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**LAND AND ASSET SIZE, STRUCTURE AND DISTRIBUTION
AND THE LINKS TO INCOME IN THREE DRYLANDS**

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Michael Lipton, Robert Eastwood and Johann Kirsten, Feb 2002

At a late stage in preparing this work, we felt - responding to the view of all partners - that, before analysing the consequences of asset situations for fertility, migration or environment, we should present, and to some extent explain, some facts about the size, composition, and distribution of assets for the three countries. This paper presents some general contextual evidence, and some main results for South Africa. Work is in progress on the India data, and will be undertaken later for Botswana.

1. Need and justification for chapter

1.1. Chapter 1 explored theory and evidence that, in developing countries, small-scale farming (and fairly equally distributed land and other assets) are usually good for efficiency, agricultural performance, and economic growth. These *allocative* gains, on top of the *distributive* effects, suggest that a government concerned for poverty reduction should induce de-concentration of large farms (and possibly other rural asset accumulations). But might such redistributive 'schemes of improvement' have overriding drawbacks?¹ Malthus claimed that one such drawback to land reforms (and implicitly to other 'schemes of improvement') is that they would increase population pressure, through higher fertility and perhaps lower rural emigration. This book explores these claims - and the impact of land and asset size and distribution upon fertility and migration - in three field surveys of drylands, and assesses environmental implications.

1.2. First, however, this chapter presents our survey evidence (and its context) about rural asset size and distribution. Sec. 2 sets out our choices on some *conceptual and measurement issues*. Sections 3-6 draw on, and seek to interpret, the field realities analysed in the country-specific chapters 2-4 above. Sec. 3 very briefly recapitulates and contrasts key findings from these chapters on the *rural economies of drylands* regions, villages, and farm households in the three country survey. Following a glance at the context of national-level evidence (mostly on land distribution), Section 4 presents *rural asset characteristics* - mean size, distribution, and composition - globally, for these countries, and for survey populations; and links them to *associated, possibly causative, features of (types of) individuals, households or places*. The hope is to establish which sorts, locations or groupings of household are (a) asset-richer, (b) more unequal, (c) with different proportions of productive and other assets, in these three dryland areas. Section 6 (**to do**) summarises the findings and takes up some hints, to be developed in later chapters, about the nexus between asset size, composition and distribution and *demographic and environmental outcomes*. At several points, we place the evidence about asset size, structure and distribution, in our survey regions, into the context of other national and local evidence.

1.4. The usefulness of this approach is seen from a finding in sec. 4. An average survey holding of about 2 hectares leaves a household, reliant mainly on it, asset- and income-poor relative to many or most neighbours in S Africa - but not so in India. Few drylands smallholders live mainly from farming in S Africa and the landed remain relatively poor despite not-too-unequal *local* land distribution. In India, most drylands smallholders live mainly from farming, and those with less, or no, land (in these *locally* unequal conditions) are relatively poorer still. The policy relevance is that land redistribution in S Africa, if it is to cut poverty much, has to focus on measures encouraging land transfer from large commercial holdings (plus some State lands) to smallholders. On the evidence of the drylands rural asset structures revealed in these surveys, *within* currently smallholder areas little poverty reduction can be achieved in S Africa - but more in India - by land redistribution, or tenurial and legal changes that stimulate it. Botswana is intermediate between these positions.

1.6. A further concern is to explore how asset size and asset inequality, their correlates, and (if possible) their origins and causes, are linked to features of the rural economy in the three country

¹These might include high transactions-costs, increased uncertainty, unfairness, or disruption.

studies. For example can mean landholdings or their inequality be linked to exogenous features of a village or region, such as aridity, and how might this be explained?

1.7. Why analyse all that in this book? Its **scientific concern** is the *effect* of individual and household land and other asset size and composition, and perhaps also of land and asset distribution, on fertility, migration, and hence the drylands environment.² The **policy concern** is the *effect* of policies that alter land or asset size or inequality on fertility, migration and environment. So why review the *nature and causes* of asset size or inequality? There are four reasons.

- First, the nature, type and causes of asset size and inequality may influence its effects.³ For example, the same amount of inequality may affect fertility more, if it is mainly between educated and uneducated (but little as between women and men) than if it is gender inequality but not educational inequality. \$1000 of land value per person may affect migration differently from \$1000 of non-farm assets per person. Intra-village, inter-village and interregional inequality may affect water use differently.
- Second, the effect of any given policy on asset size or distribution may depend on the nature and causes of initial inequality. The same land reform⁴ may have different effects if unequal control over land is linked to gender, ethnic group, education, or agricultural competence.
- Third, different land reforms (or other policies) may be appropriate if the aim is to change male-female, inter-group, inter-village, or intra-village land distribution.
- Fourth - if (as this book shows) asset size or distribution *is* related to demographic or environmental outcomes - we need to establish which is cause and which is effect.

That is why this chapter gives a brief account of the scale, nature, and where possible causes, of asset endowment size and inequalities as linked to rural economies.

2. Some conceptual issues: picking types and measures of assets, endowments, inequality

2.1. In this section, to specify our procedures in secs. 3-6, we address some questions:

- Do we need separate discussions and evidence about asset *size* and asset *inequality*? (2.2)
- What assets should be measured for size and distribution? How do we add them up? (2.3)
- Do we measure size or distribution per-household, per-person, or per-equivalent-adult? (2.4)
- What is the set of households, persons or a.e.'s over which we should measure distribution: the village, the region, the national drylands, or the nation? (2.5)

² Suppose behaviour (e.g. fertility) depends only on individual characteristics (e.g. wealth) of the household. Then will *mean* behaviour depend only on *mean* household characteristics? No, for two reasons: (a) the wealth-to-fertility relation may show *nonlinearity*; if, for instance, if it is U-shaped, mean fertility will rise with wealth inequality; (b) there may be *interactions* among household characteristics (another nonlinearity, in fact). Consider a two-household economy in which fertility depends on both wealth and education; even if the means of wealth and education are the same, mean fertility may be affected by whether or not the higher-wealth household is also the higher-education household. In addition to (a) and (b) there may be cross-household *externality*, whereby household behaviour depends on the endowments of others. For instance, *given* all your endowments and preferences, your capacity to borrow - and to use the loan to buy extra assets - may depend on whether another villager is rich enough to set up as a lender. These issues are treated more fully in chapter 1.

³ Given a group's mean asset value, asset inequality may affect group outcomes as discussed in fn.2. and ch. 1.

⁴ Or other measures intentionally or unintentionally affecting land distribution through incentives to transact in farmland - policies such as progressive land tax, tenancy laws, or subsidies to tractors, irrigation or credit.

- Which indicator of inequality is most appropriate for our purposes? (2.6)

The answers depend on what we should ideally like to do; on what we can infer from household surveys; and on the scope and shortcomings of our empirical results.

2.2. First, why look at both asset *size* or endowment (per person, per a.e. or per household) and asset *inequality* (e.g. within a region)? As for behaviour, asset size and asset inequality may each affect it: a person with given assets, in a place with given average assets per person, may behave differently if a few neighbours are much richer than if they are not (e.g. because credit markets or job options are different). As for policies, though asset redistribution always affects some persons' asset size, policies changing total asset value need not affect its distribution.⁵ Further, redistribution at one level may present as pure size changes at another. In South Africa, the main prospect of redistributing land is from areas where only whites could own land in the apartheid years, towards nearby areas of tiny smallholdings where blacks were able to own land. If each inhabitant in recipient regions gains land value and area proportionate to initial holding, then, *within* recipient regions, per-person land size rises but distribution is unaffected - it changes at national level (and perhaps in the donor regions) only.

2.3. What assets should we measure, and how do we add them up? For each drylands region (and for villages, types of household, etc.) we look at farmland by area and value; livestock-units⁶ and value; value of nonfarm productive assets, housing, and household assets; and total asset value. Any of these could affect demographic or environmental behaviour and outcomes, and (especially if asset markets are imperfect) effects can differ among asset types. Value, of course, is used to add different asset types, but there are valuation problems for land and cattle in South Africa and Botswana (**Annex D.d**) We also briefly discuss amount and distribution of educational assets, but do not add them to other asset types (or discuss their correlates in detail). That is because valuation, policies for redistribution or distribution-neutral size increase,⁷ and demographic and environmental impacts of education are not comparable to those of other asset types.

2.4. Should we measure asset size and distribution per-household, per-person or per adult equivalent (a.e.)? If asset size affects behaviour via an 'intermediate variable' such as current well-being, risk exposure, or transactions-costs, it is not clear whether it is assets per household, per person, or per a.e. that matter. For example, 'economies of scale in consumption' are significant and vary among household sizes and structures. Formulae for adult equivalents are designed to reflect this, suggesting that assets/a.e might be the best measure: however any such formula is imperfect, so we report key variables per-household and per-a.e (see **Annex D.a**) and, where relevant, per-person and per-working-adult data also.

2.5. In what geographical sets of households should we measure/compare asset sizes and distributions: village, region, national drylands, or the nation? For **positive analysis**, all are of interest. For example, cross-village disparities in mean wealth are evidence of underlying

⁵ E.g. if reclaimed land is divided among households proportionately to the land they already have; a household may respond differently to the same extra land if due to non-redistributive reclamation than if due to land redistribution.

⁶These allow 'adding up' of types of livestock by weighting them by their typical relative worth - important if valuation of some types is difficult. :

⁷For example, most educational assets are much harder to 'add' to adults than to children.

heterogeneity across villages that might imply important village effects on individual migration decisions; the same might apply to heterogeneity across regions. For **policy analysis**, the relevant aggregate - village, region, drylands, nation - depends on the policy (whether for asset size or distribution) under review. For example, in designing a land reform for a regions within SA Northern Province (where redistribution would be from non-village lands in White commercial farms), it would be useful to know (a) the proportion of households that were landless, (b) whether such households were impoverished - and how uniformly, and (c) how much these conditions varied within the region. For Rajasthan, where land redistribution would affect mainly intra-village lands, different data aggregations would be useful.

2.6. Whatever the chosen range, we need to decide which indicator of inequality is most appropriate for our purposes. We usually use the Gini, because it is clearest, most 'intuitive', and most widely available in secondary data for comparison with survey results, but the Gini has drawbacks (unequal weighting of inequality in different parts of the distribution, in some senses non-decomposability into sources of inequality). So in some cases Theil-T, Theil-L or coefficient of variation is reported. The issue is discussed in **annex D.d**.

3. Rural economies in the three drylands

Plan (as per outline): The rural economies: Region and village-group-specific level of living (very brief), origins of income (production-transfers) and structure of production (especially crop-animal-nonfarm). Can we distinguish 'types of household' for these, within or across country studies, regions, groups of households (e.g. female-headed), village types? For example, do villages fall into groups, some with very much stronger crop sectors, other more animal-oriented, others largely nonfarm, and a fourth group more centred on remittance incomes - and can a village's membership of one such group be linked to its ranking in the set of all villages by asset or land value per person, or by intra-village asset or land inequality?

4. The facts of asset endowments and inequality

SUMMARY

4.1. The surveys in their context

4.1.1-3: Asset size and distribution evidence is scanty, but *national operational* land Ginis, widely available, do not systematically mis-estimate *regional owned/controlled* land distribution.

4.1.4-5: But they confirm (table 1) that countries/regions with large average holdings, and much grazing land separated from arable land, have higher land Ginis.

4.1.6-7: A bias to non-labour-intensive open grazing is both agro-ecological *cause* and socio-political *effect* of very unequally distributed farmland in southern Africa (as in Latin America).

4.1.8. Ginis allowing for landlessness can be estimated for our surveys, and for some countries.

4.1.9. Survey evidence on dryland Ginis confirms national and regional macro-surveys.

4.2. Assets & links to income, agriculture: the data & hypotheses (so far largely S Africa only)

4.2.1-3: Not much theory exists, but a '3-stage' account of agro-rural development suggests hypotheses on asset size, structure, distribution and links to income in developing rural drylands.

4.2.4. We test against survey results:

- (a) I-C poor households have a lower ratio of physical assets to income than the non-poor, so that values of total physical assets are more unequally distributed than income.⁸
- (b) For I-C poor households, a low proportion of asset value is 'productive'.⁹
- (c) A high proportion of productive assets is oriented to farming (farmland, livestock, and other assets that raise farm output) for most rural households, and especially for the I-C poor.
- (d) A high proportion of farm-oriented assets is farmland, at least for the I-C poor.¹⁰
- (e) The I-C poor tend to structure productive assets towards high liquidity and divisibility¹¹ - e.g. smallstock rather than largestock, especially within poorer rural areas.
- (f) Asset positions affect income *choices*, e.g. landless households receive a relatively high proportion of migrant contributions in kind.
- (g) Farm-related income is a high share of total income, especially for the I-C poor.

4.2.5-12: (a) the S African survey shows that the income-poor are asset-poor, but assets are less unequal than income. Reasons for this unusual finding, and implications, are reviewed.

(b): in the S African survey, dwellings dominate asset value, specially for the income-poor - but with important, agriculture-linked regional variation in role and structure of productive assets.

(c): the role of non-farm assets in productive assets is still being explored.

(e), (f): the S African survey confirms these transactions-cost micro-economic hypotheses.

(d): in the S African survey, land is even less important for the non-poor than for the poor; in West region, the non-poor have a higher ratio of livestock to land in *productive* assets.

(g) In West region alone, land access is widespread and (especially for factor-reliant households: #), linked to a higher, but still small, role of farm income, and indirectly to higher earnings. These households show that land and farming, in some areas, and potentially, are more relevant to rural development and poverty reduction than their low current profile in S Africa suggests.

⁸ In *developed* countries asset/income ratios rise sharply with income (and a fortiori with assets). For *developing* countries the probable causes of this (weaker saving and borrowing capacity among the poorer) should apply even more strongly, but evidence on household non-land asset distribution, especially linked to income data, is scarce (but see fn. 10 and, for all-India, Pathak [1977]. In Bangladesh, the ratio of land *acres per household* to mean *taka daily consumption per person* in 1998-9 was: for the 13.9% of persons landless (household holding 0-.04 [taken as .02] acres), .002; for the 31.5% near-landless (.05-.49 [27]), .020; for the 19.2% marginal (0.5-1.49 [995]), .068; for the 11.3% small (1.5-2.49 [1.995]), .090; for the 18.8% medium (2.50-7.49 [4.995]), .275; and for the 5.3% large (>7.5 [10.0?]), .380. Land-per-household rises much faster than consumption-per-head [Ravallion and Sen 1994: 827]. That would also apply, if a bit less strongly, to land-per-head (household size rises with land per household, but slowly [Lipton 1985]). In our surveys, land is a falling share of household assets as income-per-person rises (#xx below); this almost certainly applies to expenditure-per-person too, and to the Bangladesh case. So there - as in our surveys - asset/income ratios across households almost certainly rise with expenditure-per-person.

