

AN ATLAS OF HOUSEHOLD ECONOMY ANALYSIS INFORMATION ACROSS THE SAHEL



Save the Children

FEG

THE FOOD ECONOMY GROUP

Updated and expanded September 2017



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The Atlas offers an overview of rural economic geography on a vast scale, illustrating livelihood patterns across the Sahel region of West Africa from Mauritania to Chad. This unique information comes from 85 baseline surveys conducted with the Household Economy Analysis methodology in many of the livelihood 'zones' defined for each country.

The maps and their commentaries deal with crop and livestock production, households' consumption of food, and their cash income and expenditure. They also provide insights into production hazards for crop cultivation and livestock-raising and how people cope with them.

The accent throughout is on how people obtain access to the essentials of life and livelihood, and on the differences between poorer and wealthier households. Interpretations and conclusions are offered that are relevant to policy-makers and for advocacy.

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Every child has the right to a future. Save the Children works around the world to give children a healthy start in life, and the chance to learn and be safe. We do whatever it takes to get children the things they need – every day and in times of crisis.

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Cover photo: A couple plant seeds in preparation for the unpredictable rainy season, Maradi, Niger.
(Photo: Jonathan Hyams/Save the Children)

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1 Introduction

1.1 HEA and the Atlas

Household Economy Analysis (HEA) is a methodology for assessing livelihoods and food security. It has to date been used in more than 40 countries around the world, with over 500 baseline surveys completed in less than 20 years; and it has been used increasingly in the Sahel since the first baseline survey in Niger was undertaken in 2007. HEA provides a quantitative database and analysis centred on three integrated elements:

1. where households normally obtain their food from, and in what proportions to satisfy their energy requirement (measured in calories) – whether from their own harvest, or from the market, or from gifts or collected wild foods, etc;
2. how they obtain the cash to pay for the purchased food and the other essentials of life and livelihood;
3. what they spend their money on, and in what proportions.

Information on these questions and associated subjects is gathered in relation to wealth groups within the population: in rural HEA studies, the population is usually split into four groups: Very Poor households, Poor households, Middle households and Better-Off households (see Annex 2 for the proportions of the population in each wealth group).

This Atlas is a contribution to understanding the rural economy of a great swathe of Africa immediately south of the Sahara ('Sahel' comes from the Arabic for a 'coast' or 'border', so here the southern edge of the Sahara desert). The Atlas shows livelihoods across Mauritania, Senegal, Burkina Faso, Mali, Niger, Chad and the far north of Nigeria, from pastoral nomadism to surplus cereal farming. This is the third edition of the Atlas. A Pilot Atlas was published in 2013 and then updated in 2014 with new livelihood zone baselines;

the present document is, in turn, a revision of the 2014 Atlas. It takes account of a further set of newly studied livelihood zones as well as a good number of previous zones that have been re-surveyed after several years. The overall number of surveyed rural livelihood zones included has risen from 50 in 2013 and 68 in 2014 to 85 in 2017, plus a handful of urban studies.

In each edition we have examined geographical patterns in the HEA information across the Sahel according to a number of key themes. A map allows comparisons to be made and continuities to be identified that do not stand out so easily from graphed data. The studied zones represent a considerable geography across the Sahel region; and although this geography is not complete it is sufficiently continuous to allow for intuitive filling-in of gaps to show very extensive patterns.

A glance at the contents list above will show that the majority of the map themes are associated in one way or another with cash earnings or expenditure. This is because today the livelihoods of the Sahel's rural populations are highly monetised, from the ordinary cereal farmer to the remotest nomadic pastoralist. In a former era it would have been only the wealthier farmer who was most concerned with the world of money. But now we cannot understand the situation of poorer people without looking hard at their cash budgets. Today they are quite unable to produce sufficient crops or livestock to satisfy their food and other requirements, either through direct consumption or through sale. Therefore, apart from some gathering of 'free' wild foods, poorer farmers must seek income away from their farms, generally in the form of cash except when wages are paid in food ('payment in-kind'). Similarly, poorer herders survive mainly by working for wages for kinsmen and clansmen who own the greater part of local herds and flocks. And so today among farmers and herders alike there is a

paradox: the poorer you are, the more you need to spend money. This is an overarching theme of the Atlas.

The body of the Atlas is divided into seven chapters, each dealing with a broad theme echoing the HEA methodology. The maps are accompanied by a commentary aimed at bringing out key points, teasing out some elements that may not be obvious at first sight, and explaining real or apparent anomalies as far as can reasonably be done. Three maps are presented on each subject. First we present the average values across the four wealth groups, weighted according to the proportions of households or population in each wealth group. Then, to examine the contrast between wealth groups, the values for the Very Poor and for the Better-Off are presented in two further maps.

While it is hoped that the presentation will offer some new perspectives on livelihoods and food security in the region, readers will draw their own inferences on policy or other matters that particularly interest them. Without wishing to supersede this, at the head of each chapter we offer some main messages that we feel emerge from the evidence.

