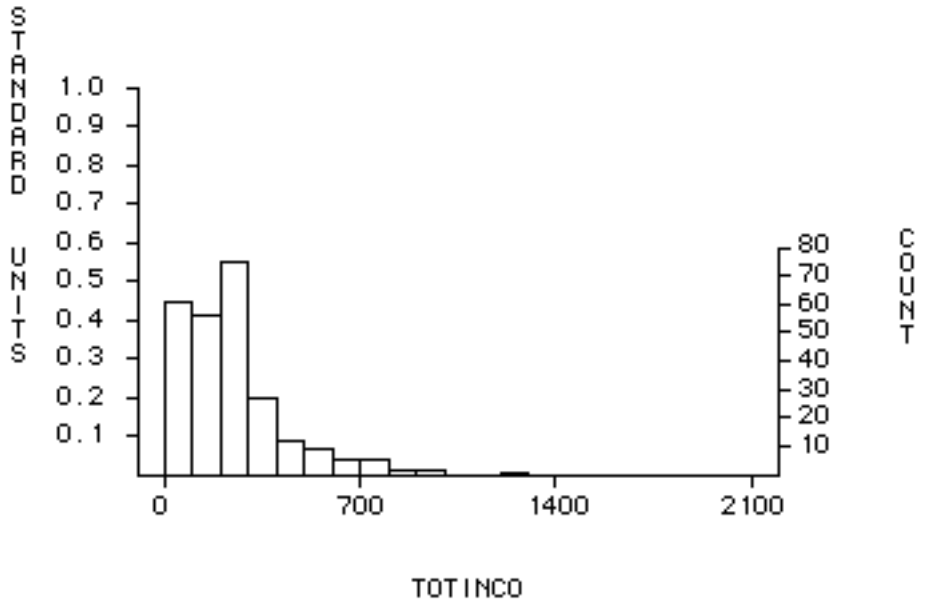


In the factor analysis below we shall see that the basic distinction among these variables is between (a) INCOSELF (b) INCORENT and (c) INCOME and INCOSO, resulting in three different

monthly income brackets, this yields the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	category	
14	14	5.5	5.5	0	
130	144	51.0	56.5	1	(P1-200
80	224	31.4	87.8	2	(201-400
17	241	6.7	94.5	3	(401-600
11	252	4.3	98.8	4	(601-800
2	254	.8	99.6	5	(801-1000
					(1001-1200)
1	255	.4	100.0	7	(1201 and more)

There were 5 missing cases. Only 14 cases claimed to have no income whatsoever. The histogram shows the distribution (differently categorized as compared to the table) of this continuous variable:



X-AXIS MEASURES PULA/MONTH; 5 CASES WITH MISSING VALUES EXCLUDED FROM PLOT

3.12. variable RESFTOWN

(respondent's claimed length of residence in Francistown, in years)

There were 5 missing cases. The variable ranged from 0.33 to 55 years, with a median at 10.50 years. The histogram shows the distribution of this continuous variable:

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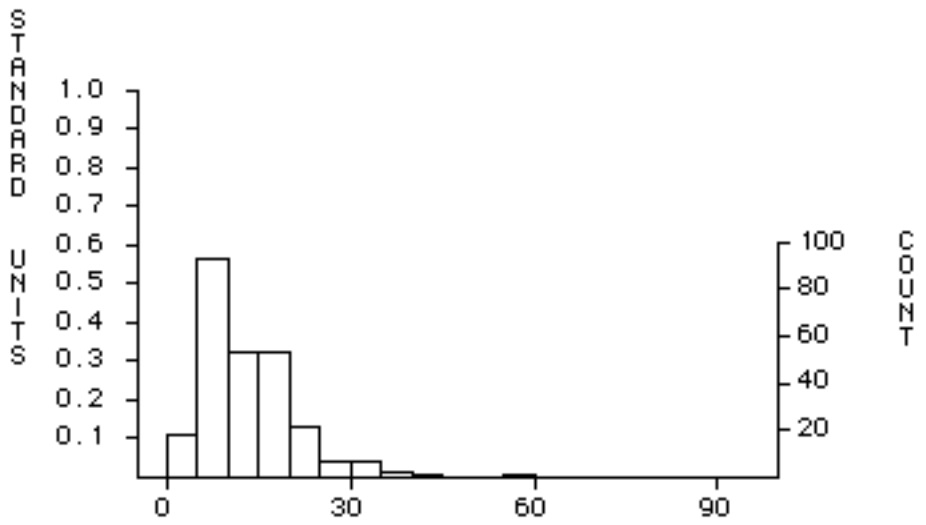
and mutually uncorrelating factors.



X-AXIS MEASURES YEARS; 5 CASES WITH MISSING VALUES EXCLUDED FROM PLOT

3.13. variable PREVRES

(respondent's claimed length of residence in any other Francistown township prior to settling in PWD)

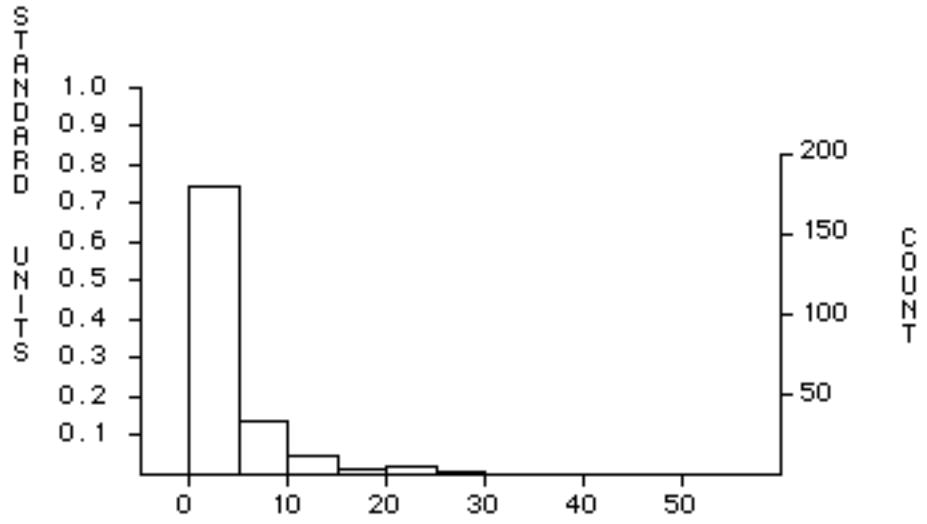
There were as many as 28 missing cases.

One way of looking at the data is by dichotomizing them between those who did did, and those who did not, claim previous residence elsewhere in Francistown. This is the variable FORPREV, with the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	FORPREV (code)	
125	125	53.9	53.9	1	yes, had previous res in FT
107	232	46.1	100.0	2	no, immigrated straight to FT

Clearly, as many as 46.1% (107 cases) claim to have had not previous residence in Francistown but to have settled straightway in PWD upon arrival in the town.

The histogram shows the distribution of PREVRES as a continuous variable stating the number of years a respondent claims to have been in previous residence in Francistown:



28 CASES WITH MISSING VALUES EXCLUDED FROM PLOT

X-AXIS MEASURES YEARS

3.14. variable PREVTOWN

(respondent's claimed previous township of residence prior to settling in PWD):

COUNT	CUM COUNT	PCT	CUM PCT	PREVTOWN (code)	
1	1	1.2	1.2	202	Masimenyenga
7	8	8.4	9.6	204	Bluetown
1	9	1.2	10.8	205	Tati West
31	40	37.3	48.2	208	Monarch
4	44	4.8	53.0	209	Riverside
6	50	7.2	60.2	212	Somerset West[15]
1	51	1.2	61.4	213	Somerset East Extension
2	53	2.4	63.9	214	White City
3	56	3.6	67.5	215	Minestone
6	62	7.2	74.7	216	Government Camp
1	63	1.2	75.9	220	Area L
1	64	1.2	77.1	221	Donga
4	68	4.8	81.9	222	Railway
2	70	2.4	84.3	224	Area S
2	72	2.4	86.7	226	Area G
3	75	3.6	90.4	233	Kgapamadi
2	77	2.4	92.8	235	Maipaafela, = Tati West
1	78	1.2	94.0	242	Somerset West squatters
5	83	6.0	100.0	249	Prison (= Gvt Camp)

The implications of the values on this variable will only become clear when the townships are classified according to type of residential area. Since in the continuous development of Francistown new townships are created and existing squatter areas (of which Francistown used to have more than any other Botswana town, cf. Molamu 1989) are upgraded and then made subject to the payment of service levy,[16] the precise year when a respondent left his or her

[15] There are three different Somerset townships in Francistown, extending over a large area: Somerset West (squatters — sometimes specified as such: code 242 — and partly upgraded), Somerset East (upgraded), and Somerset East Extension (site & service). When only 'Somerset' has been specified in the raw data, the case is classified as Somerset West.