⁹ High birth-rates and infant mortality rates reinforce this, because they mean a high proportion of household members who consume but do not save.

¹⁰ Part of assets (as of labour and income) is linked to the *rural non-farm sector* (RNFS), producing (a) farm inputs, (b) value added to farm outputs, (c) consumer goods and services. In poor rural areas, RNFS comprises 25-40% of income and employment - less of land and animals, more of equipment. The share of (a), (b), and especially (c) rises with development (as does *specialisation* within and among households), but depends heavily on growth of nearby farm demand, especially for the emerging main RNFS subsectors, construction, trade and transport [Reardon 1998...]. The survey lists household and non-farm assets, but they are hard to separate (#xx below).

¹¹ This is normally constrained by an absolute need for a dwelling (see (a) above). However, even here, lower-income groups are likelier to choose gradually-renewable or disposable dwellings (e.g. kachcha as against pukka houses in rural India) and, in developed countries, houses with higher turnover, readily saleable in emergency.

4.1. The surveys in their context

4.1.1. Ideally, we should compare the average value and distribution of assets in our three surveys with similar data for other, relevantly similar regions and countries. Information on total and specific rural assets is scarce, but we know more about size and distribution of operated rural farmland - often the main *productive* rural asset, and/or the 'key' to household access to others. Decennial FAO [1997: 6-10] Agricultural Censuses and other sources allow us to compile a summary rural farmland distribution statistic, the Gini, for 47 developing countries; all but five also show average holding size (Table 1).¹² To assess and compare such data, note that:

- *Regions* of a country with larger farm size tend to have lower land quality and value [for India, Bhalla and Anand 1988], though *within* a village or small region there is no such link [for six semi-arid villages in India see Ryan and Walker 1990: 170];
- Grazing land is often common or open-access (and hence not part of household landholdings); access to such land is normally more equal than is private land [see e.g. Jodha 1986];
- Larger households operate more land [Lipton 1985; Singh 1990: 71; Krishnaji 1987: 893].

4.1.2. For all three reasons, any overall national statistic of inequality of operated farmland *area among households* normally overestimates inequality of operated farmland *value among persons*. In India, the third factor alone reduced the estimated Gini of *owned* land from 0.57 to 0.52 in Palanpur village, Uttar Pradesh, in 1993 [Lanjouw and Stern 1998: 77], but rental options can raise the effect on *operated* Ginis (for 252 households a district in Punjab, 0.45 for households, but 0.23 for persons) [Julka and Sharma 1989: 423-7]). However, reductions in the Gini, as we move to per-person measures, are less on lower-quality, more uniform land,¹³ and *much* less where top-end land inequality is very high, as in S Africa; 10-ha farms tend to support smaller families than 1-ha farms, but the gap between a 10,000-ha and a 10-ha farm will not be reduced much by family size, especially where huge farms are associated with one ethnic group (Annex E). Also, while all measures of 'operated household farm area' overstate inequality *among the landed*, the Gini has advantages and drawbacks as a summary distribution statistic [Annex A].

4.1.3. Two issues remain. First - offsetting these tendencies to overstate inequality - land distribution measures among land operators would rise if they included the landless.¹⁴ From a Gini among land operators, we can calculate a land Gini among *all* households, but only if we know the proportion landless. It can be done for our surveys (see e.g. Table 4), but only for seven national data sets (Table 2). Second, care is needed when comparing national farmland inequality indicators (Table 1) with regional (and possibly village) indicators special to drylands, as in our surveys. Farmland per household within drylands is normally more on average (but of lower quality and value), and less unequal, than in well watered areas. Table 1 shows national Ginis for 47 countries; 42 can be listed in descending order of land per person, usually about 1980-81.

¹² (a) These sources often also show holding numbers and areas in standardised size-categories. (b) From these, the Gini coefficient is estimated as in Annex A. Its values range from 1 (maximum inequality) to 0 (no inequality).

¹³ 'Household size...increased more rapidly with the size of operational holdings' in N, E and S India than in W, because in W India 'the marginal productivity of land tends to fall [less] sharply' [Parthasarathy 1979: 327].

¹⁴ In an Indian village it raised the 1993 operated land-per-person Gini from .36 to .52 [Lanjouw and Stern 1998: 149].

TABLE 1. NATIONAL GINIS OF OPERATIONAL FARMLAND AMONG HOLDINGS

Country	agg'p/ha.a'ble '80	FmldGini50s	60s	70s	80s +	ha/hldg 80s
I Uruguay	0.3		.82, .83W (66)	.83	.84	234.4
Chile			.93B			92.4
Paraguay	0.9		.93, .87 DO		.94	88.1
Venezuela			.94	.92		82.0
Brazil	0.5	.83	.84	.84	.86	70.7
Arg'tina			.84B	.87W		46.9(70)
Mexico			.75B, DO	.75		41.4
Cos. Rica	1.2	.79	.78	.83 (73)		38.3(70)
N'r'gua			.80B			37.3(60)
Col'bia	1.6	.85 (54)	.86	.86		23.3(90)
Peru			.95W, .93 DO	.78/OCH.91(72)		20.1(90)
II Tunisia			.64B			15.4(60)
Ecuador			.84DO			15.3(70)
Panama	1.2	.72 (50)	.74, .80DO	.78	.84	14.7
Honduras	1.3	.73 (52)		.78 (71/4?)		11.2(90)
Saudi A'bia	4.1			.79 (72)	.83 (83)	10.1
Morocco			.64B			9.8(60)
Iraq	0.7	.88 (57)	.73DO	.57/.65S	.39 (82)	9.7(70)
Dom.Rep.	1.8	.79	.80	.79		9.0(70)
III G'mala			.83B	.85S (79)		7.8
Algeria				.72S (73)		6.2(70)
Turkey	0.9		.63 (63), .59 DO		.58	6.2
Jordan					.69 (83)	5.9
Iran			.62W			5.2(90)
Pakistan	2.5		.61SW, .63 (63), .56DO	.52 (73)	.54	4.7
El Salvador				.61S		4.6(70)
IV Thailand	1.7		.46 (63), .43 DO	.41	.46 (78, S75-6)	3.7
Senegal			.40B, .49 DO			3.6(60)
Mali			.48 DO (69)			3.3
Jamaica			.80	.80 (69)	.81 (74), .85 (80)	2.9
Ph'pines	3.2	.51 (48)	.50, .56DO, .58W	.51	.61S, .53	2.9
Tanzania			.79 DO			2.8(90)
Kenya	6.0		.82, .75DO	.80	.77S	2.5
Myanmar			.44 DO			2.4(90)
Uganda			.48B, .55 DO			2.2
India	2.7	.68 (54)	.59	.64, .62 (77/8)	.63; .64 (91-2)	2.0
V Ethiopia				.43S (77)		1.4
Bangladesh	7.2		.47 .57, .47 (77);	OCH, DO.42 (76/7)	.55/.60S (84)	1.3
M'ascar					.80 (84)	1.3
Ind'sia	4.1		.55B, DO; .62 (63)	.72/S.53/OCH.56(73)		1.1
Nepal	5.9		.57	.69/OCH.56	.61 (82)	1.1
Sri Lanka	3.4		.66	.51 (73)	.62 (82)	1.1
Korea S	5.8	.72 (45)	.20B, .39S, .30;DO .34, .38 (65)	.31/.37	.30	0.9

VI China		.70 (1930's)		.21 (1970's)	.19 (84)
Cuba			.35 (62)	.28 (73), .21 (78)	
Egypt	7.8	.61	.38/.55DO (65)		.43 (84)
Malaysia			.64 DO		
Taiwan			.40, .47W		

Sources and methods: see Annex B.

4.1.4. All 42 (of 47) countries in Table 1 that report both mean holding size (normally in the early 1980s) and the Gini of operated holdings (latest available year, typically also in the early 1980s), fall into five groups, divided by sharp discontinuities of mean holding size:

- Group 1: in 11 countries, mean holding exceeds 20 ha. They include all 7 S American countries with known Ginis, and 4 Central-American/Caribbean (CAC) countries. The mean Gini is .86.
- Group 2: 8 countries, four each in CAC and the Middle-East/N-Africa (MENA), have mean holdings between 9.0 ha and 15.4 ha. Their average Gini is .72.
- Group 3: 7 countries have mean holdings of 4.6-7.8 ha. 4 are in MENA, one is next to it in S Asia (Pakistan), and two are in CAC. Their average Gini is .66.
- Group 4: 10 countries have mean holdings of 2.0-3.7 ha. They include 5 of the 7 sub-Saharan African countries, 3 in E Asia, and one each in S Asia and CAC. Their Ginis average .59.
- Group 5: 7 countries have mean holdings of 0.9-1.4 ha. Three are in S Asia, and two each in E Asia and sub-Saharan Africa. Their mean Gini is .52. If China's mean holding size were known, it would certainly be in this group, and would cut its members' mean Gini to .48.

4.1.5. The discontinuities in holding size go with Ginis of operated land that rise with average size of holding, at least across country groups, creating regional patterns. Most countries in South and Central America, and many in the Middle East and North Africa, contain unusually large areas of low-quality land, usable only for grazing, often far from small areas of densely settled, often irrigated, cropland. Such 'grazing-arable separated' (GAS) countries tend to have higher land-area inequality than others, in two ways. First, even if every country had the same land-*value* inequality, 'GAS countries' would tend to show higher land-*area* Ginis: a hectare of good arable land may be worth as much as fifty hectares of arid grazing. Second, the high costs, risks, and indivisibilities of acquiring large animals tend to raise mean holding size, relative to arable areas, even further within the grazing areas, except for much smaller smallstock-oriented farms.

4.1.6. However, such agro-ecology is not the only reason why countries in some regions "connect" large average holdings with high land inequality: power-structures and socio-economic history also matter [Binswanger et al. 1995]. Otherwise, how can one explain that in these GAS countries land inequality is also very high *within* regions of high-value arable land such as NE Brazil [Thomas 19xx] and the Nile Valley? For example, in Latin America 300-500 years ago, land and people alike were colonised, and indigenous farmers pushed to tiny holdings of marginal, often hilly, land; today, owner-operators of giant farms are often descendants of the colonists - and mini-farmers, of the *indigenos*. Moreover, the high proportion of land in South America, and much of MENA and central America, devoted to land-extensive (and low-employment) open grazing - as against intensive arable - is an effect, not just a cause, of the extreme land inequality in Table 1. Large farmers, having seized land from family farms, cut labour-related transactions costs by choosing

less (labour-)intensive product-mixes, shifting land at the margin from arable to grazing.¹⁵ Smaller, more equal farmers would reverse the shift, saving capital-related transactions costs that loom larger for them; even GAS countries often have large areas where arable and grazing lands are nearby, and where there is a choice of use.

4.1.7. This is important for our study. Southern African countries are like Group 1 or Group 2 countries (#4.1.4) in respect of both causes of great land-area inequality. They are GAS countries, with large dryland grazing areas often quite far from arable land. Also, the pattern of land use and land inequality is rooted in colonial or racial land expropriation and subsequent inheritance. There are few data on aggregate land Ginis in southern Africa, but Annex E provides evidence for S Africa suggesting high 'Latin American' or Group 1 levels (0.93 in Northern Province).

4.1.8. What can we say about the distribution of operated farmland among the rural population, landed and landless? If a proportion L of rural households is landless, and the operated and Gini is G, the rural Gini of land among the landed and landless $G^* = (L) (1) + (1-L) (G)$.

TABLE 2. RURAL OPERATED FARMLAND DISTRIBUTION AMONG HOUSEHOLDS

Place, source Ref. year G (Gini among landed) L (proportion landless) G* (distribution overall)

el-Ghonemy:

Egypt	1984	.43	.24	.57
Honduras	1974	.78	.33	.85
Jordan	1983	.69	.07	.71
Kenya	1981	.77	.15	.80
Pakistan	1980	.54	.31	.68

Annex C:

Bangladesh	1984	.575	.25	.68
India	1991-2	.64	.15	.69
Rajasthan	1991-2	.61	.08	.64

Annex E:

N Prov S Africa	1993	.93
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Our surveys:

Rajasthan	1999	to be added and written up after data work		
N Province, SA*	1999	.35	.46	.64
Botswana	1999	to be added and written up after data work		

Sources and notes: First five countries: Table 1; L from [el-Ghonemy 1992: 168-9]. Bangladesh, India, Rajasthan, Northern Province (overall): see Annex C, E* African households only.

4.1.9. How do our survey populations fit into the global evidence of land size and distribution? Our survey countries and regions show mean land sizes, and Ginis among them, in the normal range in

¹⁵Also, in the macro-economy, higher inequality shifts demand to meat and dairy products - important in agriculture, where high weight/value ratios (and protection for powerful elites) limit long-distance, especially international, trade.

drylands areas and countries including them. Due to historically residual largeholdings, Northern Province is at the extreme of global land Ginis (akin to the largest in Latin America), and the survey area contains 'low-end' S African smallholdings only; yet within this area Ginis are much lower, and farm size averages over 2 hectares of arable per household (Table 5). With the substantial common grazing land, this could be the basis of substantial farm activity; yet in most of the survey region it is well below 10 per cent of income. Variation in farm incomes is linked to other options (e.g. transfer incomes), to sub-regionally different farm resources and distributions, and to policy. In Rajasthan, land Ginis are far lower than in Northern Province, and smallholder areas have enjoyed a far higher share of national irrigation and farm research; hence land productivity, and land value for median farms, is much more than in the S African sample, and so is the role of farming in total income In Botswana ..

4.1.10. There is little comparable evidence on the mean and distribution of assets other than land in rural drylands of developing countries, with which to compare the three survey data sets.

4.1.11. [To be inserted.]