1.2 Mapping the livelihood zones

The template upon which the various HEA-surveyed zones are set is the combined national livelihood zones maps constructed by FEWS NET¹ with local partners. The primary aim of this remarkable effort has been to develop national maps offering FEWS NET and others a division of each country based on the ecological and economic factors that shape local livelihoods, rather than simply making analyses on the basis of an administrative map (although administrative divisions are always shown superimposed upon the livelihood zones map). Most of the national livelihood zones maps were first developed between 2003 and 2005, although the map of northern Nigeria was drawn in 2007 and the first Senegal map in 2010. Revisions have since been made for several of the countries. (See Annex 1 for a full set of country maps showing national livelihood zones.)

These maps were originally accompanied either by brief descriptions of each zone or by longer 'profiles' without the quantification shown in the subsequent HEA baselines. FEWS NET's requirement was that zones should be identified using a broad brush rather than a fine pencil, in order to have a reasonably practical number for monitoring purposes rather than a plethora of localised zones. As a result, there are some rather wide zones in most of the countries; but for Nigeria, Africa's most populous country, this principle was taken to an extreme in 2014 when the whole country was rezoned to show only 13 livelihood zones for the entire country (the same number as for Niger) as opposed to the 44 zones originally identified for northern Nigeria. For our particular purpose, it is more appropriate to keep to the originally defined northern Nigeria livelihood zones.

¹ The Famine Early Warning Systems Network commissioned since 1985 by USAID.

In each country the zoning was taken as a separate exercise in its own right for national purposes, and there was no formal attempt to match cross-border zones if a neighbouring country had already been mapped. However, it is clear that certain kinds of livelihood zones are repeated across

much of the Sahel, falling within broad agro-ecological bands in gradations from *sudanian* to *sahelian*. The main ecology, and the paramount influence of rainfall in shaping it, are illustrated in Map 1.

MAP 1: CLIMATE ZONES

LEGEND

Isohyet (mm/year)