[16] In line with the overall Botswana policy of non-subsidy to urban growth (and the complementary policy of stimulating socio-economic growth in the rural areas) (cf. Molamu 1989), inhabitants of Francistown townships, once developed in terms of roads, storm water drainage, street lights, stand pipes, demarcation of plots and provision of latrine pits, are subject to

previous township of residence in order to settle in PWD must be known before we can ascertain whether, at that time, that previous township was still a squatter area or already an upgraded area. For this purpose the RESPWD variable need to be converted in:

3.15. variable YEARPWD

(respondent's year of arrival in PWD)

Since the data were collected in end April/early June 1989, they can be assumed to date from a moment when 1989 was four and a half months old (half May). So

YEARFT = INT (89 + 4.5/12-RESPWD),

where INT is the largest integer value contained between the parentheses. The histogram gives the distribution:

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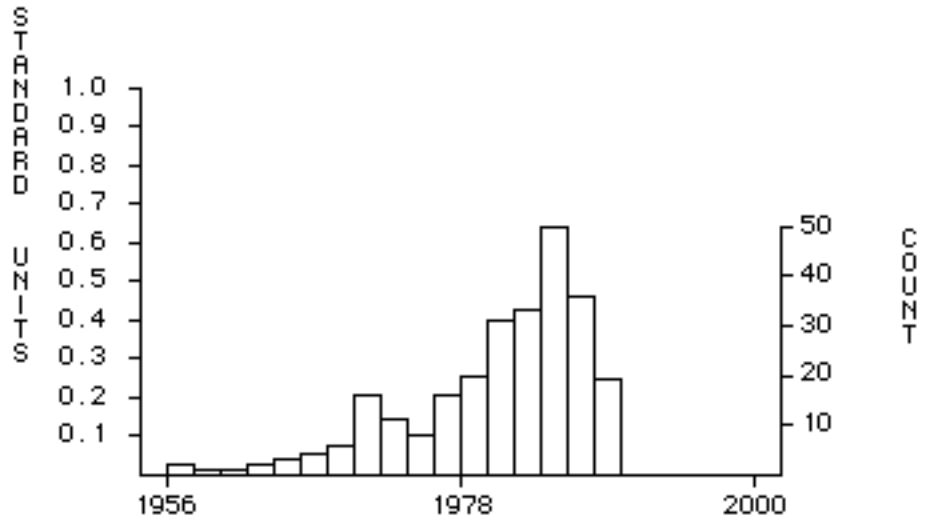
the payment of a monthly service levy of P8.50. This applies to new site-&-services schemes as well as to upgraded existing squatter townships. Irregular payment of service levy is a universal feature of Francistown administrative conditions. Technically, those running into considerable arrears can be sued and even evicted from their site-&-service plots, but for several years a lenient attitude has been taken by the municipal authorities, until judicial action recommenced around April 1989, which formed grist for the mill of politicians organizing their wards for the national elections.



YEARPWD

1 missing case

X-AXIS MEASURES DATE (YEAR)

3.16. variable PREVHOTP

(type of housing area of respondent's previous township in Francistown, if any)

With the auxiliary variable YEARPWD, it now becomes possible to identify the type of housing area of respondent's previous township in Francistown, if any, by reference to the information contained in appendix table 8.7.[17] This yields the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	PREVHOTP (code)	
13	13	15.7	15.7	1	squatter
43	56	51.8	67.5	2	upgraded
5	61	6.0	73.5	3	site-&-service
5	66	6.0	79.5	4	bhc[18]
15	81	18.1	97.6	5	institutional
2	83	2.4	100.0	6	freehold

177 missing cases

The large number of missing cases must be principally attributed to the fact that, from the total sample, almost 50% did not have a previous residence in Francistown. Of the non-missing cases on the variable PREVHOTP, it is remarkable that more than 50% (43 cases) came from upgraded areas. While further analysis might reveal whether these cases migrated to PWD during or shortly after upgrading of their previous township, there is a strong suggestion that many people have sought refuge in PWD from the payment of service levy which, upon upgrading, had become compulsory in the township they previously inhabited. That very few people have left a secure dwelling in a site-&-service scheme, a BHC estate or a freehold area, for PWD, stands to reason — although we must be aware of the fact that some migrants into PWD from previous residences within Francistown may not have been heads of households in that previous residence, but young adults leaving their parents' home, or tenants, looking for some of their own place to stay. The relative paucity of ex-squatters from Francistown we find a bit puzzling. The fact that 18.1 % (or 15 cases) of previous residence in Francistown hail from institutional housing (including 6 from Prison!) can be partly interpreted in the light of the government

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[17] This table is identical to table 2, p. 24, in Van Binsbergen 1989.

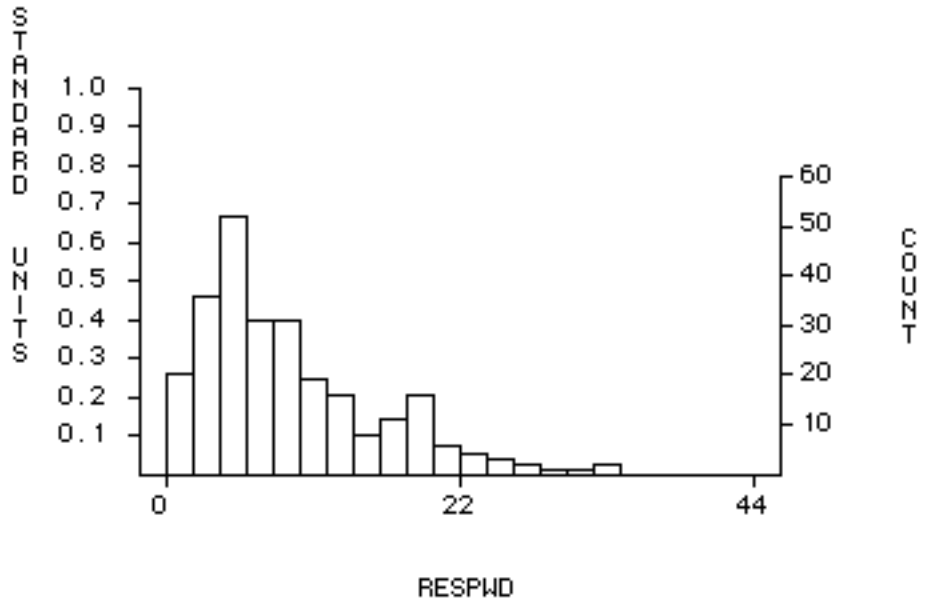
[18] Botswana Housing Corporation, the main housing agency in Botswana outside SHHA.

association that forms PWD's most permanent feature: perhaps these are government employees who for one reason or another lost their claim on institutional housing and then explored PWD as a likely and cheap alternative, near to their place of work.

3.17. variable RESPWD

(respondent's claimed length of residence in PWD)

There was one missing case. Cases ranged from 0.25 year (3 months) to 33 years, with the median at 6.5 years. The histogram shows the distribution of this continuous variable:



X-AXIS MEASURES YEARS; 1 CASES WITH MISSING VALUES EXCLUDED FROM PLOT

We are inclined to read the histogram as evidence of three more or less distinct periods in the immigration into PWD:
— the earliest period, 19 or more years ago, of the first batch of residents: people who settled in PWD in the 1960s or possibly earlier. It is puzzling that a few cases claim PWD residence from a date older than the first recorded existence of PWD.
— people who arrived as from the 1970s, in a second wave which reached its climax around 1984
— the dwindling immigration into PWD as from 1984.
However, the pattern of the histogram is biased in this respect that it

does not reflect those who have immigrated into PWD and subsequently out-migrated while giving up (selling) their structures in PWD; only those estimated few who out-migrated but retained and rented out their structures are found in the sample — while their moment of departure from PWD is not recorded in the data set.