4.2. Assets and their links to income and agriculture: some hypotheses and the survey evidence

4.2.1. We now use survey materials from chs. 2-4 to *describe* household asset size, distribution, and composition in the three areas in their national contexts and to *explore* factors associated with these asset positions. This is preliminary to chs. 5-8, showing how asset size, distribution and composition affect fertility, migration, and environment in low-income drylands. It is also important in itself: we know much less about assets than about income in rural developing areas, yet asset access is an important determinant of income, security and status. There is not much economic theory of assets [as opposed to savings and consumption: Nakamura 19xx] for the producer-consumer rural household.¹⁶

4.2.2. However, standard economics - plus the 'normal' view that most households in poor rural areas (especially the poor¹⁷) spend most of their working time on farming¹⁸ and get most of their income from it - does lead, in conjunction with other supposed facts about low-income agricultures, to hypotheses (underlined in (a)-(g) below) about household physical assets. Not all these hypotheses can be tested with our data,¹⁹ but several can.

¹⁶ There is of course such theory for *banks*, focused on optimal balance between profitability, liquidity and safety.

¹⁷ Initially we define the 'income poverty' line, for *each* 1999-2000 country sample, at a round sum (e.g. in S Africa 2000 Rand per equivalent adult), below which fall some 30 per cent of households. We later show that our results are (a) not very sensitive to the poverty line, (b) largely valid with a poverty line *standardised across* countries at roughly the World Bank's 1993 \$1/person/day cutoff (in international purchasing power parity).

¹⁸ Two objections: 1. Farming usually has a lower capital/output ratio than rural non-farm goods production - yes, but (a) less so if animals are included in capital, as they should be; (b) ratio in ag probably lower than in rural services. 2. Big, growing rural non-farm share: true in some areas and does modify above argument, but less the case in poorer/remote/drylands areas.]

¹⁹ The surveys for this study were developed to explore the *effects* of land and asset size, composition and distribution (on fertility, migration and environment). If our survey resources had been focused on assessing the *causes* of household asset size, composition or distribution, they would not have sufficed to meet this main objective.

4.2.3. Hypotheses about the size, distribution and relation to income of rural assets and their composition in cross-section depend on the area's stage of economic, demographic and technical development. The following sequence [leaning on Boserup 1965 and Ishikawa 1968] is an ideal type. Remote, undeveloped Stage 1 regions contain elements of Stage 2, even Stage 3. Post-green-revolutionary, diversified Stage 3 regions retain elements of Stage 2, even Stage 1. However, the ideal type, while not a stage "theory", has uses in organising our observations and data:

- A few places, mostly in West or Central Africa, are still in the **initial stage** after land settlement, with land plenty [Boserup 1965]. Land expansion remains a feasible response to population growth - or to a change of tastes from leisure to income - without falls in total factor productivity (TFP), even with no technical progress or educational advance. In such places land inequality is normally small. Undeveloped land has little value, but land prepared for cropping embodies scarce labour and forms a large part of household assets. Farming is the main income source, but the highest incomes normally come from other sources.
- Most of our survey areas are in an **intermediate stage**. Arable land shortage, falling TFP from successive increments of developed land plus farm labour, and land-saving technical progress have appeared alongside rising population [ibid.] or otherwise rising demand. But diversification into modern non-farm income (and assets) is not yet far advanced. The better-off still depend mainly on farming, and on land as the key to it. Hence land, livestock and other farm assets loom large as sources of both asset and income inequality.
- In the **diversification stage**, in better-off (including advanced 'green revolution') areas and visible in some of our survey locations, some wealthy farmers remain, but their wealth depends increasingly on livestock and (with development) modern, labour-saving farm assets. Increasingly, the best-off live mainly on income from employment or non-land assets. These start to become increasingly significant sources of asset and income inequality, and of income.

The rural areas surveyed are mostly in the intermediate stage, though some areas (especially in Rajasthan) have entered the diversification stage and others, especially in Botswana, may be in the initial stage. Our hypotheses to be tested where possible against the survey results include the following.

4.2.4. (a) I-C poor households have a lower ratio of physical assets to income than the non-poor, so that values of total physical assets are more unequally distributed than income.²⁰

²⁰ In *developed* countries asset/income ratios rise sharply with income (and a fortiori with assets). For *developing* countries the probable causes of this (weaker saving and borrowing capacity among the poorer) should apply even more strongly, but evidence on household non-land asset distribution, especially linked to income data, is scarce (but see fn. 10 and, for all-India, Pathak [1977]). In Bangladesh, the ratio of land *acres per household* to mean *taka daily consumption per person* in 1998-9 was: for the 13.9% of persons landless (household holding 0-.04 [taken as .02] acres), .002; for the 31.5% near-landless (.05-.49 [.27]), .020; for the 19.2% marginal (0.5-1.49 [.995]), .068; for the 11.3% small (1.5-2.49 [1.995]), .090; for the 18.8% medium (2.50-7.49 [4.995]), .275; and for the 5.3% large (>7.5 [10.0?]), .380. Land-per-household rises much faster than consumption-per-head [Ravallion and Sen 1994: 827]. That would also apply, if a bit less strongly, to land-per-head (household size rises with land per household, but slowly [Lipton 1985]). In our surveys, land is a falling share of household assets as income-per-person rises (#xx below); this almost certainly applies to expenditure-per-person too, and to the Bangladesh case. So there - as in our surveys - asset/income ratios across households almost certainly rise with expenditure-per-person.

Accumulation of physical assets by the poor through saving and borrowing is limited by the urgency of current consumption needs (their high time-preference implies lower savings/income ratios) and the cost and difficulty of borrowing. Accumulation through inheritance is limited by the fact that the parents of the poor tend to have faced the same difficulties. This hypothesis will also be explored for main asset types (land, livestock, dwellings).²¹ A possible modification is that where agriculture offers few prospects – either because the area is still in the initial stage, or because farm resources have been depleted or colonised (see below) *local* enterprise, not only farming, is unlikely to thrive. In such cases, higher-income households may prefer to accumulate education, or other resources that enable them to migrate, rather than low-value physical assets locally.

(b) For I-C poor households, a low proportion of physical asset value is 'productive'.²²

Small saving and borrowing capacity is concentrated on dwelling needs.²³ It may also be the case that, apart from household effects, poorer regions are especially unpromising for physical asset formation, yielding a region effect on the share of productive assets in wealth; in regions in the initial stage, or from which land and agricultural assets have been substantially alienated, households able to borrow or save might choose to acquire education for migration, or durable consumer-goods, rather than local productive assets with low returns.

(c) A high proportion of productive assets is oriented to farming (farmland, livestock, and other assets that raise farm output) for most rural households, and especially for the I-C poor.

While, notwithstanding this, one would normally expect to find mean landholding (and the proportion landed) increasing with income, there is evidence that the reverse occurs in some less-developed African drylands, so that the landed are on average worse off than the landless. Substantial agricultural activity (and even farm assets) may characterise mainly income-poorer households [Delgado, Reardon on **Burkina, N Nigeria**]. This is usually 'distress diversification' marking overall rural economic failure, not development transition marking success. Given stagnant or falling farm output per head *and* per hectare in much of Africa in 1965-90 [Timmer 1995], the few rural households to escape poverty must do so mainly through non-farm opportunities. However, because these depend for growth mainly on rising demand from agriculture, its sluggishness means they grow slowly, often more slowly than population.²⁴

²¹ In three Indian drylands villages in 1975/6-1983-4, wealth-per-person Ginis were 15-40% above income-per-person Ginis [Walker and Ryan 1990: 73]. In Palanpur, Uttar Pradesh, per-person real-income and assets Ginis, respectively, were: 1962-3, .39 (.46); 1983-4, .31(.47). Corresponding Ginis for operated land per person including (excluding) the landless were: 1962-3, .45 (.37); 1983-4, .51 (.37) [Lanjouw and Stern 1998: 149, 157, 162].

²² High birth-rates and infant mortality rates reinforce this, because they mean a high proportion of household members who consume but do not save.

²³ Especially to the extent that the market in rented housing is thin or absent.

²⁴ South Africa's farm income trajectory has been more favourable in 1965-95 than in most other parts of Africa [e.g. Timmer 1995]. That is in part because S Africa's rural success has been based on forced transfers and subsidies of land, water and inputs to favour a small minority of wealthy, capital-intensive farms, alongside neglect of - or, at times, heavy extraction from and restrictions upon - the rural majority so there is simply not enough land, water, or information to support much farming in the sample area; and partly because this area has survived through remittance and pension income, rather than developed either through farm enrichment or through non-farm diversification.

(d) A high proportion of farm-oriented assets is farmland, at least for the I-C poor.²⁵

Productive land can often be accumulated without formal borrowing, or saving (at the cost of the poor's already scanty consumption). There are four reasons. First, farmland often yields some livelihood even with few other farm assets (livestock, tools etc); the reverse less often applies. Second, unlike other farm assets, *area* does not depreciate. Third, slack-season labour is more readily employed to raise or maintain *value* of owned farmland (or sometimes to break new land)²⁶ than to earn means to acquire other farm assets. Fourth, all these reasons make land the most plausible producer asset to be bequeathed across poor generations.

(e) The I-C poor tend to structure productive assets towards high liquidity and divisibility²⁷ - e.g. smallstock rather than largestock - to allow gradual acquisition without infeasibly large saving or loans, and gradual sales in case of uninsured emergency need. This will apply especially to poor rural areas, where capital markets are particularly imperfect, and in such areas may not be confined to the poor.

(f) Landless households receive a relatively high proportion of migrant contributions in kind, e.g. as food. Asset positions affect income *choices* – it is easier for landed households to grow their own food.

(g) Farm-related income is a high share of total income, especially for the I-C poor.

Asset positions affect income totals. If (c) and (d) apply, farm-linked assets, especially land, are a large *share* of rural assets, especially of productive assets for the poor. For them, however, the *value* of such assets – and hence their contribution to income – may be small, either because of inadequate or bad land overall, or because it is very unequally shared. But will not such inequality create big farmers, who employ labour, thereby boosting the asset-poor's *farm-related* income? Perhaps, but (i) big farmers are less labour-intensive than smaller farms, pushing down the demand curve for farm labour;²⁸ and the poor's lack of farmland (ii) raises their need for employment income and (iii) lowers their opportunity-costs when supplying labour for hire, raising their supply curve of labour. Hence great farm inequality pincers the wage down, raising per-hectare labour supply while reducing per-hectare demand.²⁹ Further, very large farmers spend little of their production and (especially) consumption budget locally [Hazell and

²⁵ Part of assets (as of labour and income) is linked to the *rural non-farm sector* (RNFS), producing (a) farm inputs, (b) value added to farm outputs, (c) consumer goods and services. In poor rural areas, RNFS comprises 25-40% of income and employment - less of land and animals, more of equipment. The share of (a), (b), and especially (c) rises with development (as does *specialisation* within and among households), but depends heavily on growth of nearby farm demand, especially for the emerging main RNFS subsectors, construction, trade and transport [Reardon 1998...]. The survey lists household and non-farm assets, but they are hard to separate (#xx below).

²⁶ On 'labouresque' capital see Sen [1968].

²⁷ This is normally constrained by an absolute need for a dwelling (see (a) above). However, even here, lower-income groups are likelier to choose gradually-renewable or disposable dwellings (e.g. kachcha as against pukka houses in rural India) and, in developed countries, houses with higher turnover, readily saleable in emergency.

²⁸ The larger a farm, the likelier it is to gain, via lower transactions-costs, from product-mixes and methods that cut labour/land and labour/capital ratios.

²⁹ The use by colonial countries of poll-tax or cattle-tax to 'force out' small farmers into the labour market may therefore have been supported by the land seizures, also reducing the alternatives open to suppliers of labour.

Ramasamy 1992]. Often, as in much of the S African survey area, large farmers are far away, which cuts demand for both local farmworkers and local non-farm products. This may leave rural regions, if at the 'wrong end' of inequality in land (and stock and other farm assets) - and, even more, poor households within them - unable to subsist mainly on local income, whether from farm assets or from employment. Whether farm incomes are a 'large' share of total income - for the region or for the poor, and both absolutely and relatively to others - will depend on local farm vis-a-vis non-farm growth (following the three 'stages' of #4.2.3), and on rural household chances to 'depend' on *urban* remittances or transfers. Such variations in the proportion of rural people with farm assets, associated with variations in farm income, earnings and poverty, stand out starkly from regional contrasts in the surveys.³⁰ Some regions - whether due to lack of farm opportunity ('natural' or because the whole region has been deprived of farmland or resources) or to within-area inequality - provide most households with little farmland and hence rural income: from farming, farm employment (because large farms are less labour-intensive), and secondary income (because larger farmers have lower propensities to consume locally). This increases *rural dependency* on transfer incomes,³¹ but the impact on different types of income (migrant and pension income), and on poor vis-a-vis non-poor, is regionally variable, as we shall explain

4.2.5. We set these seven hypotheses against our SA survey results in #4.3.3-10 below. First, we ask how they relate to the rural 'sequence' of asset acquisition across the stages described in para 2, and to an overriding feature of farming in drylands: risk. As for sequence, the first asset for poor households is a dwelling. While they have few other assets, they must normally rely on others for employment (except in the very few areas where land is still freely available for development into farmland, private or common). Later, with development (and savings capacity), even poor rural households often attain some rights to farmland. These are often followed by command over livestock³² and/or other farm assets. All this farm capital initially grows - in value, share of physical assets, even share of productive assets - with development and poverty reduction.³³ Later, at first for the less poor, land (and even total farm-related capital), as a share of assets and as a source of income, is displaced by non-farm physical assets, education, and - unless extreme land inequality restrains demand for labour (#4.2.4g) - non-farm and more 'modern' employment income. (Thus earnings, rather than assets, are the main income sources for the rural poor in much of India, and the generally far from poor rural populations of Western Europe.) Summarising, in early rural development - until almost all workers have sufficient food, and have begun to rely for total consumption substantially on non-local production - growth in farm output per head is associated with:³⁴

³⁰ As implied by Malthus, if rural area A - because of fewer farm prospects, more inequality, or otherwise - started with more poverty than B, faster emigration or slower natural increase in A might equalise income levels with B. Chs. X-xx explore this effect, but it is not instantaneous, and turns out to be dubious even in the long term.

³¹ Often this is the counterpart of the 'forcing out' of people - from areas deprived of smallholding land by colonial-type seizure - to work in mines, towns, or large farms, providing remittance (or ultimately pension) income for their smallholder households, now deprived of land. Cf. the 'marriage of maize and gold' in S Africa in the 1920s, or the sequences described in Zimbabwe (then Southern Rhodesia) by Arrighi [ML ref] and Saul [ML ref].