200 --- Average isohyet 1940–1967

200 --- Average isohyet 1968–2000

Current climate zones

■ Saharan

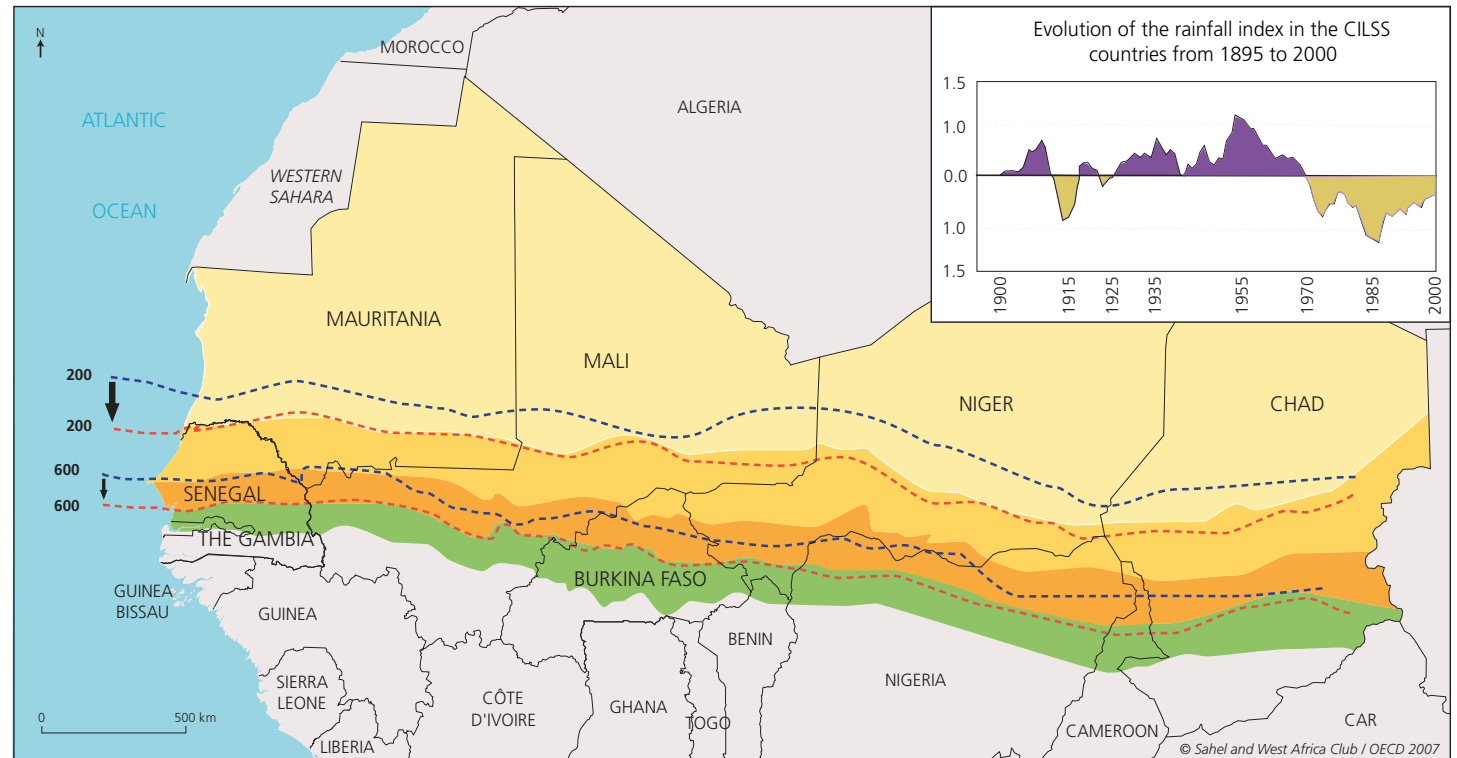
■ Sahelian

■ Sahelo-sudanian

■ Sudano-sahelian

— Border

Source: *Vulnerability in the Sahelian Zone*. Philipp Heinrigs and Christophe Perret (SWAC/OECD) Regional Atlas on West Africa, Chapter 15. OECD

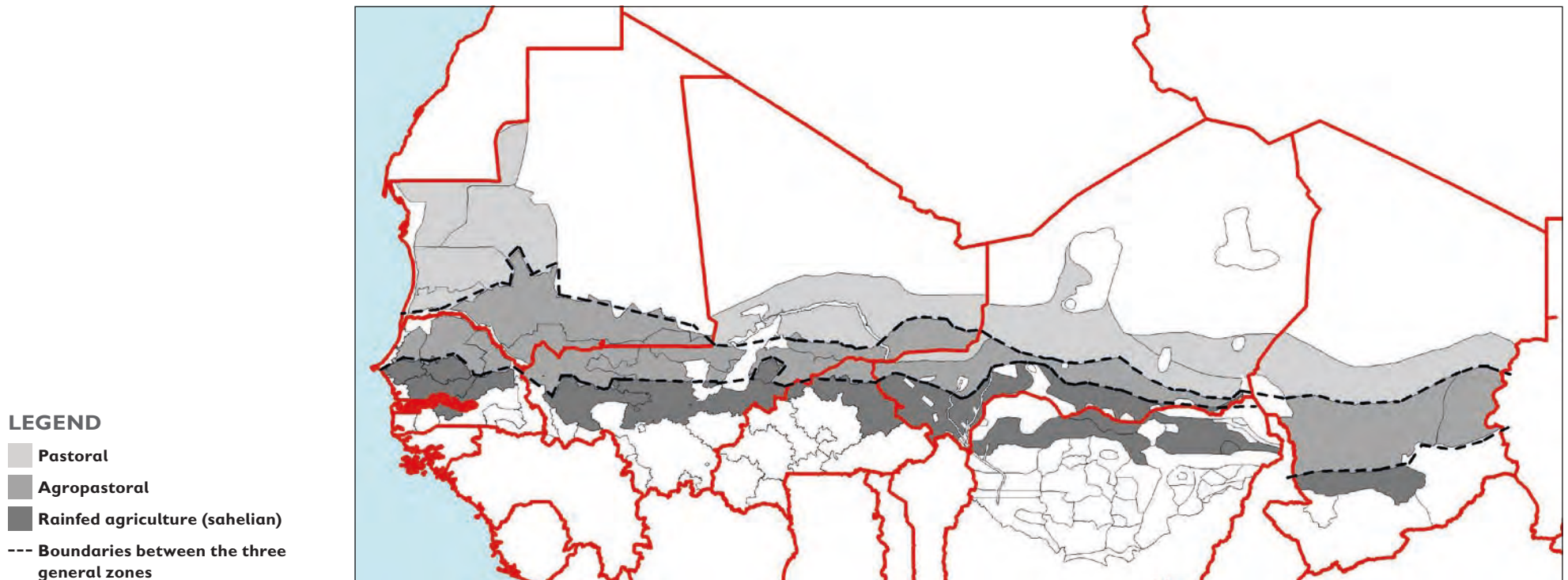


In Map 2, the livelihood zones with the three basic modes of production are combined into three bands. The darkest grey represents the typical rainfed agriculture of smallholders in the *sahelian* band; the middle grey represents drier, agropastoral areas where livestock-raising assumes a greater and sometimes dominant position in the local economy, although crop cultivation is still important; the light grey shading represents arid, pastoral areas where livelihoods are firmly based on cattle and/or camels, sheep and goats: here crop cultivation either is not possible or is localised, minor and often 'opportunistic' depending on the extent of rainfall in a given season. Livelihood zones that do not fit into these bands are outlined without shading: these

are areas with substantial irrigated production, or towards the south they are areas beyond the *sahelian* ecologies proper, with higher rainfall and with natural vegetation and crop production to match – the *sudanian* ecology.