3.18 Variable NUMPERM

(respondent's number of permanent structures)

COUNT	CUM COUNT	PCT	CUM PCT	NUMPERM (number)
241	241	92.7	92.7	0
13	254	5.0	97.7	1
2	256	.8	98.5	2
2	258	.8	99.2	3
2	260	.8	100.0	4

There are no missing cases. Among the population of heads of household, 241 cases, or 92.7 percent, did not have any permanent structure, that is, a house built throughout of durable material: concrete bricks, manufactured doorframes and windowframes, and proper roofing. The total number of permanent structures in the entire township turns out to be only 31 (= the sum of frequencies * the number of structures).

3.19. Variable NUMTRAD

(respondent's number of traditional structures)

COUNT	CUM COUNT	PCT	CUM PCT	NUMTRAD (number)
133	133	51.4	51.4	0
61	194	23.6	74.9	1
41	235	15.8	90.7	2
12	247	4.6	95.4	3
10	257	3.9	99.2	4
1	258	.4	99.6	5
1	259	.4	100.0	9

There is one missing case. 133 cases, or 51.4%, did not have any traditional structure, i.e. a house with mud walls and thatched roofing For the other cases, the number of traditional structures ranged from 1 to as many as 9. The total number of traditional structures in the entire township can be calculated to be 233.

3.20. Variable NUMMIX

(respondent's number of mixed structures).[19]

COUNT	CUM COUNT	PCT	CUM PCT	NUMMIX (number)
127	127	49.0	49.0	0
54	181	20.8	69.9	1
45	226	17.4	87.3	2
23	249	8.9	96.1	3
5	254	1.9	98.1	4
5	259	1.9	100.0	5

There was one missing case. 127 cases or 49% had no mixed structure at all, while for the remaining cases the number of mixed structures ranged from 1 to 5. It can be calculated that the total number of mixed structures in PWD stood at 258.

3.21. variable NUMTEMP

(number of temporary structures)[20]

COUNT	CUM COUNT	PCT	CUM PCT	NUMTEMP (number)
257	257	98.8	98.8	0
2	259	.8	99.6	1
1	260	.4	100.0	2

There were no missing cases. 257 cases or 98.8 percent had no temporary structures. The total number of temporary structures in PWD was only 4.

3.22. old squatter numbers

As part of the original raw data, in 38 cases the enumeration forms showed an old squatter number, said to have been allocated in 1984. Since the status of ths number was unclear, and it was missing in 222 cases, this variable was not subjected to further analysis.

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[19] This is a house of mud walls covered with corrugated iron, but usually without proper rafter structure.

[20] These are makeshift structures of cardboard, plastic etc., or tents, or movable manufactured shelters of sheet metal.

3.23. variable TOTSTRU

This is a new variable calculated as the sum of NUMPERM, NUMTRAD, NUMMIX and NUMTEMP.[21]

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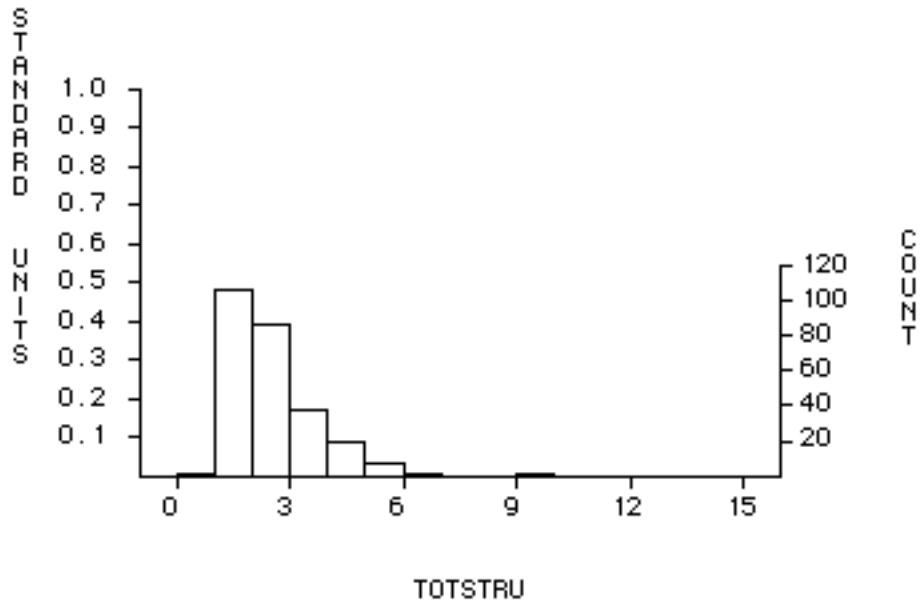
[21] Although it would seem to be legitimate to add, per plot or case, the structures of the various types, a Guttman scale analysis revealed that the four constituting variables NUMPERM, NUMTRAD, NUMMIX and NUMTEMP do not form a nice linear scale together. The following diagram of variable dimensions after 24 iterations (final stress = 0) illustrates this (the letters A-D indicate the plot coordinates of each variable):

COUNT	CUM COUNT	PCT	CUM PCT	TOTSTRU (number)
1	1	.4	.4	0
106	107	40.9	41.3	1
86	193	33.2	74.5	2
37	230	14.3	88.8	3
20	250	7.7	96.5	4
7	257	2.7	99.2	5
1	258	.4	99.6	6
1	259	.4	100.0	9

There is one missing case. Strangely enough one case turned out to have no structure whatsoever, which is likely to be a mistake in the data.

The histogram shows the distribution of this variable:



X-AXIS MEASURES NUMBER OF STRUCTURES; 1 CASE WITH MISSING VALUES EXCLUDED FROM PLOT

3.24. Variable TRIBE

(respondent's ethnic group as reconstructed on the basis of the

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-2 -1 0 1 2

In other parts of the present analysis, e.g. factor analysis, the essential irreducibility of the four NUM-variables will also be brought out.

recorded village home)

On the basis of appendix table 8.2., the ethnic group of each case was reconstructed. This led to the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	TRIBE (CODE)	NAME
8	8	3.2	3.2	1	Birwa
8	16	3.2	6.5	2	Hurutse
53	69	21.4	27.8	3	Kalanga
11	80	4.4	32.3	4	Kgatla
34	114	13.7	46.0	5	Khurutse
2	116	.8	46.8	6	Kwena
1	117	.4	47.2	7	Leta
2	119	.8	48.0	9	Ngaketse
53	172	21.4	69.4	10	Ngwato
7	179	2.8	72.2	12	Rolong
1	180	.4	72.6	14	Sarwa
2	182	.8	73.4	17	Talaote
4	186	1.6	75.0	18	Tawana
7	193	2.8	77.8	19	Tlokwa
2	195	.8	78.6	20	Tswapong
1	196	.4	79.0	23	Herero
1	197	.4	79.4	96	outside Botswana
36	233	14.5	94.0	97	mixed including Kalanga
15	248	6.0	100.0	98	mixed not incl. Kalanga

12 missing cases

3.25. Variable RECTRIB

(respondent's broad ethnic category as reconstructed on the basis of the recorded village home)

The number of categories for the variable TRIBE is still too large to make statistical analysis meaningful. So a further regrouping was made, which led to the following distribution:

COUNT	CUM COUNT	PCT	CUM PCT	RECTRIB	
14	14	5.6	5.6	1	other
43	57	17.3	23.0	2	Tswana general
53	110	21.4	44.4	3	Kalanga
34	144	13.7	58.1	5	Khurutse
53	197	21.4	79.4	10	Ngwato
36	233	14.5	94.0	97	mixed including Kalanga
15	248	6.0	100.0	98	mixed no Kalanga

12 missing cases

3.26. Variable TSWANA

(respondent's belonging, or not, to an ethnic group from the Tswana-speaking cluster)

An even further reduction of the ethnic variable is possible by simply assessing whether or not the respondent belongs to an ethnic group from the Tswana-speaking cluster. The historical and sociological considerations for the selection of this variable are outside the present first draft. Let it suffice to say that 'the' Tswana language and culture, which at Independence in 1966 gave their name to the nation-state of Botswana, is promoted by the central government as the dominant, standard expression within the republic, despite the existence of a considerable number of non-Tswana speaking communities within the country, who pursue their own cultural traditions. In the context of Francistown the TSWANA variable is all the more interesting to examine since the town finds itself in an area, that of the North East and North Central, where the Kalanga culture and language have been dominant for centuries, to such an extent that many who today identify as Kalanga would consider Francistown, ipso facto, to be a Kalanga town. In terms of African urban studies, the Kalanga would be counted as the 'guest tribe' in Francistown, the ethnic group on whose ancestral land the town is built and who, by implication, could be said to extend hospitality to the multiplicity of other ethnic

groups out of which the heterogeneous social fabric of the town is composed.