³² Our surveys confirm, however, that even the very poor acquire some *smallstock* quite early in development.

³³ This time-sequence, in which early agricultural development leads to a *rise* in the share of asset value comprising land and farm assets, is in contrast to the cross-section hypothesis (c) above.

³⁴ This slides over the differences between staples farming, food (including animal) farming, and farming for own or nearby consumption. Only in *early* development in *poor* rural areas is this elision reasonable [IFAD 2001].

- an initial rise in the ratio, to total and productive physical assets, of farm assets - and sometimes (e.g. via rising land value, and till saving-and-investment 'catch up') even of land;
- except in very unequal areas increasing *disconnection* of income poverty from lack of physical assets, because even those without them benefit from rising demand for labour [Kerr and Kohlavalli 1999, Hazell 1999];
- and a rise in the proportion of the poor's asset value that is 'productive'.

In later development, there is both capital-intensification in, and product and labour diversification out of, agriculture; the ratios of land to farm assets, and farm assets to total productive assets, fall sharply; low-income groups shift from reliance on assets to earnings.

4.2.6. Turning to risk, in rural drylands especially, behaviour is modified by the need, especially in poor households, to take precautions against covariate, uninsurable and substantial risks associated with drought. Especially if there is little irrigation (as in our survey areas in Botswana and S Africa), this pushes poor households away from some activities, especially those incurring input or hired-labour costs³⁵ before there is assurance of timely and sufficient rainfall; and thus towards low-input, low-value crops such as sorghum, and in drier areas away from crops towards smallstock farming. Our surveys were not designed to explore such issues, but the result is to modify, not to reverse, behaviour underlying the argument of paras. 4.2.3-5. In particular, in all three survey areas, while several years of drought or bad rains were reported, so was significant landholding, cropping, and farm income for many households.

[4.2.7. **Tentative.** (c), (d) and (g) roughly match evidence from two of the Indian survey districts (#xx). But in much of India, including these dryland but significantly irrigated areas of Rajasthan, smallholder productivity has grown rapidly in the past three decades. Hence (c), (d) and (g), while still largely true of the Indian sample, have begun to erode. This has gone furthest in Nagaur district, due to its successful diversification out of agriculture into quarrying. That is a small example of the 'development transition' that is the usual result of rapidly rising land and labour productivity in agriculture. In India this is seen mainly in green-revolution, still agriculture-based, districts with which Nagaur can exchange, so that initial agricultural surplus generation becomes, in the formerly backward rural sector, embodied in widespread economic growth.]

4.3. Farmland, assets, agriculture: why South African survey data refute some 'asset expectations'

4.3.1. The hypotheses in #4.2.4 (underlined below) accord only partly with our S African data.

³⁵ There was almost no hired labour market to local smallholders in Botswana or S Africa survey villages (**check**).

Table 3. Some key asset and income features of SA rural households

[illegible]

%rcvrs												
earngs	0.46	0.36	0.51	0.41	0.25	0.51	0.43	0.35	0.47	0.73	0.70	0.73
pensions	0.43	0.44	0.42	0.52	0.55	0.51	0.40	0.43	0.38	0.45	0.22	0.53
farm	0.45	0.47	0.45	0.24	0.22	0.25	0.43	0.49	0.41	0.89	0.89	0.89
migrt	0.45	0.25	0.54	0.38	0.37	0.39	0.43	0.20	0.55	0.61	0.38	0.68
%owners												
land	0.57	0.63	0.54	0.56	0.64	0.51	0.52	0.60	0.48	0.91	0.90	0.91

Notes to table 3

Source: Kirsten et al, this volume, and their SA country sample data (dec17a.doc, dec18.doc, dec20.doc). For standard errors and further data, see tables **5-6??** below.

Notes: I-C (income-consumption) poor: households with income below 2000 Rand/year/equiv-alent adult (see **Annex D.a.**) Ratios of totals, **i.e. row x divided by row y.**

Farm income = agricultural sales + self-consumed (subsistence) cereal output (**Annex D.c.**).

Migrant income: remittances + goods brought back by returning migrants.

'Wtd rcvrs' and 'wtd owners': no. of households receiving income (owning assets) of that type; households from villages with smaller sample/population ratios weighted upwards (**Annex D.b.**).

For standard errors and more detail, see Tables 6 and 7.

(a) I-C poor households have fewer assets, but a lower ratio of physical assets to income, than the non-poor, so that values of total physical assets are more unequally distributed than income

I-C poor households unsurprisingly have fewer physical assets than others, but their asset/income ratio (Table 3, last row) is much *higher*, about triple that of the non-poor, reflecting the fact that sample assets, and some main types, are substantially *less* unequal than income (Kirsten et al., this volume, p. xx). This surprising finding reflects the nature of the sample and of S African distributional history. White farmers, frequently allocated formerly Black-farmed land by fiat in the apartheid era, are outside the sample and their entitlements to land, water, and other rural resources make them extremely asset-rich (much more, relatively, than income-rich) compared to sample members. Were these farmers included, hypothesis (a) would probably pass. Annex E (*to do*) estimates the Gini for arable and grazing land in Northern Province (attributing the latter among households in smallholder areas) at 0.93 - surpassed, in the 43 developing countries with records, only by Paraguay and Peru (Table 1). That this helps explain the sample IC-poor's *higher* asset-income ratio than the non-poor gets some support from the fact that the ratios are closest in the 'more-developed' West, the sample region where mean income and asset inequality are both highest.

4.3.2. That, however, does not fully resolve the mystery. Though this sample is truncated (excluding the asset-richest rural group), one would expect the sampled IC-poor, even compared to others *in the sample*, to be disproportionately low-saving, low-borrowing, and hence even more asset-poor; yet asset inequality is *less* than income inequality. If average assets are few (because of great asset concentration outside these smallholder drylands - on white rural, and urban, people) and not very unequal (less so than income), how do the surveyed IC-non-poor attain their substantial income advantage over the IC-poor? Big and very unequal *local* earnings are not the main answer. The average poor household gets 44 per cent of income from pensions and 15 per cent from migrancy; for the average non-poor household the proportions are reversed, respectively 15 per cent and 47 per cent (Table 3). For all households together, mean migrancy income is 2.5 times mean pension income; mean migrancy income *minus* mean pension income is about 27 per cent of mean total income. The much greater dependency of poor households on pensions, but of non-poor households on much larger migrancy income, accounts for most of the gap between them. We return to these issues in the context of the striking separation of almost all the S African survey households into three discrete groups: those whose income depends overwhelmingly on pensions, on migrancy, and on local earnings, land and other assets (sec. zz).

4.3.3. Perhaps migrant income brings (i) pressure to build up assets (real or financial) for the migrants rather than for their original households, and (ii) if it is in goods rather than cash, as with xx per cent of remittances, transactions costs in investment. This is consistent with the fact that - though the IC-poor's asset/income ratio is, paradoxically, far *above* the poor's in Central and South - the ratios are closer in West, where land, livestock and farm-linked assets per household, and proportions of income from local sources³⁶ (farm income in particular), are well above the other regions (Table 3), though all still much lower than in most non-South-African

³⁶ See Table 3. Compared to West, both Central and South depend much more heavily on non-local income: Central on pensions, especially for the poor; South on migrant income, especially for the non-poor. See #(XX) *below*.

rural developing areas. We return to this in the context of the special features of migrant-dependent households (sec. 4.4).

4.3.4. The primacy of dwelling capital (and household assets) in S African smallholder areas - 'non-productive' given the thin or absent market in rented accommodation - is supplemented by the low value (due to its small amount and unimproved nature) of semi-arid cropland. So, more than the Indian sample, the S African sample confirms hypothesis (b): For I-C poor households, a low proportion of physical asset value is 'productive'. Land, livestock and farm assets comprise only 13 per cent of asset value for the I-C poor, and 26 per cent for the non-poor; respectively, a further 11 and 15 per cent comprises household assets, some of them productive.³⁷ However, once again, a pointer towards the likely consequences of agricultural development comes from the more 'landed' and agriculturally active West region. There, productive farm assets are a substantial part of total measured assets for the non-poor (47 per cent) but, again, significantly less so for the poor (11.5 per cent). The gap is also significant in South region (26 per cent as against 16 per cent), but in Central region (where over 90 per cent of physical assets comprise dwellings and mostly non-productive household assets) the gap is not statistically significant. The high share of dwellings, and the small differentiation between dwellings value for the income-poor and the income-non-poor, helps explain the apparent paradox of higher asset/income ratios for poor than for non-poor, especially in Central, where poverty incidence is much the highest, and where land, stock, and farm assets and income count for least.³⁸ The excess of non-poor over poor farm assets per household elsewhere (and at all-sample level) is due mainly to largestock and other non-land farm assets; farmland, and except in West smallstock, go against the trend, forming a significantly larger share in assets among poor households.

4.3.5. Our samples provide very limited evidence to assess hypothesis (c): a high proportion of productive assets is oriented to farming (farmland, livestock, and other assets that raise farm output) for most rural households, and especially for the I-C poor.

4.3.6. Before coming to (d) and (g), we confirm (e) and (f); (e) the I-C poor tend to structure productive assets towards high liquidity and divisibility, at least to the extent that this is indicated by a higher ratio of smallstock to largestock than in non-poor households (Table 6); (f) landless households receive a relatively high proportion of migrant contributions in kind, e.g. as food: landless households receive 26% of migrant incomes as goods as against 15% for the landed.³⁹ In this instance transactions-costs generate a link between asset-type and the preferred type of income.

4.3.7. Literally interpreted, the S African data only partly support (d): a high proportion of farm-oriented assets is farmland, at least for the I-C poor. Some 53 per cent of their farm-oriented assets comprises farmland, more than for the non-poor (15 per cent), but overall the share is only 20 per cent.⁴⁰ The difference is sharpest in West, where 62 per cent of the IC-poor's farming

³⁷ All cited differences are significant at 5 per cent unless otherwise stated.

³⁸ The almost equally low share of farm income in South - despite having considerably more land, stock and farm assets per household - suggests exposure to more severe drought in the reference year

³⁹ The difference is significant at 1 per cent. The average landed household receives more remitted cash, and a lower goods value, from migrants than the average landless household.

⁴⁰ This depends on our (perhaps rather high) assumed land price.

assets comprise land, as against only 7.5 per cent of the much greater farming assets in non-poor households and 9 per cent overall. Non-poor households, in this more promising farming region, have supplemented modest land assets by acquiring livestock, especially largestock (Table 6), much more than elsewhere, or than the poor have been able to do

4.3.8. As for (g), farm-related income is a high share of total income, especially for the I-C poor, only 4.3 per cent of sample income is from farming. Does this understate the importance of farming to the rural economy, especially the poor, or in the apparently more farm-oriented West region (where it provides 13 per cent of income, and where 90 per cent of households own farmland)? If so, we expect that households with little farmland, above all the landless, in West have smaller mean income/a.e. (and greater risk of IC poverty) than those with more; and that the IC-poor have a greater *share* of income, especially of productive income, derived from farming. Nevertheless, due to historically high *national* land Ginis, even West's larger, better-shared farmland endowment (Table 5) does not leave enough land to generate even close to the majority of rural income for all but a few households, partly because migrancy and pensions together provide over half the income of 70 per cent of households in Central, 60 per cent in South, and 50 per cent even in the more 'factor-reliant' West region (see Table 9 and sec. 4.4, where we explore interacting differences between main household income source, region, and the role of farm land, assets and income).

4.3.9. Pulling together the regional aspects of the findings, we see that where land is less equal, with a large proportion of tiny farms, and/or linked with few livestock, landedness tends to go with more poverty. Central typifies this case and West the converse (see table 5). The data show that:

(i) Landed households' mean income is not significantly different from landless households' for the whole sample (R19453 v R19572) or in South (R20560 v R19291), but is 62 per cent higher (R27731 vs R17146) in West and 25 per cent lower (R11690 v R15611) in Central, the least agriculturally active region (as indicated by the shares of income and assets related to farming in Table 3).

(ii) Poverty incidence is significantly higher in South for landed (38.0%) than landless (27.3%), as in Central (43.7% and 31.1% respectively), but not West (22.7% and 24.6%). (i) and (ii) indicate that, in a smallholder region with somewhat more land and livestock (and a more equal internal distribution of land), agriculture can help pull people out of poverty.

(iii) The better prospects for mean income and poverty incidence - relative to other regions and/or to the landless - of landed households in West reflect not only direct effects of farm incomes, but also their link to earnings. Outside West, landless households have higher earnings: on average, double those of the average landed household in South, and triple in Central. In West, the *landed* have 2.6 times the earnings per household of the landless (R13067, or 48 per cent of total household income, v R4961, or 29 per cent); the gap, and the difference from landed/landless earnings ratios elsewhere, is significant at 5 per cent despite the small number of landless sample households in West. Higher earnings in West probably reflect greater local demand for labour - due to the greater propensity of smaller, more equal farmers to buy goods locally [e.g. Hazell and Ramasamy 1992].⁴¹ In West, land (via both agricultural activity, and

⁴¹ But this cannot be the whole story, as it would push up earnings of the landless commensurately with those of the landed

perhaps as a contributor to earnings via non-farm production) shows some potential as a path to higher total incomes and escape from poverty and pension-dependency (para. xx). Inequality may not fall: in West poor households have fewer *total* assets than in South or Central, and the non-poor more (Table 3): i.e. assets are more unequal. A higher proportion of assets in West, for both poor and non-poor, is *productive*, farm-related, and helpful to the poor. Poverty incidence is lower, and the mean income of the poor higher, than elsewhere; especially in Central, there are too few or too low-quality farm opportunities for farming to contribute much either to the poor's income and assets, or to the escape from poverty (Tables 3, 6). This underpins the finding that (in contrast to West) landedness in Central militates against high mean income and predisposes to poverty, suggesting unattractive farm opportunities there. Especially since land access appears necessary (though not sufficient) for accumulating other farm assets, and conducive to acquiring largestock (#xx) - and in conjunction with the much greater pension-dependence of the poor in South and Central (see below) - the regional contrast, especially between West and Central, confirms the linkage of rural dependency to premature de-agriculturation⁴² in *most* S African smallholder areas. West partly escapes, via more land, water and stock endowments, and perhaps higher farm productivity (it is nearest to the more productive, largely White-run farms further West: **see map in S Africa country paper**). But even in West, with barely 12 per cent of income directly from farming - and much more elsewhere - such escape requires more access to land now locked into giant farms outside the survey villages. The landholdings in Tables 3-5 may not seem so small, but almost all land is unirrigated. In six Indian dryland villages in 1982, the value of wetland was about four times that of dryland; the *median* landholding in unirrigated-land equivalent ranged from 2.5 ha to 5.8 ha, averaging 3.7 ha, for the roughly 70 per cent of landed households [Walker and Ryan 1990: 13, 160]. This (and only slightly smaller equivalent holdings in (??) the Indian sample) is worth more, both per landed household and overall, than in the S African sample, even in West. Even in many drylands, irrigation in India allowed a labour-intensive green revolution, with big income gains for poor small-holders and labourers [Hazell 1999]. S Africa's concentration of over 80 per cent of land (and irrigation) in 5-7 per cent of big capital-intensive farms is inconsistent with that trajectory.