Map 3 shows all the region's livelihood zones against a more detailed mode-of-production map. This shows not only the three Map 2 bands in olive, brown and dark yellow, but also the more humid 'other agriculture' areas to the south in dark green, and the irrigated and coastal areas in blue. In the north, arid areas are shown in shades of yellow. The main expanse of yellow is semi-desert or pure desert, where nomadic herders chase seasonal grazing or where only camel caravans or trucks are to be seen on the trade routes

MAP 2: LIVELIHOOD BANDS BY MODE OF PRODUCTION



to Libya and Algeria. The darker yellow band running through Chad, Niger and Mali is the main home of both nomadic and transhumant pastoralists, the latter being those who reside in fixed villages but whose main livestock is taken to seasonal far-grazing by some members of the household. The darker part in Niger denotes a particular concentration on camel pastoralism. Then there are local variations on the desert theme: the lightest yellow in Niger and in Mauritania represents the overall areas of oasis-based economy where date-palms are the main source of income. And in the west of Mauritania, shown in orange, are desert areas where nomadism combines with substantial trading or with mining employment. Finally, in Niger the 'outmigration'

areas in mauve indicate populations who, whether farmers, agropastoralists or pastoralists, depend to an extraordinary degree on household members migrating for seasonal work, often crossing national frontiers.

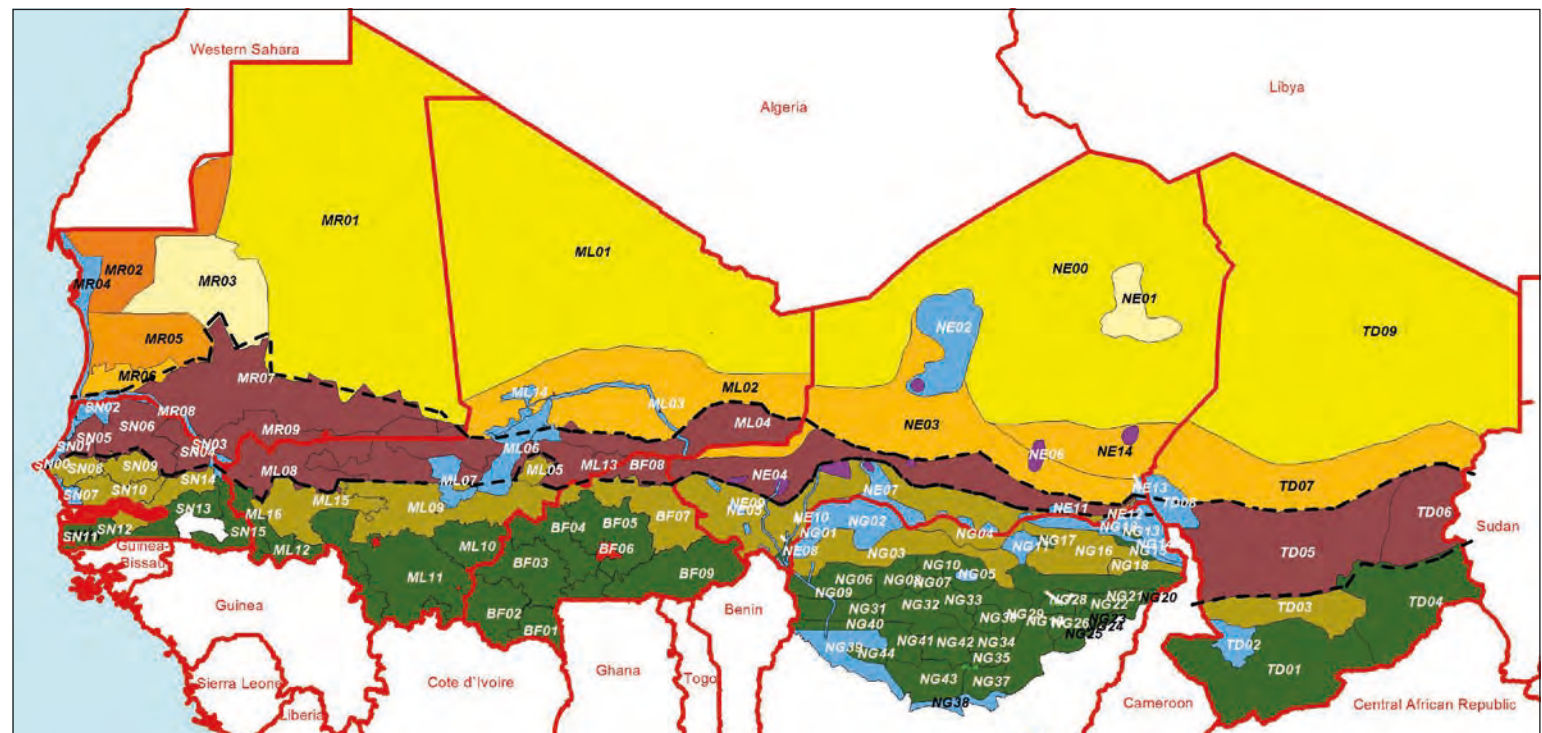
As mentioned above, the national livelihood zoning was done independently in each country, and over the years adjustments have been made to better match similar zones across national frontiers. However, one mismatch remains to be tackled: the broad brown band of agropastoralism across the map is interrupted in far western Niger by a sliver of yellow, denoting the continuity of pure pastoralism. No doubt this anomaly will be resolved in due course.

MAP 3: REGIONAL LIVELIHOOD ZONES (GENERAL)

LEGEND

- Desert
- Pastoral
- Agropastoral
- Rainfed agriculture (sahelian)
- Other agriculture
- Irrigated/Riverine/Coastal/Lake
- Out-migration – Niger
- Urban/Peri-Urban

Note: livelihood zone codes and names can be found in Annex 1 (page 91).