Whatever the truth contained in the view of Francistown as a Kalanga town when the whole of Francistown would be considered, the following distribution patterns shown that at least PWD has a strong Tswana identity:

COUNT	CUM COUNT	PCT	CUM PCT	TSWANA (code)	
130	130	52.4	52.4	1	yes, Tswana
51	181	20.6	73.0	2	from mixed communities including Tswana
67	248	27.0	100.0	3	no, not Tswana

12 missing cases

3. 27. Variable KALANGA

(reconstruction of the respondent's belonging to the Kalanga ethnic group)

This is the mirror image of the TSWANA variable. Its distribution reveals the relative numerical weakness of the Kalanga in PWD:

COUNT	CUM COUNT	PCT	CUM PCT	KALANGA (code)	
53	53	21.4	21.4	1	yes, Kalanga
36	89	14.5	35.9	2	from mixed comm. incl. Kalanga
159	248	64.1	100.0	3	no, not Kalanga

12 missing cases

Not more than maximally 36%, and more likely less than 30%, of PWD heads of household can be counted as Kalanga. The data currently at our disposal do not allow us to ascertain whether with these figures PWD is an exception within Francistown, or whether, alternatively, the Kalanga representation there is of the same order of magnitude as those throughout Francistown. There are indications however that the PWD figure is not exceptional.

3. 28. Variable DISTANCE

Once we know the village home, in principle the distance between Francistown as place of residence (and in most cases as place of immigration, and not place of birth), on the one hand, and the village home on the other, can be ascertained. We found that a broad dichotomizing of the data was sufficient for the purposes of our analysis: either 'near' (=<100 km from Francistown) or 'far' (>100 km from Francistown). The North East district, the Central North area around Tutume, and the part of the Central district around Tonota and extending as far south as Serule, are thus counted as lying in the proximity of Francistown, whereas the rest of Botswana, and of

Southern Africa in general, is counted as 'far from Francistown'. This yielded the following distribution:

```
          CUM          CUM
    COUNT     COUNT   PCT   PCT DISTANCE (code)
      125       125  51.7  51.7        1       < 100 km
      117       242  48.3 100.0        2       > 100 km from FT
18 missing cases
```

Amazingly, almost half of the inhabitants of PWD hail from 'far', which is in line with the strong Tswana representation in the township (even though ethnic groups as Khurutse and Rolong, found in nearby places like Tonota, Makaleng, Borolong, Matsiloje and Moroka, are also counted as Tswana).

The ethnic variables, in conjunction with the distance variable and its distribution, reveal more than just ethnic affiliation and language preferences. The paucity of Kalanga, even though they abound in the villages around Francistown, and the preponderance of Tswana, point to two factors which reinforce each other:

— the access to formal sector employment, particularly in the government domain

— the access to plots in the squatter area.

Both factors, of course, are not randomly spread but ultimately depend on social relations and the mobilization potential contained in the latter. What already emerges from our initial exploration of the variables is the image of chains of ethnic and regional solidarity, along which people from the relatively near, Khurutse-dominated Tonota village, as well as other Tswana-speakers from relatively remote places like Serowe, Mochudi, Mahalapye, Tlokweng etc., create a combination of job opportunities and residential opportunities for each other, their 'home-boys'. These are most probably the people who have settled straightway in PWD, without previous residence elsewhere in Francistown.

Considering the relative paucity of Kalanga in PWD, the latter would seem to be less involved in chains of this nature, or at least the chains may be less effective, due to the shorter length of stay, the lesser numerical strength, and the lesser entrenchment in the informal sector of self-employment, as found among these Kalanga people when compared to the dominant Tswana group in PWD. Yet the material to be presented below (in section 4.8) will show that village-home clustering among the PWD Kalanga occurs just as it does among the PWD Tswana, albeit in lesser numbers.

Having now examined all the variables measured in the original data

set, and whatever further variables we could derive from these, let us now turn to the spatial patterns adopted by some of these variables when projected onto the geographical space that PWD occupies in Francistown.

4. SPATIAL PROJECTION OF THE PRINCIPAL VARIABLES

The meticulous localizing of each plot (identified by plot number) on a large-scale (1:1,500) map of Francistown allowed us to study in detail the spatial patterns of the principal variables. For this purpose considerable leg-work in the township, as well as considerable programming had to be done: converting the coordinates into values manageable by the statistical package, and converting the ordinary variables into alphanumerical ones which, for each case, could be plotted in the actual geographical position of the plot number concerned.

All this results in the diagrams presented on the following pages. There is one major distortion in all these diagrams: due to the limitations of the printer used for this draft version, the Y axis (north–south) has been elongated by a factor 1.536 as compared to the X axis (west-east). The diagrams are not true geographical maps, but could be easily converted into such; meanwhile the metrical scale along the horizontal and vertical border reminds the reader of this minor flaw.

The exact location of two plot numbers could not be ascertained, and these were excluded from the analysis. For the other 258 cases, the diagrams depict, in the exact coordinates corresponding with the location of each plot (as identified by its plot number), a letter corresponding to the values of that variable as specified in the legend to the diagram; or alternatively a period (.), if the specific variable spatially projected in that diagram has a missing value for the case in question.

In this first draft, the spatial analysis is, somewhat crudely, confined to a visual examination of computer-produced diagrams. While this brings out the more obvious spatial patterns, like those related to gender, in a later version it will be contemplated to further sophisticate the spatial analysis by the introduction of two–dimensional cluster-analysis techniques.

4.1. Plots in their relative position

This diagram in the first place confirms the validity of the spatial analysis: it corresponds in detail, albeit in greatly simplified manner, with the map in appendix 8.5.

(insert diagram 1)

Diagram 1 suggests the considerable variation in density of plots throughout PWD. This impression is confirmed in the next diagram, where the area of PWD has been subdivided in squares of 75x75 meters, and the number of plots c.q. plot holders in each square is counted.

Diagram 2. PWD density of plot holders, April/June 1989

This diagram clearly reveals the extreme overcrowding, in terms of numbers of different plots c.q. plot holders, in the northwestern periphery, relatively high on the Nyangabwe slope; the virtual repetition of this high density on the northeastern slope; the belt of considerable density immediate south of these two squares; and the relatively empty square in the heart of PWD. The low density of plots c.q. plot holders all along the edges of PWD with the exception of the northwest merely means that the boundary of the PWD built-up area falls right in those squares so that the number of plots is 'diluted' by the open space beyond. Yet in those parts of the peripheral squares which are adjacent to the central squares of PWD the density is not necessarily lower than in the adjacent ones.

The data summarized in diagram 2 also allow us to calculate numerical values for the relative density of plots:

number of plot holders per 75*75 m	0	1-5	6-10	11-15	16-20	>20
average number of plots	0	3	8	13	18	23
average size of plots (m^2)	0	1875	703	433	313	245
average plot density per ha.	0	5.33	14.22	23.09	31.95	40.82

These values indicate not only the occasionally extremely high density values prevailing in parts of PWD, but also the large variation in this respect. The stereotype of extreme overcrowding on plots which are too small for decent human habitation far from applies everywhere in PWD, even if in the above table no allowance has been made for the geographical space occupied by access paths to individual plots.

The next diagram, no. 3, calculates not individual plots, but the total number of structures, within the same overall grid structure of 75*75 m. With the exception of one or two squares, the diagram is virtually identical to diagram 2, with this proviso that on the average two structures must be counted for every plot c.q. plot owner.

Diagram 3. Density of structures in PWD, April/June 1989

The data presented in diagram 3 also allow us to calculate the average

density of structures:

number of structures per 75*75 m	0	1-10	11-20	21-30	31-40	41-50
average number of structures	0	5.5	15.5	25.5	35.5	45.5
average area available per structure(m^2)	∞	1023	363	221	158	124
average structure density per ha.	0	9.78	27.55	45.25	63.29	80.65

Again the pattern emerges of occasionally extreme values, and considerable variation across PWD.