4.3.10. The S African data - superficially showing farm land and income, actual or potential, as *minor, overall now, for assets or income*⁴³ - if disaggregated reveal land and farming as crucial, *locally now, and potentially overall*, to these, especially for the poor:

- Household farmland is a higher proportion of household physical assets (6.9 % for the poor and 3.8% for the nonpoor: table 3). It is also larger for *asset-poor* households (13.7% for the bottom quarter as against 4.1% for the rest). Land is more equal than other productive assets. More land for households like those in our sample would help the asset-poor and IC-poor most, unless its distribution became less equal.
- Correspondingly on the income side, farm income looms larger in *income for IC-poor* households than for others (respectively 7.6 per cent and 3.0 per cent); interestingly, the reverse is true for the asset-poor (for the bottom quarter in wealth it is 1.9% and for the rest it is 5.0%). However, where farm income matters most (West), it is equally important for poor and non-poor.
- Land as a *share of productive assets* is 14.8% for the nonpoor and 52.7% for the IC-poor.

⁴² Based on historically mandated expropriation to White largeholders of land, water, research, and infrastructure.

⁴³ This view is found right across the political spectrum, owing to its various possible policy implications.

- Household farmland seems a necessary key to non-livestock farm assets.⁴⁴ Not one household had such assets - nor even general-purpose productive assets such as a van, or non-farm ones such as a sewing machine - unless it also held farmland.
- Despite common grazing of largestock and most smallstock, both are more for the landed, and correlated with private farm size⁴⁵, even given region-linked ecology. This may reflect complementarities: fodder from crop residues, manure, draught.
- Only household farmland is measured in the survey, and we have assigned a value to it. Yet households also have access to *common grazing land*. Hence farmland forms a larger proportion of assets than appears from considering private land alone.
- Where farm income and land are more, and more widespread (in West), households with farm involvement have *more* earnings than others; elsewhere, they have *less*. Hence farm assets can, but need not, ease escape from poverty. How do they relate to *rural dependency*? The S African data suggest that land access is unrelated to rural dependency, but that livestock ownership and agricultural income, at least in West, is.

4. Poverty, income, local dependency, land and agriculture: the S African [and Indian] samples

4.4.1. Smallholdings normally feature much larger labour/land ratios than largeholdings (for reasons of transactions costs [Binswanger et al. 1995, Lipton 1993]). Therefore, in low-income areas with rapid growth of rural workforce and increasing constraints on arable land supply, the extent to which rural development enables rural people to obtain livelihoods locally depends largely on the proportion of land that is in smallholdings; the effects of technical progress upon such land; and, in particular, which of three alternative *sets of background conditions* applies:

- Little technical change, but farmland mainly in widely-accessible smallholdings: 'agricultural involution', as found in Indonesia by Geertz, with need-driven labour-intensification: more work just to maintain, at best, farm output and income per person and poverty levels.
- Farmland mainly in smallholdings, but agro-technical progress - induced by rising labour/land ratios [Boserup 1965, Binswanger & Ruttan 1977] or largely exogenous as in Asia's 'green revolution' [Lipton & Longhurst 1989] - fast enough to raise mass farm incomes and cut poverty despite falling real farm prices (especially with later rural de-agriculturation).
- Extreme farmland inequality *overall*; agrotechnical progress is induced (and affordable, financially and as regards risk and access) mainly for large capital-intensive farms, and thus biased towards their factor-mixes; the rural poor gain little (though seldom nothing).

We now turn to features of the S African sample - and perhaps of S Africa (and other African countries with extreme land inequality) more widely - suggesting a fourth path:

- Extreme land and farm-input inequality *between socially separated, but currently integrating, rural areas*. In the historically advantaged areas, the inhabitants, often colonially or ethnically privileged, were granted land and other agriculture-linked inputs (at the cost of workers elsewhere), and show agrotechnical progress followed by success-driven rural deagriculturation - falling agricultural shares in rural output and workforce - and urbanisation. In the disadvantaged areas, output and workforce show *premature de-agriculturation*. They enjoy neither agricultural prosperity nor rural diversification (though

⁴⁴ Such assets are rarely leased in rural smallholdings areas of S Africa, so reverse causation is unlikely to apply.

⁴⁵ Across 573 households with asset data, the simple r between land and livestock = .18. Further the simple r between livestock and other farm assets is .41.

the less agriculturally disfavoured show some 'involution'), but become increasingly *rural dependencies*, upon transfer incomes (from migrants or pensions) from other areas. Even after ethnic or colonial bias have ended, great inherited land and other intra-rural inequality - combined with urban bias against rural households⁴⁶ - so deprives the disadvantaged rural areas of land, water, farm research, and farm-linked nonfarm options [Hazell and Ramasamy 1992] that they must turn to non-local transfer incomes for acceptable livelihoods.

4.4.2. The S African sample shows such 'rural dependency' in the structures of assets, poverty, and income (see Table 4). Almost 98% of the survey population of households falls into three sharply distinct groups: 27 per cent dependent very largely on pensions, 32 per cent on migrancy (table 4), and 38 per cent on local (farm and employment) factor returns.

TABLE 4 RURAL DEPENDENCY

	% of households with over half income from:			
	Pensions	Migrancy (rems+gds)	Local factors	Other households
All	26.8	32.3	38.5	2.3
Poor	40.5	16.5	42.0	1.5
Non-poor	20.1	40.2	36.9	2.8
Central	44.1	25.2	30.6	0.0
South	24.8	33.6	39.8	1.8
West	11.7	35.6	43.0	9.7

4.4.3. The following conclusions can be drawn from tables 4 and 8-11:

(i) For the '*pension-dependent*' (PD) 27 per cent of households - half of them poor - 79 per cent of income is pensions (for others it is 6.7 per cent). Mean income is half that of non-PD households - R10827 (R22756) - and per a.e. R 2288 (R.5124). PD households, despite the massively greater role of pensions, obtain a larger share of income from farming than others (5.6 per cent vs. 4.0 per cent, n.s.); the share of farm income in *non-pension* income is, respectively, 27 per cent and 4.3 per cent. Yet *by region* PD is most where farming is least (PD affects 44 per cent of households in Central) and least where farming counts for most (only 11 per cent of households in West are PD).

(ii) For the '*migrancy-dependent*' (MD) 32 per cent - fewer than 1 in 7 poor - 84 per cent of income is remitted, or brought back as goods, by migrants, as against 6.6 per cent for non-MD households. Mean income is almost 50% above that of non-MD households (R25068 as against R16844), and per a.e. R 5547 (R 3752). Like PDs, MDs get a slightly (n.s.) larger share of income from farming than others (5.8 per cent as against 4.9 per cent), but the share of farm income in *non-migrancy* income is 36.5 per cent for the MD and 6.2 per cent for the non-MD. MD affects 44 per cent of households in South, but only about a quarter in the other two districts; South relies less on land assets and farm income than West but more than Central, but stands out for its much higher land inequality.

⁴⁶ Such dependency of rural people upon (often urban) transfer income is entirely consistent with - indeed, may be necessitated by - public action to turn the terms of trade, or the balance of public expenditure, education, etc., against rural (or farm) activity, e.g. in the context of 'urban bias'.

(iii) What of those who are not MD nor PD, but live mainly on income from earnings or farm-linked assets: the '*factor-reliant*' (FR) 40 per cent of households? (Only 2.3 per cent is not FR but not, either, MD or PD.)⁴⁷ The FR households comprise 38 per cent of the survey total, about one-third poor. 93 per cent of their income derives from local factors - employment or farming - as against 8 per cent for non-FR households. Mean income *over the whole survey area* is almost the same as for non-FR households (about R 20,000), though income per a.e. at R4800 is slightly higher; but we later discuss the large regional variations - FRs are far ahead of others in mean household and per-a.e. income in the more agriculturally active West region, but not in median incomes, nor in poverty reduction, suggesting better 'development' than 'poverty' impact.

4.4.4. With over half income from pension or migrant sources, and with each source providing 80 per cent of income for those households - over 60 per cent of all - that are PD or MD, dependency is clearly a key feature of this sample area, as of much of rural S Africa [Lund and Ardington 19xx]. But MD and PD households are, in some senses, opposites rather than similars. Before exploring how this relates to farmland and other rural assets, we need to explore regional amounts, access and distribution of these (Table 5).

Table 5. SA Landholding: incidence and distribution by region; wealth Ginis by region								
	hhs	%landed	G-landed	G-all	Meanland	Meanland	G-wealth	G-wealth
		(s.e)	(s.e)		Landed	All	hh(se)	ae(se)
Total	573	54(3)	0.35(.02)	0.64	2.86(.14)	1.55(.11)	0.49(.02)	0.52(.02)
Cent	155	54(5)	0.51(.06)	0.73	2.65(.36)	1.44(.23)	0.44(.04)	0.50(.06)
South	275	49(4)	0.28(.04)	0.65	3.07(.17)	1.51(.15)	0.49(.02)	0.51(.02)
West	143	90(3)	0.23(.03)	0.31	2.28(.09)	2.06(.15)	0.45(.03)	0.47(.03)

In South and Central, barely half the households have farmland. In West, 90 per cent - both among poor and among others - do, and land distribution is most equal. It is in West that the proportion of households in poverty is lowest: 26 per cent, as against 31 per cent in South and 40 per cent in Central. Also, mean income per *poor* household in West exceeds South's by 34 per cent, and Central's by 21 per cent⁴⁸ (Table 7). True, even for the average IC-poor household in West, land is only 7 per cent of physical assets, but households owning land are far likelier (#4.3-10) to own livestock and other farm assets; with land, these are 12 per cent of assets for the poor in West, and 45 per cent for the non-poor (Table 3). Direct farm incomes form 11.0 per cent of household income in West for the poor - as against 8.7 per cent in South and 3.0 per cent in Central. Also earnings form a much larger proportion of the poor's income in West (42 per cent, as against 32 per cent in South and only 17 per cent in the least landed region, Central). Most sample earnings do not come from employment in local agriculture, but some do. Probably,

⁴⁷ MDs, PDs and FRs are three very different types, with few overlaps or near neighbours, and together cover almost all households. MD and PD households are almost opposites. MDs are better-off than non-MDs, less poverty-prone, larger, with higher proportions of prime-age adults even among resident members??, and most prevalent in South; PDs the reverse? Also, reliance on pension income in PD households, and on migrant remittances and goods in the MDs, is around 80 per cent, distinguishing them sharply from each other and FR households.

⁴⁸ The advantage of poor households in Western over other regions in terms of income *per equivalent adult* is slightly less (29 per cent and 20 per cent respectively), but still significant at 5 per cent, and substantial.

higher earnings in areas with more, and more widely spread, land and farming are due mainly to greater primary (and secondary non-farm [Hazell and Ramasamy 1992]) hired employment there.

4.4.5. This brings us to the key and distinct regional roles of the 'three-way split' into types of main income source, and of households largely reliant on each. In West, only a fifth of poor households receive pensions, and they support 14 per cent of household income for the poor (and 13 per cent for other households); elsewhere about half the poor households receive pensions, which comprise 44 per cent of the poor's income (13 per cent of the non-poor's) in South and 52 per cent (27 per cent) in Central. Poverty is clearly associated with pension-dependence; farm incomes, plus earnings perhaps associated with these, appear to substitute for pensions in the more agricultural West.

4.4.6. While PD-households *overall* have lowest mean income and are most poverty-prone, the reverse is true of MDs, but the regional story is more complex. Where migrancy looms largest in household total incomes (South), it provides much bigger income shares, for a much larger share of households, among the non-poor than among the poor. In West, migrancy incomes also enter a significant larger share of poor than of non-poor households, but form a slightly smaller share of income; and in Central, the least landed region, migrant incomes are greater among the poor.

4.4.7. A profile of West emerges clearly from tables 8 and 9: a much bigger proportion of households with land; farm assets, land, and livestock a larger share of assets; higher mean income; lower poverty incidence and depth; less reliance on pensions-plus-migrants (pensions being much the main contrast vis-a-vis Central, migrant incomes vis-a-vis South); more reliance on farm incomes, specially for non-poor. We now ask how the three-way split of S African survey households into pension-dependent (PD), migrancy-dependent (MD) and factor-reliant (FR) households - relates to variation of asset size, structure and distribution, and its link to incomes, in the S African survey.

i. The three-way split by regions: income-dependence, and relevance to assets:

4.4.8. Before using Tables 8-11 to ask how asset size, structure and distribution relate to this split, we recapitulate its dramatic features. 98 per cent of households in the region⁴⁹ derived more than half their income from just one of three types of source. 27 per cent were pension-dependent for more than half their income. 32 per cent were migrancy-dependent, relying mainly on remittances sent or goods brought by migrants. 38 per cent were factor-reliant, with incomes mainly from earnings and farming. Typically these 98 per cent of S African survey households depend on their main source for much more than half income: 80 per cent in PD-households, 84 per cent in MD-households,⁵⁰ and 93 per cent in FR-households.⁵¹ It is well known [Ardington

⁴⁹ (i) Regional proportions differ slightly from those of observed households, due to population-weighting (**Annex xxx**). (ii) The three-way split among persons differs somewhat from that among households due to inter-group differences in household size. (iii) Of the 513 households with income data, the 'anomalous' 16, *not* receiving over half income from pensions, migrancy or factors alone, are close to average in income and asset size and structure (first two columns of numbers, table 9).