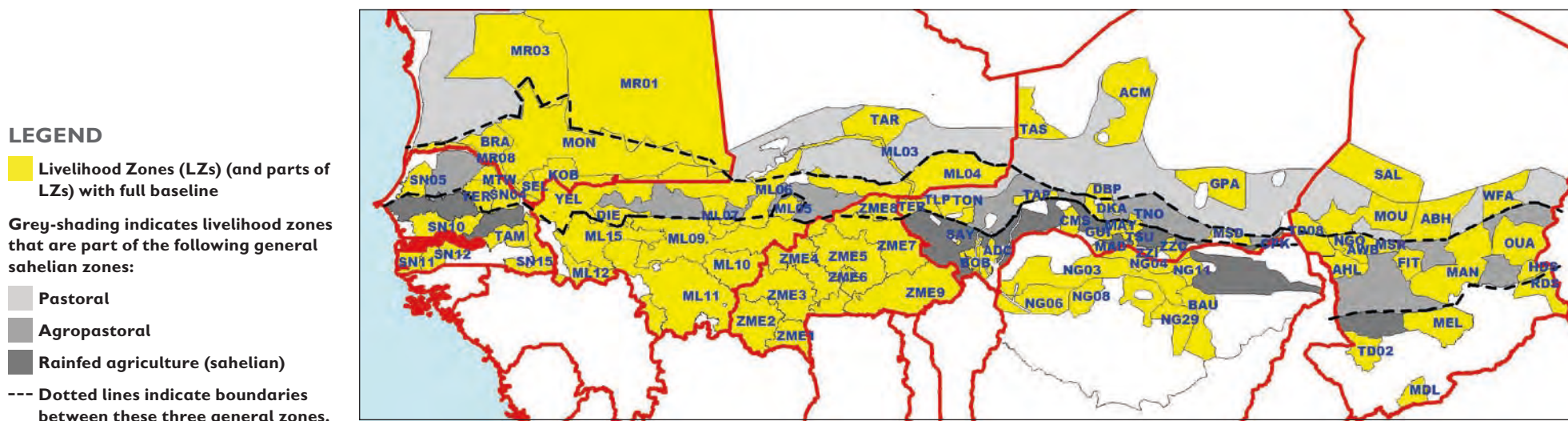
1.3 Coverage and geographical representativeness of the HEA studies

Map 4 shows all the areas that have been subject to an HEA baseline study to date. It will be noticed that these do not always match up with the regional livelihood zones indicated in Map 3 (and shown country-by-country in Annex 1). This is because each country makes decisions about the representativeness of a given study vis-à-vis the whole livelihood zone within which it is located. The map therefore may be deceptive. For example, in Niger and Chad, there has been a restrained attitude towards the representativeness of local studies that are within a wide, national livelihood zone, with the result that even two studies within the same wide livelihood zone (within the pastoral, agropastoral or rainfed agriculture bands) do not result here in yellow shading covering the whole zone. However, in Mauritania a single study in the south of pastoral nomads (MR01) is taken to represent the whole desert nomadic pastoralism zone stretching far north. In Map 4, therefore, where HEA study areas have not been taken as alone representing

entire livelihood zones they are given letter codes. Where they do formally represent national livelihood zones they are given the number codes (ML09, NG03, etc) as in the national livelihood zones maps. An exception is ACM in northern Niger (Air Mountains Irrigated Gardening), which is effectively a whole national livelihood zone (NE02). (Note: In northern Nigeria the Northwest Sorghum, Cowpeas and Groundnuts livelihood zone is split into two parts, the one in the east labelled NG06, which should also be understood as the label for the part to the west that looks as if it has a hole in the middle – in fact, the city of Kano.)

There are historical reasons for this situation. When the first two HEA baseline studies in the Sahel region were undertaken in 2007 in central Niger, the targets were the project areas of the non-governmental organisation (NGO) concerned (ie, Save The Children UK). It could not have been known then that within a decade there would be 23 studied zones in Niger alone, some of them re-surveyed, and 85 studied zones in the Sahel overall. In 2007 Save the Children UK was aware of the national livelihood zones map, and

MAP 4: HEA BASELINE COVERAGE OF THE SAHEL AS OF MID-2017



even identified the localities of the surveys as being within the overall Rainfed Agriculture and Agropastoral livelihood zones, but there was no formal intention of representing these on the national scale. That came with the interest shown in livelihood zoning by the government Early Warning System in Niger and subsequently in all the Sahel countries.

The trigger for this interest has been HEA's contribution to regular seasonal assessments, developing scenarios ('Outcome Analysis') of the effect of shocks that rest on HEA baseline information. In the first years after 2007 there was an understandable bias towards studying locations with a history of particularly high malnutrition and/or locations with a particular history of food insecurity. These necessarily lay mostly within the sahelian ecological band, with its propensity to rain failures from year to year. But more recently a good number of zones have been studied also in both irrigated areas and beyond the sahelian ecology proper in the southern, more food-secure areas of countries. The current coverage therefore offers, as we have said, information about nearly all the main types of livelihood activities identified by

national livelihood zones maps. The seven zones studied in northern Nigeria mainly echo the sahelian cereals and pulses economies or those in the south of Sahel countries.