4.2. Length of residence in PWD and previous residence elsewhere in Francistown

For clarity's sake, we have reduced the values on the RESPWD variable to three categories: the very recent immigrants (A, one year of residence or less); the group — 50% of all cases — with a residence exceeding the median value of 7 years (C); and the intermediate group of between 1 and 7 years of residence.

insert diagram 2 (N.B. numbering as original, in fact one or two too low)

Contrary to expectation, the newcomers do not find themselves particularly in the extreme periphery of PWD and up the slopes, but are relatively evenly distributed all over the township expect the central part, which appears to be reserved for people with the longest residence. The intermediate group is conspicuous both up the slope and along the southern boundary of the township, along the main road.

The next diagram shows the spatial distribution of cases with (Y) and without (N) previous residence in any other Francistown township than PWD. No conspicuous pattern emerges at first sight, although one has the impression that those with previous residence tend to cluster around the edges of the township (particularly the northwest and the southeast), with the central core having a larger share of people who came straight to PWD.

insert diagram 2a

4.3. The spatial distribution of gender

The most amazing diagram in the series is the one depicting the spatial distribution of gender. In a manner totally unexpected, yet impossible to explain away as an artifact, the township turns out to have a neat moiety structure when we look at the gender of the plot owners: in the southeastern half virtually all plot owners are female, in the northwestern half virtually all plot owners are male. Such a distribution does not immediately meet the eye when walking through the township, because in everyday life the plot owners do not conspicuously stand out among the total population which includes their spouses and concubines, co-residing adult relatives, tenants and children. On further questioning in the township, a vague awareness of this gender distribution pattern however turned out to exist among a minority of PWD residents. For the time being we are satisfied to record this amazing phenomenon without as yet being able to offer any explanation.

insert diagram 3

4.4. Employment status

The next diagram depicts the spatial distribution of employment status in PWD. The areas of intermediate length of residence, up the slope, are so conspicuous in the number of employed, while the southeast corner (the one with almost exclusive female plot owners) is conspicuous for self-employment. This hints at correlations which we shall further explore in the subsequent chapters of this report. The unemployed, nowhere particularly concentrated or numerous, appear to be fairly evenly distributed across the township.

insert diagram 4

4.5. Spatial distribution of employers

The most salient feature of the spatial distribution of types of employers (apart from the large number of missing cases, in line with the number of unemployed and self-employed) appears to be the concentration of domestic workers in the eastern and southeastern part of the township: the women's quarter, as we can loosely term it. This is in line with the fact that in Francistown, as elsewhere in Southern Africa but by no means everywhere across the African continent, domestic labour is largely reserved for women. In the central core of the township a preponderance of government workers can be noted: the old historic core of PWD. Workers in the private sector appear to be rather evenly distributed.

Among the government workers we see an interesting pattern of residence, which is to throw light on the ethnic and home-village clustering we shall examine below: government workers in PWD tend to form residential clusters of 2 or 3 plots together. Although the imposed recoding of the EMPLOYER variable into only four categories does not allow us, without further analysis, to claim that these are workers for the same government department, the suggestion is strong, none the less, that working together, and as part of the job moving to Francistown together, leads to dwelling together in a place, like PWD, where people can still select their own neighbours. The ethnic dimension to be introduced later might then be read as either the first step in this chain of relationships (coming from the same village home or ethnic group, one worker introduces a newcomer to his or her government department) or as a strengthening factor: the fact that one can identify on regional and ethnic grounds reinforces such day-to-day social relations as spring from the work situation, and allow then to be developed into neighbourship.

insert diagram 5

4.6. Spatial distribution of income

If we had hoped to find a clear-cut spatial distribution of income groups, such as is a fairly recurrent sociological feature in human habitation, the next diagram is not very convincing on this point. All we can say is that the second but lowest income bracket (P1-P200 per month), while by far the most frequent, is less prevalent in the male quarter than in the female quarter; in the male quarter higher income levels appear to prevail. At the same time the variety of income in the male quarter appears to be somewhat higher, although further statistical testing would be required on this point. The close association between gender, access to salaried employment, and income will be further explored below.

insert diagram 6

The following diagrams present the spatial distribution of the various types of income as distinguished in the survey. Again the relative difference seems to manifest itself between the central core (with more salaried employment, less self-employment, and little cases of income from rent) and the periphery, especially the northwest and southeast. This overall pattern is less manifest in the distribution of cases claiming income from ‘other sources’, but then, the number of positive cases on this point is rather limited.

insert diagrams 6a

6b

6c

6d

4.7. Distance to village home

On this variable a spatial distribution can be discerned, reserving more or less the central core of the township for those from long distances, while all around the edges of the township the immigrants from closer-by seem to prevail.

insert diagram 7

4.8. Spatial distribution of ethnic groups and home villages

The relatively high number of different ethnic categories included in this diagram for the time being precludes the formulation of distinct patterns. Foreshadowing the analysis of home-village clusters in the final diagram, one is struck by the clustering, in the present diagram, particularly of people sharing the Ngwato respectively the Kalanga identity.

insert diagram 8

The following diagrams, 9 and 10, are complementary: the former shows the spatial distribution of Tswana (in the largest sense of the word) in PWD, bringing out the great preponderance of Tswana throughout the township but particularly in the central core; the latter bringing out the spatially and numerically peripheral position of the Kalanga.

insert diagrams 9

and 10

When the distribution of home villages rather than ethnic groups is considered, as in the final diagram, a striking pattern of clustering is revealed, which contains important clues as to the ethnic and regional ties governing the recruitment of residents to PWD. Of course, it is only meaningful to include, in this type of analysis, home villages which occur at least twice in the data set: clusters consisting of only one element are analytically uninteresting. We see that an amazingly large number of PWD resident has managed to include, among their closest neighbours, people from the home village. In some cases, especially with highly represented home villages such as Tonota and Serowe, this effect may be due to chance rather than to the purposeful recruitment of 'home-boys' to take up residence close to one's own plot (or on one's own self-chosen plot, after which the plot may be split between the original occupant and the newcomer). But chance cannot begin to explain the striking pattern in its entirety (as further statistical testing may reveal, in a later version of this report).

The residents of the township, and its councillor, have a clear perception of the existence of these clusters, and attribute them not to chance but to the deliberate mobilization of home ties in the appropriation of plots and the allocation of residential opportunities in PWD.

village home	ethnic group	cluster no.	cases in cluster
Tonota	Khurutse	2	2
idem		5	3
idem		8	2
idem		12	3
idem		14	3 (or 6 including cluster 18)
idem		18	3 (or 6 including cluster 14)
idem		20	3
idem		23	4
idem		27	2
idem		29	2
idem		32	2
Serowe	Ngwato	3	4
idem		10	2
idem		16	2
idem		19	5
idem		22	2
idem		28	3
Mathangwane	Kalanga	4	2
idem		6	2
idem		15	2
idem		26	2
idem		33	2
Mahalapye	Ngwato	11	2
idem		13	2 (4)
Mochudi	Kgatla	7	2
idem		17	2
idem		31	2
Bobonong	Birwa	9	2
Tlokweng	Tlokwa	1	2
Kalamare	Kalanga	30	5
Senyawe	Kalanga	21	2
Ramokgwebane	Kalanga	24	2
Moroka	mixed including Kalanga	25	3

Home village clustering does not seem to be confined to any particular ethnic group. The question whether yet some ethnic groups display this tendency more strongly than could be expected on the basis of that group’s numerical representation in the data set remains open for further analysis.

5. FACTOR ANALYSIS OF THE DATA SET

Having examined the spatial distribution of the variables, we now turn to factor analysis of the data set, in an attempt to reduce — by means of a purely mathematical technique — the many original and newly derived variables, to a lesser number of mutually independent and non-

correlating factors, assessing the latter's relative weight by looking at the percentage of the variance each factor is capable of explaining. A varimax rotation method is used. Only factors with a so-called eigenvalue of at least 1.0 are retained.

The relevant matrices: of correlation between the variables (excluding non-dichotomous nominal variables, such as EMPLOYER), and of factor loadings, are contained in appendices 8.3 and 8.4.