⁵⁰ A further 10.0% of PD household income is from migrancy, and a further 8.6% of MD household income is from pensions. So these households use locally applied factors of production for less than one-tenth of their income.

and Lund] that migrancy and pensions loom large in black S Africans' rural income. Less familiar is our finding that in Northern Province most households are sharply 'one thing or the other', PD or MD or FR (table 9). These are unlike rural households in many countries in not being 'bricoleurs', cobbling together income from widely diversified sources, and so reducing risk.⁵² Drought, the main source of drylands income risk elsewhere, may here be that only for a few farming-oriented households - but most face similarly serious risk from job loss by one migrant, death of one pensioner member, or removal of one main local earnings source. Such risk to non-diversified incomes may deter tying down savings in specific physical assets, especially illiquid ones such as largestock or tractors.

4.4.9. Is the approximate 27-32-38 percentage split into PD, MD and FR households, and the percentage reliance on main income source (respectively 80-84-93), uniform by region? Tables tws1-2 show that South (with over two-thirds of all households) is close to the survey-wide results. West has a significantly larger proportion than Central of FR-households (47 per cent as against 31 per cent) and MD-households (39% v 25%), leaving a much smaller proportion of Central households as PD (44 per cent; West 13 per cent) (table 8, row 1). These PD households in West are the only group showing clearly lower main-source income dependence (64 per cent).⁵³ All this could be linked to the more promising farm situation in West than in Central.

Bottom line: 98% of households derive over half income - and on average 80-90% of it - from just one source-group: migrancy, pensions, or local factor earnings. These three groups face distinct choices and prospects (including poverty risks) and there is good reason to believe this affects their assets.

ii. PD, MD and FR: 'demographically distinct' income-seeking behaviour?

4.4.10. For the whole survey area, Table 8 shows no significant differences between FR, PD and MD households in mean or variability of number of resident persons (7.2-7.4), adult equivalents (4.7-5.1), or persons of working age (15-60). If anything, migrancy-dependent and pensioner-dependent households have *more* working-age residents than others. This is surprising.⁵⁴ In the year 1999-2000, by earnings and farming, 3.9 working-age residents produced on average 19,100 Rand in FR-households, yet 4.5 such residents averaged only 1900 Rand in MD-households, and 4.0 in PD-households only 1200 Rand (tables 8-9). *Why should working-age residents in MD and PD households generate so much less income - in each region, as well as survey-wide - than their FR counterparts? Why should migrants and pensioners hand income to relatives of working age who seem to do so little for themselves?*⁵⁵

⁵¹ The median PD household obtained **xx** % of income from pensions; the median MD household, **xxx** % from migrancy; and the median FR household, **xxxx** % from earnings and farming.

⁵² Levi-Strauss [19**xx**]. A large majority of MD and PD households report only one pensioner or migrant (**x**% **PD**, **xx**% **MD**); so their income sources are highly undiversified'. FR household earnings may come from several sources, but are usually from a single 'job'; and only in West region is farming is a substantial source (17%), and hence diversifier, of FR income.

⁵³ Significantly lower than other Districts at 5 per cent, despite the few (15) PD-households in West.

⁵⁴ Especially since the survey average of residents of working age per household, 4.15, is anyway high by the standards of most such surveys in developing countries.

⁵⁵ Of course the definition of PD, based on income shares tends to collect households with low earnings capacity, but the comparison in para.4.4.12 shows that the point is valid, even when such bias is allowed for.

4.4.11. A credible account is possible for MD-households. Survey-wide, these get no less income from migrancy (R21,100) than do FR-households from local factor-based work (R19,900), and have slightly more *total* income per resident adult-equivalent than FR-households, and significantly less poverty risk (36 per cent vs 16 per cent). There may be a division of responsibilities among working-age members of MD-households involving so-called 'chain migration' of members in turn; periods of rest or illness; and/or rotated or sequential education, child-care, or care of the old or ill. All MD-household adults may judge that such arrangements provided at least as good income and security as the option of being factor-reliant - and all might thus prefer migrancy, despite residents' low factor income and high unemployment.

4.4.12. Staying an MD-household with low factor income, given the numbers in tables 8-9, might therefore be an equilibrium outcome for both (migrant) income-receivers and (resident working-age) income-users. It is harder to construct a rationale for pensioner income-receivers and resident working-age income-users in an average PD-household. This averages 4.0 persons of working age. They cannot all be looking after Granny full-time. Why should either pensioners or working-age residents accept the latter's low local factor income? In households with no pension income earnings per working age adult are *five times* as high as in households with pension income. PD-households' total income per a.e. averages below half that of other households; half are poor; and their average household income from pensions is only R8600 - as against the R20,000-odd apparently available from migrancy or factor-reliance (to judge by MD- and FR-households respectively) as a use for the time of working-age persons. Local gossip sometimes suggests that pensioners are bullied into acquiescence, by younger adults who prefer low income with much leisure to working either locally or as migrants. We have no evidence for this low view of either human nature or attitudes to income.⁵⁶

4.4.13. Regional perspectives cast further light on demographic and income differences between the three household types. West has larger mean household size than Central (7.93[.25] v 7.00[.33]), a higher ratio of working-age persons to population (61% v 52%), and more adult equivalents per household (6.4 v 4.7); all these differences are significant. This is despite West's above-average proportion of FR-households (which average fewest a.e.'s and working-age persons in the survey area overall); below-average proportion of PD-households (which average most a.e.'s at survey level); and below-average a.e.'s per household among PDs. So something is sharply 'pushing up' a.e.'s per household in West in the groups based on economic income - FRs and MDs. This, and West's lower incidence of PD-households, hints that *incentives are stronger for individuals to remain in, shift into, or to form, households in the more productive categories, leaving far fewer PD households in West than Central (with South intermediate in these respects).*

4.4.14. We hypothesise that this is linked to the greater economic options associated with West's wider spread of significant land and livestock ownership. Recall that groups with land also have significantly more earnings at all-sample level; this, too, fits with West's higher incidence of

⁵⁶The 15 PD-households in West, with considerably fewer mean working-age residents (especially relative to FR and MD households) than in Central and South, generate much more local income compared with other households, and achieve relatively much more household and per-a.e. income; but the subsample is too small for strong conclusions.

landedness, FR, and earnings options. That suggests, too, that disappointed townward migrants, of working age, may find more to attract them back to households in West than elsewhere: a little land/livestock-based agricultural income is more widely available, raising both demand for local nonfarm products and labour, and the local wage of those supplying it.

Bottom line: demographic differences among (region x main-income-source) household groups are small. So PD and MD households contain about as many working age-adults as those in FRs. Yet breadwinners in PD households are mainly pensioners, in MDs migrants; working-age resident adults, unlike their counterparts in FR-households, typically contribute little income via local factors. One can explain breadwinners' complaisance in MD-households; it is harder for PDs. All this probably affects asset-related decisions.

iii. *An identity to 'account' for productive assets by region and dominant income source:*

4.4.15. We have shown big income-source differences, and modest demographic differences, between PD, MD and FR households, overall and regionally. Are these differences linked to different values or types of productive assets? For any group, the following identity sorts out some ways in which households may have high or low productive assets per adult-equivalent:

$$\text{Productive Assets/a.e.} = \frac{(\text{Inc/hh}) \times (\text{assets/income}) \times (\text{productive assets/assets})}{\text{Adult equivalents per household}}$$

Mean productive assets per adult equivalent range from R 11,000 for factor-reliant households in West to R 620 for migrancy-dependent households in Central. To what extent are higher figures linked to higher household income, a higher propensity to turn income into assets, a higher share of productive in total assets, or lower adult-equivalents per household? The FR-households in West stand out, averaging R 11,000 of productive assets per a.e. as against R 2500 survey-wide. (The medians are also in sharp contrast: R 3000 of productive assets per a.e. for the median FR-W household, R643 for the median for the entire survey). FR-W is strikingly ahead on most scales in table tws 10-11 - but not on *median* income per a.e. and productive share in assets, nor on mean and median ratios of total assets to income.

4.4.16. We now look at the region-wise 'three-way split' for each of the variables in turn. First, we detail regional and income-type variations in productive assets per a.e. We then examine, in turn, the 'enabling factors' allowing households of various regions and income-source-types to build up these assets: income per household; asset/income ratios; their upshot, assets per household; the proportion of these that is 'productive', and their composition; and finally the impact of variations in adult-equivalents per household. We conclude by summarising 'what matters' in affecting regional and income-source-group productive assets per adult equivalent.

iv. *The outcome variable - productive assets per adult equivalent:*

4.4.17. The 62 FR-households in West are egregious outliers in average productive assets per a.e.: 4.4 times the survey mean and 4.1 times more than for the next highest group (PD-S).⁵⁷ The *combination* of factor-reliance and location in West is required for this. *Factor-reliance alone* does not suffice: in South, assets per a.e. in factor-reliant households average about the same as

⁵⁷ For the medians the respective ratios are 4.7 and 2.2.

the regional mean (and in Central substantially less). *Location in West alone* does not suffice to boost assets per a.e: a PD- (or MD-) household has fewer productive assets per a.e. in West than in South. Yet West's FR-households are far ahead of all other groups in productive assets, and lead on almost all the other scales of income and asset ownership in tables 10-11.

4.4.18. The FR-W outlier apart, six of the nine groups (including all in South) have R1350-R2700 of productive assets per a.e. This leaves two outliers at the opposite end of the scale, below R 650: locally-productive (FR-) and distantly-productive (MD-) households in Central. These households do not have a specially low *level of* assets or income; their low productive assets per adult equivalent correspond to *ratios of productive assets to* assets and income far below other groups. This suggests that something about Central discourages productive households from acquiring local productive assets⁵⁸ - just as something about West encourages FR-households to invest in local production. That 'something' may also be what allows West's FR-households to raise income far above levels elsewhere - and gives West the highest proportion of households 'choosing' to be FR. The data are consistent with a view that this 'something', present in West but much less so in Central (and intermediate in South), is a modicum of widespread access to the chance to farm, and to secondary demand and earnings linked to that.

4.4.19. This is consistent with the fact that in Central - where landlessness is most widespread - *each* of the three income-source groups of households averages fewer productive assets per a.e. than *any* such group in West or South (table 10). Households in Central have relatively high asset/income ratios, but local opportunities are such that they choose dwelling and household assets, rather than productive ones. This cannot be explained mainly by the much higher incidence of pension-dependent households in Central (41 per cent as against 11 per cent in West and 23 per cent in South).⁵⁹

Bottom line: something about 'local options', perhaps including or derived from farm options, makes productive asset accumulation much more attractive or feasible for FR-households in West, and less so for productive (FR and MD) households in Central.

v. Income per household:

4.4.20. For all regions together this averages 47 per cent less in PD-households (R 10827) than in FR-households (R 20523), but even these fall behind MD-households (R 25068) (table 9). This shows up in mean income per a.e. - barely above poverty, R 2288, for PD households but R 4770 for FRs and R 5547 for MDs - and in poverty incidence: 49.4 per cent for PDs, 35.6 per cent for FRs and 16.2 per cent for MDs (tables 8-9).⁶⁰ Estimated coefficients of variation of

⁵⁸Though some pensioner households appear to hang on to significant farmland: see below, 4.4.34.

⁵⁹First, Central's PD-households average significantly *more* productive assets per a.e. than other Central households (Rs 1400, as against R 620-640). Second, PD-households have significantly more productive assets per a.e. than non-PD households in South also. Third, though PD-households average fewer working-age members in Central than elsewhere, the difference is not significant at 5 per cent - and even in Central there are 3.4 persons of working age who might work with productive assets, if this option were attractive. However, high inequality among PD-Central households lifts their median productive assets per a.e. relative to other groups.

⁶⁰ Proportionate differences in *median* incomes and incomes-per-a.e. are larger still; for example the 'middle' household among PDs has 45 per cent of the income of its counterpart among MDs, and 46 per cent of the income per adult equivalent.

household incomes in (PD/FR/MD) are (0.54/1.73/0.78). This may indicate smaller risk, certainly so in the case of PD households, greater within-group inequality, or both.

4.4.21. To interpret these data, one must allow for big regional differences. In West, the average FR household has 70 per cent more income than the average MD-household, in Central insignificantly - 11 per cent - more, and in South over 30 per cent *less*. This is consistent with an effect of more widespread access to land, livestock and farm assets, in West, of raising both farm income and earnings for FR-households relative to MD-households (table 9).

4.4.22. As for income *composition*, our data have limited value in the context of the 'three-way split', since FR-, PD- and MD-households are each so dominated by their main income source.⁶¹ Clearly, farming provides only a small part of household income overall. Can farming nevertheless enable rural households to be factor-reliant at decent income levels - suggesting that a modicum of land, stock, or farm assets transferred to poor households might greatly raise income and cut poverty in rural S African drylands? We cannot prove this; but it is consistent with our data for the most 'agricultural' group, FR-households in West. Even for these, farm income is only 17.4 per cent of household income. In West, where land and livestock are less inadequate and more equal than elsewhere, a larger proportion of households is factor-reliant; and West's FR-households (and a.e.'s) have mean income-per-a.e. over 50 per cent above the all-sample mean. Despite a wide spread of land - though not of livestock⁶², high *income* inequality within FR-W means high mean income pr a.e. does not translate into high median income per a.e. (table 10); and poverty incidence is 31.3 per cent, not significantly below the all-sample mean of 32.7 per cent. This is partly because FR households' high mean income in West is boosted by a few really large outliers - one household with R 68,000 per a.e. boosts the FR-W mean by R 1100! - but, despite persistent poverty, a substantial number of households have taken off, possibly reflected in the fact that the Gini of income per a.e. for FR-West is not above the overall survey level.

Bottom line: mean incomes per household and per a.e. support the story of farming leading to development in FR-W and retardation in Central, but poverty incidences, while unfavourable in Central, show FR-W's prosperity is distributed very unevenly.

vi. Asset/income ratios - the capacity and willingness to accumulate household assets:

4.4.23. How might regions or main income sources affect the asset/income ratio? Other things equal, it presumably rises with:

- Income per a.e., increasing the capacity to save and to borrow, and reducing the pressure to dissave and to use loans for consumption;
- Household 'age', i.e. time since it was formed, during which it has been able to save, borrow, inherit, and so accumulate assets - likely to rise with age of the household head;⁶³
- Attractiveness (rate of return), safety and liquidity of local physical assets (vis-à-vis acquiring education or bearing initial costs of migration) as a use for saving or borrowing.

⁶¹ The only exception is PD-households in West, which derive 36 per cent of income from non-pension sources.