There is a visual problem that the reader needs to guard against: the size of a zone on the map should not automatically suggest greater or lesser importance for that zone, not least in terms of population. This may seem obvious in principle, but for instance the large area of coverage of the MR01 pastoral zone in Mauritania mentioned above is very imposing to the eye, but represents a total zonal population fewer than the population of the geographically very small Senegal River Valley zone (MR08). To take another instance: in Mali three small or very narrow patches actually represent whole and mainly well-populated livelihood zones: Irrigated Rice – Office du Niger (ML07), the Dogon Plateau (ML05) and Riverine Rice and Transhumant Herding (ML03). Overall, the great majority of rural Sahelians live in the rainfed agriculture bands as outlined; the bulk of the rest live in the agropastoral band, and only a small minority in the pastoral band.



PHOTO: AMENI LEMMAS/SAVE THE CHILDREN

2 How much do Sahelian farmers rely on their own crops for their food and cash?

In every seasonal calendar created during the fieldwork in the agricultural zones from the north to the south of the region, a 'lean season' is indicated. This covers the weeks and even months before the new harvest when, for poorer people at least, stocks from the last harvest are long gone, money is especially tight, and food prices are at their annual peak. This is when poorer households must pull in their belts, as do even middle-wealth herders in the latter part of the dry season when the milk from their animals dwindles drastically, and they have to pay extra-high prices for grain on northern markets far from the country's cereal baskets. This annual lean season is both the symptom and the result of poverty. It is perhaps what is really meant by the term 'chronic food insecurity' in the Sahel, and in its own way it might be considered as much of a scourge as the periodic droughts and acute food stress for which the region is more known.

In truth, one of the striking findings to come out of HEA studies across the Sahel (and across north-east and southern Africa too) is the large amount of staple food purchased by ordinary farmers not only in bad years but also in normal production years. In the Sahel zones studied, just under 80% of farming households in the Very Poor and Poor categories obtain less than 50% of the food calories they consume from their own harvest; and 17% of these households obtain less than 25% of their calories from their fields. They often, in fact, produce a bit more than this, but immediately at harvest they

have to sell some of their crops to pay debts and other pressing costs. This means that during the year households must buy nearly half of their food on the market – even taking into account what they otherwise obtain as in-kind wages, collected wild foods, etc. At the root of this is their limited land, the limited availability of organic fertilizer from the droppings of their few animals, their limited ability to buy chemical fertilizers and other inputs, and, often, their limited family labour. It follows that what must finally determine household food security or insecurity is not their harvest but their access to cash to buy food.

It follows in turn that development policy needs a judicious balance between investment in increasing food production and investment in increasing off-farm cash-earning opportunities. The first may be most important for wealthier farmers with more land, whose surpluses keep nearly all of the Sahel countries from being substantial importers of grain (apart from the rice popular in the cities and with wealthier villagers). But there is a limit to which the often very small smallholdings of poorer households can be coaxed into higher food production, even with fertilizer subsidy and a bit of good luck with the rains. The quest ought to be to 'help them help themselves', beginning with an understanding of their own decisions about how to invest their labour and the small amount of capital they have – an understanding promoted by HEA information and analysis.

Development assistance may in some cases even mean helping poorer farmers to produce cash crops rather than food crops. It is very rare to find any farmer, poor or wealthy, who is not concerned to grow family food on at least part of their land. Having said that, the production of cash crops as opposed to food crops by poorer people does not in itself make them more food insecure. Their first concern is how they will keep eating during the year, and in this they make their own opportunity-cost judgements about the investment of their work and cash in food crops on the one hand and cash crops on the other. And since they are heavily market-dependent for food, whatever threatens their cash earnings threatens their food security. Therefore a dip in commodity prices, and/or a failure by an official buying agency to honour pre-agreed prices for a product, should immediately prompt concern about food security. It is not just food harvest failures that bring hunger.

Nevertheless, attention does naturally need to be given to helping poorer farmers keep the food they produce. Technical assistance to reduce post-harvest losses would be one priority. At the same time, although we commonly talk of livestock as the ‘bank account’ of Sahel farmers, this should not obviate consideration of targeted financial services for poorer households to begin a modest but benign cycle of investment in good seeds, fertilizer or other items. The attempt would be to reduce their taking of credit in the growing season, whether for agricultural inputs or simply for food to survive through to the end of the lean season – and thus to avoid their selling some of the new food harvest to repay credit. But insofar as poor farmers are forced to seek income outside their farms – and it is far indeed – we see in so many of the Atlas maps that follow a high degree of effort and enterprise on their part. Development investment should follow their lead, and among other things consider small-scale capitalisation of such activities as food processing, artisanal production and brick making, offering at the same time training in skills not usually considered the province of the farmer or herder, eg, carpentry, tailoring or masonry.