The outcome of the factor analysis underlines the importance, in the data set and presumably therefore in the social structure of PWD, of the factors gender (MALENESS, explaining 11.3% of the total variance) and ethnicity (TSWANADOM, explaining 11.1% of the total variance). No other factors contribute so much to the total variance.

The gender factor turns out to load highly on the geographical variables defining the coordinates of each plot number (XCOORD and YCOORD), in line with our surprising finding as to the gender bifurcation of the township along a northeast-southwest axis. The extent to which gender is related to income (with males having the highest incomes from salaried employment, and the highest aggregate or total incomes) is clear from the relatively high loadings of TOTINCO and INCOME on the gender factor.

As was to be expected, the ethnicity factor loads highly not only on the variables TSWANA and KALANGA, but also on DISTANCE.

The next factor in importance is LANDLORDSHIP, explaining 9.2% of the total variance. Remarkably, this factor does not load significantly on any of the income-related variables. Here the difference between original variables as measured, and factors as mathematically constructed, must be appreciated. As we have seen in an earlier footnote, there is a statistically significant association between income (TOTINCO) and being a landlord (FORENT). Now, even though FORENT loads highly (.83) on the factor LANDLORDSHIP, the latter factor appears to have been cleared, in the factor analysis, from its income connotations. Further statistical advice is required before we venture an explanation for this phenomenon. Meanwhile the factor LANDLORDSHIP does load very highly on the total number of structures (TOTSTRU) per plot (as if people construct structures with the specific purpose of renting them out), and on the number of traditional structures (NUMTRAD); the latter finding strongly suggests that it is the cheaper and easily-built traditional structures, rather than the more ambitious and costly mixed structures, let alone the highly costly and prestigeous permanent structures, which are used for renting out.

The next factor URBTIME reflects some sort of aggregated time dimension of a respondent's urban existence: the factor loads high both on length of residence in PWD, and on length of residence in

Francistown. Possibly this factor merely measures respondent's age. Somewhat surprisingly this factor also loads considerably on plot number (PLOTNO), as if the allocation of plot numbers in the course of the 1989 PWD squatter inventory exercise took length of residence into account. In a way which cannot be reflected in this first draft, the distribution of plot numbers does show a spatial pattern, although less consistently so than in e.g. site-&-service schemes where the plots are numbered beforehand following a strict administrative logic.

The next factor NODURMAT merely reflects the use or non-use of durable materials; again surprisingly, it does not load significantly on any of the income variables nor on the time factor URBTIME, as if such use of durable materials in the specific context of the PWD squatter area reflects psychological inclinations of the plot owner rather than socio-economic constraints or length of residence.

Length (or rather shortness, since the loading is negative) of previous residence elsewhere in Francistown, and again shortness of residence in Francistown as a whole, constitute a factor which could be termed PWDEXCLUSIVITY: the extent to which the respondent migrated straight to PWD.

The next factor shows how the majority of the income variables (notably TOTINCO, INCOME and INCOSO, but with the exclusion of INCORENT and INCOSELF) can be subsumed under one factor INCOGEN (= 'INCOMEGENERAL'), which however is only the seventh factor in order of importance in the data set. This suggests that in socio-economic respects (and while making allowance for the income-related aspects of gender) the population of heads of household in PWD is fairly homogenous, without excessive class differences. This however does not rule out the possibility of severe socio-economic differences between householders and non-householders, since the latter were not covered by the present survey. The factor INCOGEN loads moderately on EMPLOYDU: there is some limited correlation between the number of years that a respondent has stayed in his or her (present) employment, and the general income level recorded.

Self-employment, meanwhile, constitute an independent factor in its own right (unrelated to INCOGEN), according to expectation loading highly on INCOSELF, on duration (or rather, shortness: the loading is negative) of present employment (EMPLOYDU; in other words: most self–employed have no salaried employment at the same time), and on income from salaried employment (INCOME), for the same reason.

The final factor NONPERM largely sums up the variable NUMTEMP (number of temporary structures), with a slight loading on the PLOTNO variable again, as if allocation of plot numbers was to some extent influenced by the flimsiness of the structures.

Thus factor analysis leads to an effective and illuminating reduction of the number of variables in the data set; underpins the relative importance of gender and ethnicity; suggests the modest importance of socio-economic differentiation within the townshi, as well as a relative lack of a purely economic motivation for the flimsiness and the non-use of permanent, durable materials for the structures (since these stand out as separate factor NODURMAT and NONPERM, without loadings on the economic variables); and points at the distinct nature of self-employment as a factor in its own right (perhaps reflecting personal initiative, or a person’s access to — ethnically-protected? — networks through which support, opportunities and customers are mobilized), not directly to be subsumed under the general income factor.

Some of these patterns will be further examined in the next chapter.

6. SELECTED DETAIL ANALYSES

6.1. Aspects of gender

Although (because of the specific history of PWD as a camp for — male — government labourers) the number of female heads of households in PWD may be less than was to be expected considering the pattern for Francistown as a whole, or urban Botswana as a whole, yet the gender variable is of striking importance in this township — to wit the gender moiety structure revealed above, and the outcome of the factor analysis.

Gender differences are clear with regard to employment: women are more likely to be unemployed, and much more likely to be self-employed, than men:

```
 TABLE OF EMPLOYME     (ROWS) BY      SEX     (COLUMNS)
 FREQUENCIES
              1          2          TOTAL
code         male     female

    1           11         19         30 unemployed
    2           11         45         56 self-employed
    3          118         49        167 employed
    4            2          3          5 employed & self-employed

 TOTAL         142        116        258

TEST STATISTIC                          VALUE          DF           PROB
LIKELIHOOD RATIO CHI-SQUARE[22]      50.914           3          0.000
```

However, women have a significantly lower income from salaried employment than men (this includes cases with such income being zero due to being unemployed or exclusively self-employed). So in a later analysis we shall have to assess whether inter-gender differences in income from salaried employment are also found when we eliminate, from the analysis, the cases with such income being 0.

```
INDEPENDENT SAMPLES T-TEST ON   INCOME     GROUPED BY      SEX

     GROUP          N     MEAN (Pula)       SD (Pula)
       2          117       73.234      110.856 female
       1          143      248.230      175.882 male
```

[22] Alternatively, we can interpret the EMPLOYME variables as an ordinal scale, and then use a Mann-Whitney U-test with SEX as the grouping variable: U = 11383, P = .000.

```
SEPARATE VARIANCES T =       9.762 DF = 243.2 PROB = .000
```

The same relation holds for the total aggregate income:

```
INDEPENDENT SAMPLES T-TEST ON  TOTINCO     GROUPED BY      SEX

     GROUP          N     MEAN (Pula)       SD (Pula)
       2          112      148.352      140.585 female
       1          143      284.489      197.662 male

SEPARATE VARIANCES T =       6.420 DF = 250.8 PROB =0.000
```

For the income from self-employment, however, the relationship is reversed in this respect that women claim a significantly higher income from self-employment than men:

```
INDEPENDENT SAMPLES T-TEST ON INCOSELF     GROUPED BY      SEX

     GROUP          N     MEAN (Pula)       SD (Pula)
       2          117       58.393      121.926 female
       1          143       28.497      121.174 male

  POOLED VARIANCES T =       1.974 DF =   258 PROB = .049
```

Not only is women's income from self-employment higher though still very modest, also do women engage much more in self-employment than men:

```
            1(male)   2(female)  TOTAL
     code ÒÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÈ
        1 ¸      13         47  ¸     60 yes, engages in self-employment
          ¸                     ¸
        2 ¸     130         70  ¸    200 no self-employment
          ÍÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓ¾
 TOTAL          143        117        260

TEST STATISTIC                        VALUE          DF           PROB
LIKELIHOOD RATIO CHI-SQUARE          36.135           1          0.000
```

For the women, self-employment appears to be an alternative source of income, necessary because they have far less access than men to salaried employment. This finding perhaps should not be generalized over the whole of Francistown or urban Botswana: it is likely to reflect the specific history of PWD as a camp of male government workers.