⁶² The Gini of livestock in FR-W is 0.74, and among those who own any it is 0.71.

⁶³ In rural S Africa and Botswana, many households have no permanent male head, and many unions are common-law. Hence 'age of household' and its impact on asset/income ratios are complex issues. See the country chapters.

A cross-cutting issue is the possible porousness of boundaries between migrants and residents, households, and perhaps household types, *over time*. The relative 'landedness' of pensioner households, their high asset/income ratios and their low farm incomes (of the six households with over 8 hectares of land, five are pensioners reporting no, or negligible, farm income) may mean land formally associated with such households, but worked by relatives who get most land income.

4.4.24. Income per a.e. in PD-households is R 2287[142], as against R 4770[667] for FRs and R 5547[475] for MDs (Tables 3, 9). Household 'age', however, is high in PD-households, and their elderly but usually decision-making heads (having relatively low life-expectancy and high risk-aversion) presumably also find it less rewarding to accumulate local physical assets. How do such offsetting factors affect asset/income ratios?⁶⁴ Overall, PD-households have much the largest asset/income ratio: 4.84, as against 2.79 for FRs and only 1.99 for MD-hhs. This strikingly reverses the pattern of mean income-per-a.e., respectively R 2288[142], 4770[667] and 5547[475] (table 9). The greater 'age' of PD-households means they have had longer to acquire assets, far outweighing the effect of their much lower income per a.e.⁶⁵ The combination of poverty and asset accumulation in PD households helps to account for the failure of the SA data to support hypothesis (a). It is plausible, too, that in MD-households the migrant, who brings in 85% of household income, vetoes its use to build up assets (s)he cannot remote-control, preferring non-local assets, or consumables that returning migrants can share.

4.4.25. Regional differences in asset/income ratios are instructive. West's FR-households do not have a specially high asset/income ratio; it is higher for FR-households in Central, even though FR-Central households' 30 per cent lower income per a.e. leaves them with less 'surplus' for asset accumulation. FR-W households have significantly more assets *and* income than others, but either do not have more savings and borrowing per unit of income, or are less likely to turn them into local physical assets. But it does seem to pay such households to adopt high ratios of *productive* assets to total assets (p. xx). You can "develop" your household based on local factors in West; in South or Central, better rely on migrant or pensioner income.

Bottom line: PD-households' asset/income ratios are cut by their greater poverty, but this is probably outweighed by the effect of their longer period of accumulation - probably mostly before they became PD, when they had more income per a.e. and more 'surplus' for accumulation.

vii. *Income/household x assets/income = assets/household:*

4.4.26. What is striking about assets-per-household is:

- (i) the big overall shortfall in South (R45000; R72000 for Central, R 80,000 for West);
- (ii) closeness of PD, MD and FR households within each region, with one big exception, viz.

⁶⁴We discuss PDs' asset *structure* later; dwellings and household goods are an insignificantly different share of total assets for PDs overall (76 per cent as against 78 per cent for all households).

⁶⁵Incidentally, PDs' much greater poverty incidence, lower mean income, and higher asset/income ratios may help explain why [ref Kirsten et al paper], in the SA survey, income is distributed more unequally than assets.

(iii) the 62 factor-reliant households in West have mean assets of R116466[15056]), as against some R 52116[3847] for other households in West and about R 52368[2770] for the survey overall. FR households in West stand out for high income and proportionately high assets, not for a high asset/income ratio - but are specially likely to turn their assets-per-household into productive channels. For the whole survey, only 22 per cent of assets are productive (table 9, col. 1); yet, of the R 72,500 'excess' assets of the average Western FR household over other households in West, about R 63,000 is extra productive assets (table 10). Less than R9000 is used for more valuable dwellings and household assets, despite far higher mean income per a.e. (R 6701[1319] as against about Rs 4364(316)).

Bottom line: FR-W stands out for high assets-per-household, mainly due to livestock; otherwise asset-per-household values are clustered by region, rather than household type.

viii. Productive assets/assets and the composition of productive assets

4.4.27. Three facts stand out from the ranking by 'share of assets productive' in table 11.

(i) West's FR-households are far above any other region/income-source group, with 48 per cent of assets productive (the survey mean is 22 per cent), but the *median* household in FR-W is not 'special' in this way: it is the top third or so of households who have accumulated substantial productive assets (see 4.4.28(i)).

(ii) At the other end are all three groups in Central; only 7 per cent of assets is productive. The links to low *and unequal* land endowment have already been suggested.

(iii) Further, in South and Central, PDs, although much poorer in income/a.e than MDs or FRs, have significantly higher *proportions* of supposedly productive assets, by virtue of their rather high landholdings.

4.4.28. Five observations on structure of productive assets (table 9) elucidate these facts.

(i) Livestock comprise one-third to three-quarters of productive assets, depending on region and main income-source, but are most important for FR-West households, which have 7.5 times more livestock value than the average for all other households. The 'productiveness' of West's FR assets suggests more accessible and attractive (or less daunting) prospects for agriculture⁶⁶ in West. Much lower mean livestock values reflect worse farm prospects for other groups; After FR-West's R 40,500, only the PD group in South (R 11,800) has over R 6500 worth.

(ii) Land - while a big part of productive assets for some groups - is a small component of *total* asset value for all. In Central and South, about half the households are landed, and about 40% farm above 1 ha; for West the proportions are rather above 90% and 80% respectively.

(iii) PD-households have 'surprisingly' much land compared to other groups in all regions. Central features landedness among a much higher proportion of its 53 PD-households

⁶⁶Alternatively, FR-West households might find it specially *unattractive* to accumulate dwellings or household durables. This is implausible, however, especially as this group - with 7.8 persons per household, well above the survey mean (table tws1) - has more scale economies in consuming the benefits of housing or consumer durables.

(72.2%[6.8%]) than among the 45 FRs (42.6%[9.7%]) or the 30 MDs (44.9%[10.7%]). The discrepancy in S and W is similar but much smaller. Overall, the percentage of households with land is higher among PD-households (65.1[5.3]) than among FRs (52.4[4.3]) or MDs (54.0[5.35]). Where land is most unequal, and least important as an income source, it is most concentrated in (otherwise much poorer) pensioner households - perhaps an imprint of past inequalities and present land constraints.⁶⁷ Relative to total assets, land value (at inevitably arbitrary prices) is low, but somewhat higher for PD-households in each region than for others (table 9). Observations in most land-size categories are too few to allow much disaggregation, but the view of 'some land with pensioners' is reinforced by the fact that, of 15 observed landholdings above 6 hectares, 10 are with PD-households.

(iv) Where local productive assets matter - in West and South - farm assets other than livestock and land are much more important for FR-households than for others. However, farm assets are tiny in PD-households of all regions.

(v) Farm assets are tiny in PD-households of all regions.

Bottom line: FR-W stands out for high mean productive-asset/total-asset ratios (due substantially to livestock), and Central for low ratios. Land is a small part of total assets, but important for PD-households.

ix. Impact (small) of a.e.-per-household differences. Conclusion: recap what matters and what doesn't, in affecting ranking of [(PD-MD-FR) x region] by productive assets per a.e. Some words on within-group variations.

⁶⁷ In West, where land is widespread and farm income matters, it is found in significant amounts among FR-households too. Everywhere, groups with substantial productive assets have ratios of non-land to land value far above average

Table 6 WEALTH SIZE & COMPOSITION, POOR AND NONPOOR, TOTAL & REGIONAL

	Total sample			Central			West			South		
Set of hhs	All	Poor	Nonpoor	All	Poor	Nonpoor	All	Poor	Nonpoor	All	Poor	Nonpoor
No. of hhs	513	163	350	128	51	77	141	37	104	244	75	169
Asts/hh(R)	53902	41738	59811	72372	66799	75815	80126	34614	92180	45061	39360	50177
(s.e. assets)	(2485)	(2888)	(2289)	(2309)	(3619)	(1500)	(3097)	(2678)	(3172)	(2433)	(4084)	(4453)
% land	4.6 (.4)	6.9 (.9)	3.8 (.4)	3.2 (.7)	5.4 (1.4)	2.0 (.6)	3.9 (.4)	7.2 (.9)	3.4 (.4)	5.4 (.5)	7.7 (1.3)	4.6 (.6)
livstk	14.4 (2.0)	6.1 (1.7)	17.2 (2.5)	2.8 (.9)	2.6 (1.0)	3.0 (1.2)	29.3 (3.5)	4.3 (1.2)	32.5 (3.7)	14.8 (2.9)	8.3 (2.6)	17.0 (3.7)
<i>small</i>	3.3 (.4)	3.8 (.8)	3.2 (.5)	1.0 (.2)	1.4 (.4)	0.8 (.3)	3.1 (.6)	2.8 (.9)	3.1 (.7)	4.3 (.7)	5.2 (1.4)	4.0 (.8)
<i>large</i>	11.0 (1.9)	2.3 (1.2)	14.0 (2.4)	1.8 (.7)	1.2 (.7)	2.1 (1.1)	26.3 (3.6)	1.5 (.7)	29.4 (3.8)	10.5 (2.9)	3.1 (1.9)	13.0 (3.6)
dwllgs	63.8 (2.5)	76.2 (3.3)	59.6 (2.9)	78.5 (3.6)	85.5 (3.7)	74.7 (4.9)	47.4 (3.6)	75.3 (2.3)	43.8 (3.4)	52.5 (4.5)	71.1 (4.2)	59.6 (2.9)
hh asts	13.8 (1.4)	10.6 (3.0)	14.8 (1.5)	14.7 (3.8)	6.5 (3.0)	19.2 (5.2)	11.2 (1.5)	13.1 (2.5)	11.0 (1.7)	14.1 (1.6)	12.7 (4.6)	14.6 (1.4)
fm asts	3.4 (1.1)	0.1 (0.0)	4.6 (1.4)	0.7 (.5)	0 (-)	1.1 (.8)	8.2 (1.8)	0.1 (.0)	9.2 (1.9)	3.2 (1.7)	0.1 (.1)	4.2 (2.2)

Figures in brackets: s.e.'s.

Differences in category shares of wealth between poor and non-poor households:

- For **whole sample**, all sig at 5% except smallstock and household assets (both n.s.)
- For **Central**, land and household assets sig at 5%; dwellings sig at 10%; other diffs n.s.
- For **West**, as for whole sample; all signif quasi-t-stats much higher, despite smaller sample.
- For **South** land, largestk and (barely) livestk sig at 5%; dwllgs, fmass at 10% (and 7% I guess)

Table 7 SIZE, COMPOSITION OF INCOME, POOR & NON-POOR, TOTAL & BY REGION

Set of hhs	Total			Central			West			South		
	All	Poor	Nonpoor	All	Poor	Nonpoor	All	Poor	Nonpoor	All	Poor	Nonpoor
Inc/hh(R)	19504	6272	25933	13401	6623	17587	26784	7978	32345	19900	5981	26716
(s.e. income)	(1394)	(359)	(1875)	(932)	(636)	(1128)	(3036)	(607)	(3771)	(1883)	(458)	(2529)
<i>No. rcvg</i>	513	163	350	128	51	77	141	37	104	244	75	169
mean inc/a.e.	4364	1157	5922	3343	1197	4668	5178	1441	6284	4494	1114	6149
(s.e.)	(316)	(56)	(422)	(356)	(83)	(491)	(598)	(73)	(744)	(426)	(74)	(569)
%s of inc:												
1. Earngs	39.1	29.7	40.2	41.9	17.2	47.6	46.1	41.9	46.4	37.1	31.9	37.7
(s.e.)	(4.5)	(4.3)	(5.0)	(5.2)	(5.4)	(6.0)	(5.5)	(7.3)	(6.0)	(6.1)	(5.9)	(6.7)
<i>no. rcvg</i>	277	68	209	56	14	42	101	26	75	120	28	92
<i>wtd rcvrs</i>	<u>2381</u>	<u>58</u>	<u>180</u>	53	13	39	103	26	76	<u>106</u>	26	<u>80</u>
2. Pensions	17.8	42.8	14.8	31.4	51.8	26.7	12.9	13.9	12.8	16.5	44.1	13.5
(s.e.)	(1.9)	(4.3)	(1.9)	(4.5)	(6.7)	(5.0)	(2.1)	(5.0)	(2.2)	(2.4)	(5.8)	(2.4)
<i>no. rcvg</i>	217	66	151	65	28	37	61	7	54	91	31	60
<i>wtd rcvrs</i>	219	71	148	66	28	39	64	8	55	98	32	65
3. Farm*	4.3	7.6	3.9	2.6	3.0	2.6	12.8	11.0	12.9	2.8	8.7	2.1
(s.e.)	(0.5)	(1.4)	(0.5)	(0.1)	(1.2)	(1.0)	(1.3)	(1.6)	(1.3)	(0.4)	(2.0)	(0.4)
<i>no. rcvg</i>	222	70	152	21	8	13	123	33	90	78	29	49
<i>wtd rcvrs</i>	<u>231</u>	76	156	<u>31</u>	11	<u>19</u>	126	33	93	<u>106</u>	<u>37</u>	<u>69</u>
4. Migrts**	38.8	19.9	41.1	24.1	28.1	23.2	28.2	33.3	27.9	43.6	15.3	46.7
(s.e.)	(4.1)	(3.4)	(4.5)	(4.0)	(6.4)	(4.8)	(4.1)	(7.2)	(4.3)	(5.4)	(4.3)	(6.0)
<i>no. rcvg</i>	228	48	180	42	18	24	85	13	72	101	17	84
<i>wtd rcvrs</i>	229	<u>41</u>	<u>189</u>	49	19	30	86	14	71	106	15	93

*: subsistence, plus sales.

**: goods brought back, plus remittances.

NOTE. 'Poor' means 'below 2000R/adult-equivalent/year income'. 'No. rcvg': actual (*unweighted*) numbers in the sample. 'Wtd rcvrs': Best estimates of numbers of households corresponding to proportions of the sample (i.e. of 513) closest to those in the population. Weighting of each sample household is to correct for the fact that households in villages with smaller samples (relative to their populations) had a smaller chance of being selected. Weighted estimates (unlike unweighted ones in the preceding rows) need not add to row or column totals.