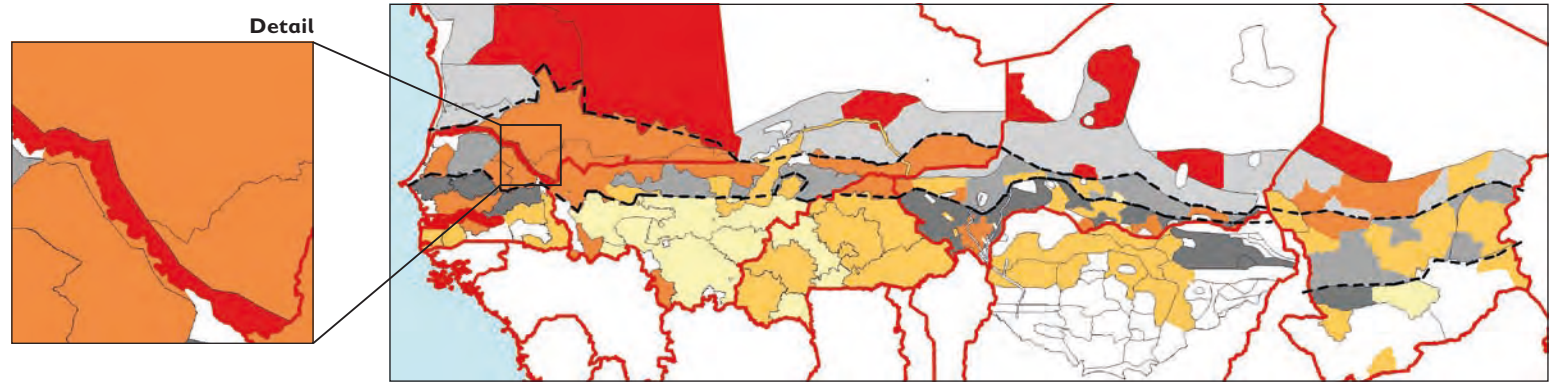
If this last notion seems more urban than rural, that too would be to follow the farmers’ lead. The United Nations (UN) forecasts that urban living will be the situation of the majority of Africa’s populations by the middle of the 21st century, and across the Sahel hundreds of thousands of rural people are voting with their feet every year. Whether this will result in larger landholdings for the farmers who remain, and even in more mechanised crop production, can only be guessed for the moment. But meanwhile, cities deeply affect farmers and herders, not only by creating an ever-increasing demand for their crops, livestock and dairy products, and for other goods they produce, but by offering them seasonal employment and also, indirectly, remittances from educated sons and daughters who settle successfully in the urban economy. It should go without saying that increased wealth creation in rural as well as urban areas depends on universal education, as much as possible beyond primary school level – surely an imperative development investment.

Note: In the following map commentaries, reference is made to livelihood zones by both name and code. Readers are invited to refer to Map 4 to locate these zones by their code.

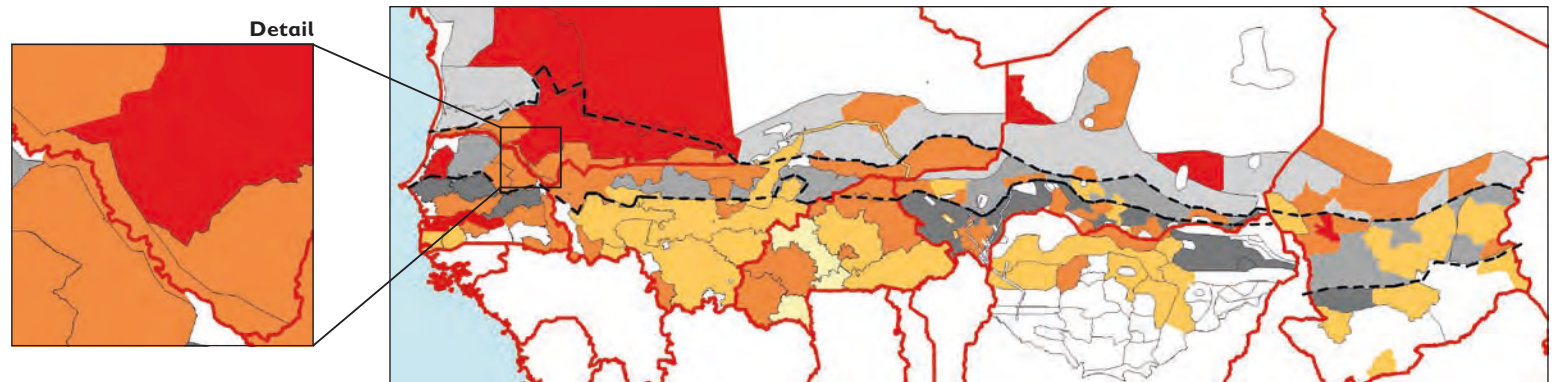
MAP 5: MARKET DEPENDENCE FOR FOOD

(Percentage of kcals consumed that are purchased)