By the same token, it is women who claim to engage more in renting out housing than men:

```
            1(male)   2(female)  TOTAL
     code ÒÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÈ
        1 ¸       2          7  ¸      9  yes, claims income from rent
          ¸                     ¸
        2 ¸     141        110  ¸    251 no income from rent claimed
```

```
          ÍÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓ¤
TOTAL          143       117       260

TEST STATISTIC                         VALUE          DF            PROB
  LIKELIHOOD RATIO CHI-SQUARE          4.176           1            .041
```

Renting out more frequently, women also claim a significantly higher (although on the average still extremely modest) income from rent:

```
INDEPENDENT SAMPLES T-TEST ON INCORENT     GROUPED BY      SEX

     GROUP         N     MEAN (pula)     SD (pula)
       2          117        5.256       23.183 female
       1          143        0.559        5.278 male

SEPARATE VARIANCES T =       2.146 DF = 125.9 PROB = .034
```

Meanwhile, there are no statistically significant differences between the sexes with regard to claimed income from 'other sources'.[23] Abstracting from the size of the income from 'other sources', and merely asking whether or not such income is claimed, there is again no statistically significant association with gender:

```
            1(male)   2(female)  TOTAL
     code ÒÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÈ
        1 ˛      5         8   ˛     13  yes, other sources
          ˛                    ˛
        2 ˛    138       104   ˛    242  no other sources
          ÍÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓ¤
TOTAL          143       112       255

TEST STATISTIC                         VALUE          DF            PROB
  LIKELIHOOD RATIO CHI-SQUARE          1.713           1            .191
```

This is somewhat remarkable, since we would tend to associated such income from other sources with financial dependence and lack of access to salaried employment — traits more specifically associated with the female gender.[24]

---

23 SEPARATE VARIANCES T =   .186 DF = 216.7 PROB = .853

24 Further analysis reveals that it is particularly the unemployed who claim income from other sources:

```
           unemployed   self-    employed  employed+
                       employed            self-employed
      code       1         2         3         4            TOTAL
code      ÒÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÓÈ
```

Nor is there any statistically significant difference between the sexes with regard to length of residence in PWD,

INDEPENDENT SAMPLES T-TEST ON RESPWD GROUPED BY SEX

GROUP	N	MEAN	SD	
2	117	8.467	6.947	female
1	142	9.074	6.413	male

SEPARATE VARIANCES T = .724 DF = 239.1 PROB = .470
POOLED VARIANCES T = .730 DF = 257 PROB = .466

nor with regard to the housing variables NUMPERM,[25] NUMTRAD,[26] NUMMIX[27] and TOTSTRU.[28]

Similarly, there is no statistically significant association between sex and having had a previous residence in Francistown,[29] distance,[30] belonging to the overall Tswana cluster,[31] belonging to the Kalanga ethnic group,[32] or the type of housing area that the

1	10	0	3	0	13	yes, income from o.s.
2	15	56	166	5	242	no such income claimed
TOTAL	25	56	169	5	255	

TEST STATISTIC	VALUE	DF	PROB
LIKELIHOOD RATIO CHI-SQUARE	38.925	3	0.000

Apparently, the employment factor in INCOSO is not gender-specific.

25 POOLED VARIANCES T = .256 DF = 258 PROB = .798

26 POOLED VARIANCES T = 1.185 DF = 257 PROB = .237

27 POOLED VARIANCES T = .361 DF = 257 PROB = .718

28 POOLED VARIANCES T = .804 DF = 257 PROB = .422

29

TEST STATISTIC	VALUE	DF	PROB
PEARSON CHI-SQUARE	.534	1	.465

30 Mann-Whitney U-test, U(131,111) = 7956, p = .14.

31 Mann-Whitney U-test, U(134,114) = 8128, p = .34.

32 Mann-Whitney U-test, U (134, 114) = 7531, p = .83.

respondent's previous township in Francistown, if any, belonged to.[33]

6.2. Aspects of employment, migration, and ethnicity

Frequent reference has been made to the specific history of PWD as a camp for government workers. One aspect of this history is that there is a statistically significant relation between employer (does respondent work for government, City Council private formal sector or as a domestic servant), and the length of residence in PWD: it is the government workers who have the longest residence in PWD:

---

[33] Mann-Whitney U-test, U (49, 34) = 809, p = .81.

```
KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE FOR 259 CASES
  DEPENDENT VARIABLE IS   RESPWD
  GROUPING VARIABLE IS EMPLOYER

    GROUP      COUNT   RANK SUM    AV RANK
             1   87     12890.5    148.17      government
             2    8       863.0    107.88      FTC
             3   49      5140.0    104.90      private
             4   23      1505.0     65.43      domestic

KRUSKAL-WALLIS TEST STATISTIC =   626.80
PROBABILITY IS  .000 ASSUMING CHI-SQUARE DISTRIBUTION WITH  3 DF
```

Among the government workers, also a significantly higher duration of employment with the present employer is found:

```
KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE FOR 256 CASES
  DEPENDENT VARIABLE IS EMPLOYDU
  GROUPING VARIABLE IS EMPLOYER

    GROUP      COUNT   RANK SUM    AV RANK


             1   88     16786.0    190.75      government
             2    8      1394.5    174.31      FTC
             3   49      7403.5    151.09      private
             4   22      2963.5    134.70      domestic

KRUSKAL-WALLIS TEST STATISTIC =  1675.21
PROBABILITY IS  .000 ASSUMING CHI-SQUARE DISTRIBUTION WITH  3 DF
```

An interesting association exists between employment status and distance:

code	unemployed 1	self-employed 2	employed 3	employed+ self-employed 4	TOTAL	
1	20	17	85	3	125	from nearby
2	7	37	71	2	117	from far
TOTAL	27	54	156	5	242	

TEST STATISTIC	VALUE	DF	PROB
LIKELIHOOD RATIO CHI-SQUARE	15.309	3	.002

Those who come from within the general Francistown area (=<100 km) are significantly more likely to be unemployed self-employed than those who come from far away. Again we hit on the distinction, within PWD, of those (typically Tswana-speakers from relatively far away)

who came to PWD on the basis of relatively secure employment as government workers, and other who migrated into the township from another employment background, with different traits as migrants, and from nearer by.

These different traits of migrants into PWD are also brought out by the association, virtually statistically significant. which exists between DISTANCE and previous residence in Francistown:

	code	<100KM 1	>100KM 2	TOTAL	
code	1	68	51	119	yes, previous residence in Francistown
	2	42	54	96	no such previous residence
TOTAL		110	105	215	

TEST STATISTIC	VALUE	DF	PROB
LIKELIHOOD RATIO CHI-SQUARE	3.825	1	.051

Those who come from nearby are more likely to have lived somewhere else in Francistown before coming to PWD: for them, PWD is not the obvious choice dictated by a combination of ethnico-regional, and employment, consideration, but apparently more of an accidental outcome in the struggle for housing among inhabitants of Francistown.

That those from nearby, and particularly the Kalanga, in PWD have different characteristics as migrants from those hailing from further afield, as also implied in the finding that there is an association between being Kalanga, in PWD, and the type of housing area from which respondents with a previous residence in Francistown came:

	Kalanga 1	mixed 2	non-Kalanga 3	TOTAL	
1	4	2	7	13	squatters
2	15	11	16	42	upgraded
3	2	2	1	5	site-&-service
4	2	0	3	5	bhc
5	0	0	12	12	institutional
6	0	0	2	2	freehold
TOTAL	23	15	41	79	

TEST STATISTIC	VALUE	DF	PROB
LIKELIHOOD RATIO CHI-SQUARE	26.277	10	.003

In the above table, the Kalanga are more than the non-Kalanga associated with the upgraded areas: they, particularly, seem to be the ones on the run for service levy.

Related effects can be further explored by tabulating employment status against belonging, or not, to the Kalanga ethnic group:

code	unemployed 1	self-employed 2	employed 3	employed+self-employed 4	TOTAL	
1	7	7	38	1	53	Kalanga
2	6	1	29	0	36	mixed incl. Kalanga
3	15	46	94	4	159	non-Kalanga
TOTAL	28	54	161	5	248	

TEST STATISTIC	VALUE	DF	PROB
LIKELIHOOD RATIO CHI-SQUARE	20.617	6	.002

Between the Kalanga and non-Kalanga in PWD there is not so much of a difference when we look at salaried employment. If anything, the Kalanga in PWD are found more in salaried employment than the non-Kalanga:

	Kalanga 1	mixed 2	non-Kalanga 3	TOTAL	
1	40	29	99	168	income from salaried employment
2	13	7	60	80	no such income
TOTAL	53	36	159	248	

TEST STATISTIC	VALUE	DF	PROB
LIKELIHOOD RATIO CHI-SQUARE	6.609	2	.037

The striking difference between the ethnic clusters is in the far lesser extent to which the Kalanga of PWD engage in self-employment. We would not be inclined to point to cultural traits that would make the Kalanga less inclined than others to engage in self-employment. In the specific situation of PWD, with its salaried Tswana-speaking core, it is more likely that the Kalanga are, relatively, denied the resources and the clientèle necessary for successful self-employment, whereas the others, mobilizing the ethnic ties that dominate in the township, do not have such handicaps.