Table 8. PD, MD, FR HOUSEHOLDS: DEMOGRAPHICS AND LANDEDNESS BY REGION

	WHOLE SAMPLE				CENTRAL			
	All	PD	MD	FR	All	PD	MD	FR
Obsvd hhs	513	124	161	212	128	53	30	45
smpl%hh		25.7%	31.0%	37.0%	17.2%	7.6%	4.3%	5.3%
Psns/hh	7.33(.16)	7.64(.33)	7.16(.25)	7.23(.25)	7.00(.33)	7.34(.56)	7.10(.38)	6.41(.58)
A.e./hh	4.94(.92)	5.15(.19)	4.94(.16)	4.73(.14)	4.75(.19)	4.96(.30)	4.85(.28)	4.37(.34)
Wk-age/hh	4.15(.11)	4.00(.22)	4.49(.19)	3.90(.15)	3.67(.20)	3.40(.30)	4.27(.41)	3.55(.35)
poor hh	32.7(2.7)	49.4(5.8)	16.2(3.3)	35.6(4.3)	38.1(5.0)	43.2(7.8)	45.6(10.5)	24.8(8.1)
Psns/hh	8.21(.28)	8.49(.44)	8.41(.47)	7.76(.46)	8.37(.58)			
A.e./hh	5.42(.16)	5.67(.23)	5.59(.30)	5.03(.26)	5.52(.31)			
Wk-age/hh	4.62(.18)	4.78(.28)	5.03(.38)	4.19(.26)	4.30(.34)			
npoor hh	67.3(2.7)	50.6(5.8)	83.8(3.3)	64.4(4.3)	61.8(5.0)	56.8(7.8)	54.4(10.5)	75.2(8.1)
Psns/hh	6.90(.18)	6.77(.47)	6.91(.28)	6.93(.27)	6.15(.35)			
A.e./hh	4.70(.18)	4.63(.28)	4.82(.18)	4.57(.16)	4.27(.22)			
Wk-age/hh	3.92(.13)	3.24(.28)	4.39(.22)	3.73(.18)	3.27(.25)			
%hh landed	57.2(2.8)	65.1(5.3)	54.0(5.3)	52.4(4.3)	56.2(5.2)	72.2(6.8)	44.9(10.7)	42.6(9.7)
	SOUTH				WEST			
	All	PD	MD	FR	All	PD	MD	FR
Obsvd hhs	244	56	80	105	141	15	51	62
smpl%hh	66.7%	16.8%	22.8%	27.1%	9.7%	1.3%	3.8%	4.6%
Psns/hh	7.32(.20)	7.82(.42)	6.91(.32)	7.28(.30)	7.93(.25)	6.62(.67)	8.71(.32)	7.88(.38)
A.e./hh	4.90(.12)	5.27(.25)	4.79(.20)	4.71(.18)	5.4(.14)	4.68(.37)	5.99(.22)	5.29(.30)
Wk-age/hh	4.16(.14)	4.30(.29)	4.35(.24)	3.83(.19)	4.84(.16)	3.77(.41)	5.60(.26)	4.69(.22)
poor hh	32.8(3.6)	54.6(8.0)	10.0(3.6)	38.5(5.5)	22.8(3.6)	17.9(9.6)	20.4(5.9)	31.3(6.0)
Psns/hh	8.13(.34)				8.50(.44)			
A.e./hh	5.39(.20)				5.49(.25)			
Wk-age/hh	4.71(.22)				4.66(.30)			
npoor hh	67.1(4.6)	45.4(8.0)	90.0(3.6)	61.5(5.5)	77.2(3.6)	82.1(9.6)	79.6(5.9)	68.7(6.0)
Psns/hh	6.92(.23)				7.76(.29)			
A.e./hh	4.67(.14)				5.42(.16)			
Wk-age/hh	3.89(.16)				4.89(.18)			
%hh landed	52.0(3.8)	59.4(7.5)	51.1(6.9)	47.1(5.6)	91.1(2.5)	98.1(1.9)	82.0(5.8)	94.6(2.8)

TABLE 9. PD, MD, FR HOUSEHOLDS: ASSET AND INCOME MEANS AND S.E'S (000 RAND)

[illegible]

**TABLE 10. Income, asset, productive asset ranks, by region x household lead income - values:
means and medians, per household and per a.e.**

Income per a.e. (R 000) assets/h'hold (R000)		Income/household (R000) Prod assets/a.e. (000)		Assets/household (R000)		Prod
Mean	Median	Mean	Median	Mean	Median	Mean
1. FR W 6.7	1. MD S 5.2	1. FR W 34.0	1 MD S 22.8	1FR W 116.5	1. FR W 80.5	1. FR W 55.7
2. MD S 6.3	2. PD W 3.5	2. MD S 27.9	2. FRW 17.6	2. MD C 82.4	2 MD C 57.0	2. PD S 14.9
3. FR C 4.8	3. FR C 3.4	3. MD W19.9	3 MDW 17.4	3. FR C 78.7	3. FR C 54.7	3. FR S 10.3
4. FR S 4.4	4. FR W 3.2	4. FR S 19.0	4. FR C 15.6	4. PD C 62.3	4. PD C 53.1	4. PD W 9.5
5. PD W 3.8	5. FR S 3.1	5/6 FR C16.7	5. FR S 14.4	5. PD S 48.9	5 MDW 39.6	5. MD W 8.6
6 MD W 3.4	6. MD W 3.0	5/6PD W16.7	6 PD W 14.1	6 MD W 45.4	6. MD S 33.6	6. MD S 8.2
7. MD C 3.3	7. MD C 2.8	7. MD C 15.0	7 MD C 13.0	7. MD S 44.3	7. PD W 32.7	7. PD C 7.0
8. PD C 2.3	8. PD C 2.1	8 PD S 10.6	8. PD S 9.4	8. FR S 43.0	8. PD S 30.0	8. MD C 3.0
9. PD S 2.2	9. PD C 1.9	9. PD C 10.2	9. PD C 8.2	9. PD W 40.4	9. FR S 28.7	9. FR C 2.8

**TABLE 11. Income, asset, productive asset ranks, by region x household lead income - ratios:
means and medians, per household and per a.e.**

Assets/income		Productive assets/assets		Productive assets/income	
Mean	Median	Mean	Median	Mean	Median
1. PD C 6.08	1. PD S 5.13	1. FR W .478	1. PD S .24	1. FR W 1.63	1. FR W 1.36
2.MD C 5.51	2. MD S 3.76	2. PD S .304	2. PD W .23	2. PD S 1.39	2. PD S .84
3. FR C 4.72	3 FR W 4.41	3. FR S .239	3. FR W .22	3. PD C .67	3.PD W .41
4. PD S 4.59	4. FR S 4.25	4. PD W .235	4. MD W .12	4/5 PD W .57	4. PD C .27
5. FR W 3.42	5. PD S 3.71	5 MD W .190	5 MD S .093	4/5MD W .57	5 MD C .22
6 PD W 2.43	6. PD W 2.75	6. MD S .185	6. PD C .066	6. FR S .54	6. MD W .21
7 MD W 2.29	7 FR S 2.36	7. PD C .112	7. FR S .034	7. MD S .29	7. MD S .12
8. FR S 2.26	8 MD W 2.27	8. MD C .047	8 MD C .018	8. MD C .26	8. FR S .06
9. MD S 1.59	9 MD S 1.59	9. FR C .035	9. FR C .006	9. FR C .17	9. FR C .01

ANNEX A. GINIS

Calculation from size-group data; pros and cons as a summary distribution statistic (compare T and L Theils); comparing national, regional, local Ginis (**to follow**)

ANNEX B. SOURCES AND NOTES TO TABLE 1:

DATE, unless otherwise stated in brackets, is that of the country's FAO World Census of Agriculture (WCA) rounds - centred on 1950, 1960, 1970, 1980 and 1990, and in practice usually up to two years on either side of this (occasionally more; if so, stated in brackets).

SOURCES:

Except last col., data with no capital letter are from M. el-Ghonemy, *The Political Economy of Rural Poverty: the case for land reform*, London, Routledge, 1990: 30; 168-9, 173, 304, 310; 183, 197 (China), 203 (S Korea), 220 (Iraq), 225 (Cuba), 230 (Egypt). WCA is primary source.

Last column: Report on the 1990 World Census of Agriculture, Statistical Development Series no. 9, Food and Agriculture Organisation, Rome, 1997: Table 1.1. 1980 used when available, else census dates in brackets. For many countries this source also gives 1960, 1970 and/or 1990 data.

S: from R. Sobhan, *Agrarian reform and Social Transformation*, London: Zed Books, 1993: 8-11.

India: Ginis after 1980 from National Sample Survey; see *Sarvekshana*, XX, 3 (70th issue), Jan-March 1997: 22, 26.

B: from A. Berry and W. Cline, *Agrarian Structure And Productivity in Developing Countries*, Johns Hopkins, 1979: 38-9, derived from FAO, 1960 Census of Agriculture.

W: from Berry and Cline: 41-2, from World Bank, *Land Reform: Sector Policy Paper*, Washington, D.C., 1975.

OCH: from K. Otsuka, H. Chuma and Y. Hayami, 'Land and labour contracts in agrarian economies', *Journal of Economic Literature*, XXX, 4, Dec. 1992: p. 1972, citing FAO 1981, plus publications by Governments of Bangladesh, India, Nepal and Thailand.

DO: from K. Deininger and P. Olinto, 'Asset distribution, inequality and growth', World Bank Policy Research Working Paper no. 2375, World Bank Development Research Group: Rural Development Group, June 2000: 24; many data from the 1960 WCA, except Egypt ('from a book by Simon Commander') and Myanmar (from the 1993 Report on the Myanmar Census of Agriculture, photocopied to DO by Gustavo Gordillo).

Many entries in S, B, W, DO and OCH confirm data in el-Ghonemy and are noted only if they give conflicting Ginis (>0.02 apart) or years.

Distribution of land among land-operating households except Iraq, and in ownership row Egypt.

Mexico: ejidos assumed equally divided among ejidatario households.
Landless always excluded.

ANNEX C: Regions and groups, Ginis and holding size, and landlessness (from Table 1)

Middle East and N Africa: Algeria (.72), Egypt* (.43), Iran (.62), Iraq (.39), Jordan (.69), Morocco (.64), Saudi Arabia (.83), Tunisia (.64), Turkey (.58) AV **.6155**

Sub-Saharan Africa: Ethiopia (.43), Kenya (.77), Madagascar (.80), Mali (.48), Senegal ((.40+.49)/2), Tanzania* (.79), Uganda ((.48+.55)/2) AV **.6043**

S America: Argentina (.87), Brazil (.86), Chile (.93), Colombia (.86), Costa Rica (.83), Ecuador (.84), Paraguay (.94), Peru ([.78+.91]/2), Uruguay (.84), Venezuela (.92) AV **.8735**

Central America and Caribbean: Cuba* ((.28+.21)/2), Dominican Republic (.79), El Salvador (.61), Guatemala (.85), Honduras (.78), Jamaica (.85), Mexico (.75), Nicaragua (.80), Panama (.84) AV **.7239**

South Asia: Bangladesh ((.55+.60)/2), India (.64), Nepal (.61), Pakistan (.54), Sri Lanka (.62) AV **.5970**

East and SE Asia: China* .19, Indonesia ((.72+.53+.56)/3), Korea (S) .30, Malaysia* .64, Myanmar .44, Philippines ((.61+.53)/2), Taiwan ((.40+.47)/2??), Thailand (.46) AV **.4548**

*: no data on holding size (5 of the 48 countries)

Mean holding size

1. 20 ha. +: 11 countries, all LAC (7 South, 4 central/Carib):	<u>mean Gini .86</u>
2. 9.7-15.4: 8 countries, 4 central/Carib, 4 mid-E/N Afr:	<u>mean Gini .72</u>
3. 4.6-7.8: 7 countries: 1 S Asia (Pakistan), else central/Carib or MENA:	<u>mean Gini .66</u>
4. 2.0-3.7: 10 countries: 5 sub-S Afr, 3 E As, 1 S As, 1 Cent. Am/Car:	<u>mean Gini .59</u>
5. 0.9-1.4: 7 countries: 3 S Asia, 2 E Asia, 2 sub-Sah. Africa	<u>mean Gini .52</u>

LANDLESSNESS: This relates to the construction of Table 2. If a proportion L of households is landless, and the land Gini is G, the Gini of land among the landed and landless $G^* = (L)(1) + (1-L)(G)$. Usable data for proportions of rural households without land in 5 countries are cited by el-Ghonemy [1992: 168-9]. For BANGLADESH, M. Ravallion and B. Sen, 'Impacts on rural poverty of land-based targeting: further results for Bangladesh', *World Development*, 22, 6, June 1994, 823-38, give 13.9% of rural *population* effectively without *owned* land (<.016 hectares) in 1988; but the proportion of households must be more, as landless households are smaller; conversely, the proportion of *operationally* landless is always less than the proportion with no *owned* land. I. J. Singh, *The Great Ascent*, Johns Hopkins 1990, p, 75, cites 32% of households owning no land other than their house lot from the 1977 Land Occupancy Survey of 400 villages; but landless labourers *excluding sharecroppers*, i.e. operationally landless, were 19.8% of total *persons* cultivating (landed plus landless) in 1967-8. If L = 20% of households operationally landless in 1984, G (operational land Gini) = (.55+.60)/2 (Table 1), $G^* = .2 + (.8)(.575) = .66$. More plausibly, L = 25% and **G* = .68**.

For rural INDIA, Sarvekshana XX, 3 (Issue no. 70), Jan-Mar 1997, gives G = .641 in 1991-2 (p. 22). The all-India estimate of rural *households* is 116.41 million, and of

operational *holdings* 93.45 million (p. 16), so $L = (116.41 - 93.45) / 116.41 = 19.7\%$ and $G^* = (.197) + (.803)(.641) = .712$. But the above population estimate of $L = .197$ is very different from the sample estimate: in the pooled sample there were 29046 operational holdings and 33289 rural households (pp. 14, 17, 85) so $L = (33289 - 29046) / 33289 = 12.7\%$. If we deduct from the 29046 the 656 sample households with below 0.002 ha (p. 85), L rises to 14.7 per cent, and the estimate of G^* is $(.147) + (.853)(.641)$ so $G^* = .694$.

ANNEX D. SOME ISSUES OF METHOD

a. Adult-equivalents

b. Sample weighting to allow for different probabilities of household selection

c. Treatment of subsistence income

d. Valuing land

ANNEX E. Estimating a 0.93 farmland Gini for Northern Province, S Africa

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To follow when paper completed for all three surveys; but to include:

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