This finding is underlined by the statistically significant association between distance, and engagement in self-employment: in PWD the self-employed come from significantly larger distance than those who are not self-employed:

code	<100KM 1	>100KM 2	TOTAL

1	19	39	58	yes, self-employed
2	106	78	184	no, not self-employed
TOTAL	125	117	242	

TEST STATISTIC	VALUE	DF	PROB
LIKELIHOOD RATIO CHI-SQUARE	11.053	1	.001

7. CONCLUSION

The image that arises, however tentatively and provisionally, out of the present analysis, is that of contrasting profiles between the Tswana-speaking core and the more Kalanga-orientated periphery of PWD — core and periphery used primarily in terms of social structure, but with an implication of spatial projection and length of local residence. To this ethnic dimension must be added the gender dimension, with women being characterized by constrained access to salaried employment and more extensive pursuit of such alternatives as offered by self-employment.

Despite these internal social contradictions, the PWD squatter area presents an image of considerable stability deriving from the convergent effects of a number of factors: the majority of the heads of households are employed with government (implying permanent jobs and secure income); the majority have stayed in the area for six years or more, and the majority is affiliated to ethnic groups constituting the dominant Tswana cluster in Botswana, and leading to effective social relations among the inhabitants. For these and related reasons, the inhabitants of PWD can be said to feel a distinct attachment to their place of residence, which is further enhanced by its convenient location, close to the place of work of the majority of the heads of household, and relatively close to urban services concentrated in the town centre.

The confrontation with the qualitative data collected by Miss Krijnen will add further substance, and life, to the abstractions of our quantitative analysis. This draft analysis, also, will inspire further statistical exploration to be worked into later versions of this report. At the same time patterns have been revealed which, far from being self-evident and conspicuous in day-to-day interaction within the township, suggest the power of computer analysis even of a limited data set as the one used here.

The future of PWD is as yet uncertain, balancing between the rationality of engineers and the mobilizing dreams of politicians. We

hope to have recorded some of its present complexity, before it disappears altogether as a thriving and complex social system.

8. APPENDICES

Appendix 8.1. Data entry form specifying the coding of the survey data

Appendix 8.2. Village home, ethnic affiliation and dichotomized distance to Francistown

Appendix 8.3. Correlation matrix of the variables used in factor analysis

Nominal variables with more than two categories were excluded from the analysis, ordinal variables (e.g. TSWANA: yes/mixed/no) were included irrespective of the number of categories. The number of decimals was rounded off to two.

	XCOORD	YCOORD	PLOTNO	SEX	EMPLOYDU
XCOORD	1.00				
YCOORD	-.27	1.00			
PLOTNO	.11	.25	1.00		
SEX	.71	-.55	-.07	1.00	
EMPLOYDU	-.18	.25	.14	-.42	1.00
INCOME	-.27	.34	.04	-.49	.64
INCOSO	.04	-.01	.09	-.01	-.07
INCOSELF	.04	-.12	-.11	.10	-.26
INCORENT	.13	.13	-.14	.13	.02
RESFTOWN	-.07	-.01	.25	-.01	.13
PREVRES	.01	-.00	-.11	.04	-.09
RESPWD	-.04	-.00	.39	-.02	.21
NUMPERM	-.03	-.06	-.11	.00	.05
NUMTRAD	.11	.07	-.02	.08	.08
NUMMIX	-.04	-.02	.00	-.02	.07
NUMTEMP	-.02	-.02	.11	.05	-.04
TOTINCO	-.20	.25	-.01	-.38	.42
TOTSTRU	.06	.02	-.08	.07	.18
DISTANCE	-.06	.11	.18	-.04	.08
TSWANA	.02	.03	-.17	-.10	-.09
KALANGA	.01	.01	.24	.06	.08

	INCOME	INCOSO	INCOSELF	INCORENT	RESFTOWN
INCOME	1.00				
INCOSO	.08	1.00			
INCOSELF	-.31	-.05	1.00		
INCORENT	.04	-.01	-.00	1.00	
RESFTOWN	-.03	.09	.04	.01	1.00
PREVRES	-.04	-.05	.02	.06	.51
RESPWD	-.10	.15	.06	-.01	.72
NUMPERM	-.04	-.03	.07	-.03	-.10
NUMTRAD	.04	-.01	-.04	.42	.06
NUMMIX	.08	.10	.01	.03	.14
NUMTEMP	-.07	-.01	.01	-.01	.03
TOTINCO	.75	.31	.33	.11	.03
TOTSTRU	.10	.09	.01	.47	.16
DISTANCE	.01	.00	.17	.03	.07
TSWANA	-.01	-.03	-.08	.02	-.19
KALANGA	-.01	.08	.13	.08	.19

	PREVRES	RESPWD	NUMPERM	NUMTRAD	NUMMIX
PREVRES	1.00				
RESPWD	-.14	1.00			
NUMPERM	-.04	-.08	1.00		
NUMTRAD	-.02	.11	-.13	1.00	
NUMMIX	.02	.14	-.11	-.54	1.00
NUMTEMP	-.06	.09	-.02	-.07	.03
TOTINCO	-.04	.07	-.00	.04	.11
TOTSTRU	-.02	.23	.19	.45	.42
DISTANCE	-.07	.19	.10	.04	.09
TSWANA	-.02	-.22	.04	.03	-.12
KALANGA	-.02	.27	.09	-.03	.23

	NUMTEMP	TOTINCO	TOTSTRU	DISTANCE	TSWANA
NUMTEMP	1.00				
TOTINCO	-.06	1.00			
TOTSTRU	-.05	.16	1.00		
DISTANCE	-.09	.12	.18	1.00	
TSWANA	-.08	-.07	-.07	-.37	1.00
KALANGA	.07	.11	.24	.63	-.80

	KALANGA
KALANGA	1.00

Appendix 8.4. Factorial loads of the variables used in factor analysis

Varimax rotated component loadings on correlation matrix (listwise deletion). For clarity's sake, only loadings =>.30 are shown.

	FACTOR				
	1	2	3	4	5
proposed name of factor	MALENESS	TSWANADOM	LANDLORDSHIP	URBTIME	NODURMAT
variable:					
SEX	-.89				
XCOORD	-.82				
YCOORD	.67				
KALANGA		.93			
TSWANA		-.84			
DISTANCE		.76			
TOTSTRU			.83		
INCORENT			.83		
NUMTRAD			.63		
RESPWD				.91	
RESFTOWN				.82	
PLOTNO				.52	
NUMMIX					-.94
PREVRES					
TOTINCO	.33				
INCOME	.41				
INCOSO					
INCOSELF					
EMPLOYDU	.34				
NUMPERM					
NUMTEMP					
percentage of variance explained by this factor (rotated components):.	11.3	11.1	9.2	9.5	7.4

FACTOR

	6	7	8	9
proposed name of factor	PWDEXCL	INCOGEN	FACSELF	NONPERM
variable:				
SEX				
XCOORD				
YCOORD				
KALANGA				
TSWANA				
DISTANCE				
TOTSTRU				
INCORENT				
NUMTRAD				
RESPWD				
RESFTOWN	-0.53			
PLOTNO				0.30
NUMMIX				
PREVRES	-0.91			
TOTINCO		0.89		
INCOME		0.62	-0.56	
INCOSO		0.60		
INCOSELF			0.85	
EMPLOYDU		0.34	-0.63	
NUMPERM				-0.84
NUMTEMP	0.34			
percentage of variance explained by this factor (rotated components):.	6.5	8.7	7.6	5.7

Appendix 8.5. Detailed map of PWD scale 1:1500

Appendix 8.6. Map of Francistown with the location of PWD (still to be compiled)

Appendix table 8.7. Townships and types of housing areas in Francistown

Appendix 8.8. Map of Botswana selectively showing place names and ethnic groups mentioned in the text (still to be compiled)