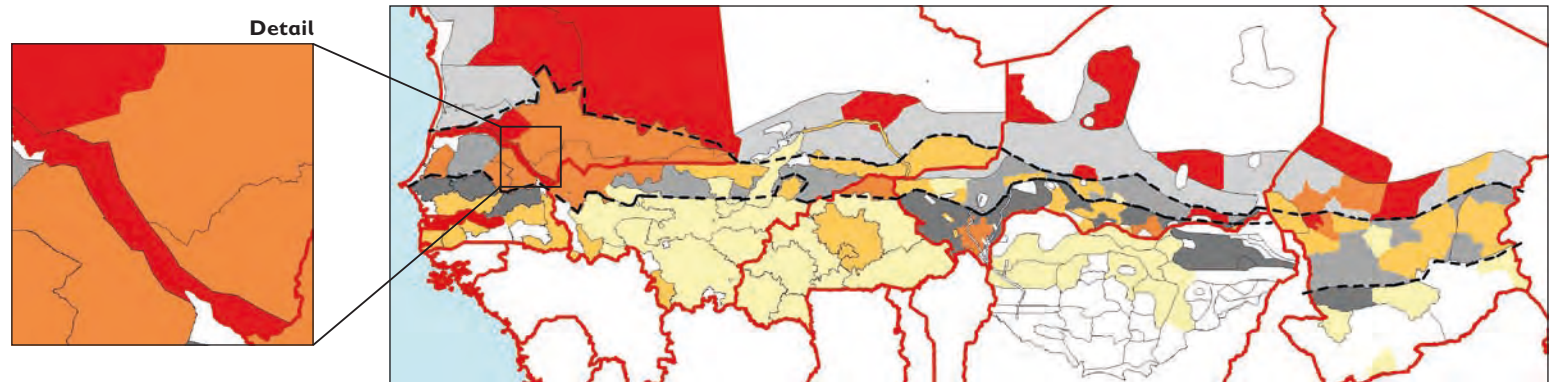
Average households



Very Poor households



Better Off households



LEGEND

% kcals purchased

- 0-25
- 26-50
- 51-75
- 76-100

COMMENTARY MAP 5: MARKET DEPENDENCE FOR FOOD

For this map and those that follow, the three sections are designed to answer two main questions. The first question is what general pattern we see and what we could conclude from it. Here, the Average Households section (which shows the average values across all four wealth groups) might be the first point of reference. The second question is what differences we see between poorer and wealthier households, here represented by the two extremes: Very Poor and Better Off. In practice, the comparison between those two household groups tends to provide the best overall guidance and to explain the Average Households section.

Market dependence for staple food, mostly cereals, is almost the obverse of self-sufficiency: almost, but not quite, because poorer households might also obtain food as direct payment for casual labour on farms (see Map 6 and its commentary) or as a meal provided at the field during the working day, or by collecting wild foods, or as a gift, food loan or food aid.

Pure pastoralists produce no crops and therefore the north is peppered with the deeper colour. If we are looking for the areas with greater food self-sufficiency, we automatically look to the far south where rainfall is higher and average food production per capita is likely to be greater. This is borne out not only among the Better Off but on Average as well. Nevertheless, the Average picture is not rosy: in the overall agricultural area, the majority of zones show up to 50% dependence on the market for calories, although south and central Mali stands out for its high degree of self-sufficiency. Neighbouring zones in Burkina Faso show a mixed picture: on the one hand, even the Very Poor in the South Tubers and Cereals zone (ZME1) manage to consume 60% of their calorie requirement from their own production. By contrast the Very Poor in the West Cotton and Cereals zone (ZME3) and the Southwest Fruits Cotton and Cereals zone (ZME2) purchase between half and three-quarters of their calories. The Very Poor in northern Nigeria's NW Cotton, Groundnuts and Mixed Cereals zone (NG08) catch the eye for the same reason. But in fact this high market dependence does not mean that

these are islands of food insecurity. The clue is in the common element of their titles: cotton. Farmers give over a good part of their land to this cash crop in the expectation of earning enough money to more than cover the purchase of the extra food they would otherwise be able to produce. They are vulnerable to problems such as the failure of government services to supply pesticides or to honour their purchase agreement at the expected price when world prices dip. But as a rule when these problems occur producers are able to use savings, assets and credit, or find enough employment, so that at least they are not threatened by hunger from one year to the next.

This prompts us to make a general distinction between food self-sufficiency and food security. It is not just the issue of cash crops versus food crops that is relevant. Poorer people who normally produce very much less of either than can meet their direct consumption and market needs are not by that token necessarily food insecure. If they can regularly meet their needs through off-farm income-earning activities, then they may be deemed food secure, however poor they may be. It is when there is an interruption that hits such production as they have, and/or their other income, that people become acutely food insecure. As a rule of thumb, the further north one goes, the more one finds people threatened with that irregularity – the great enemy being drought.

Finally, there are some cases that are counter-intuitive, where the Very Poor depend less on the market than the Better Off. The answer to this conundrum brings up interesting aspects of how people obtain food. In the Air Mountains of northern Niger (Air Massif Irrigated Gardening zone – ACM) food production is very low across the board, as the very limited arable land and the precious irrigation from wells are devoted mainly to cash crops, especially the high-quality onions that reach the Niamey market and beyond. Unlike the Better Off, the Very Poor, at 74% dependency, just miss being in the uppermost market-dependent bracket because they receive 15% of the food they consume as food aid and as direct payment for daily labour (payment

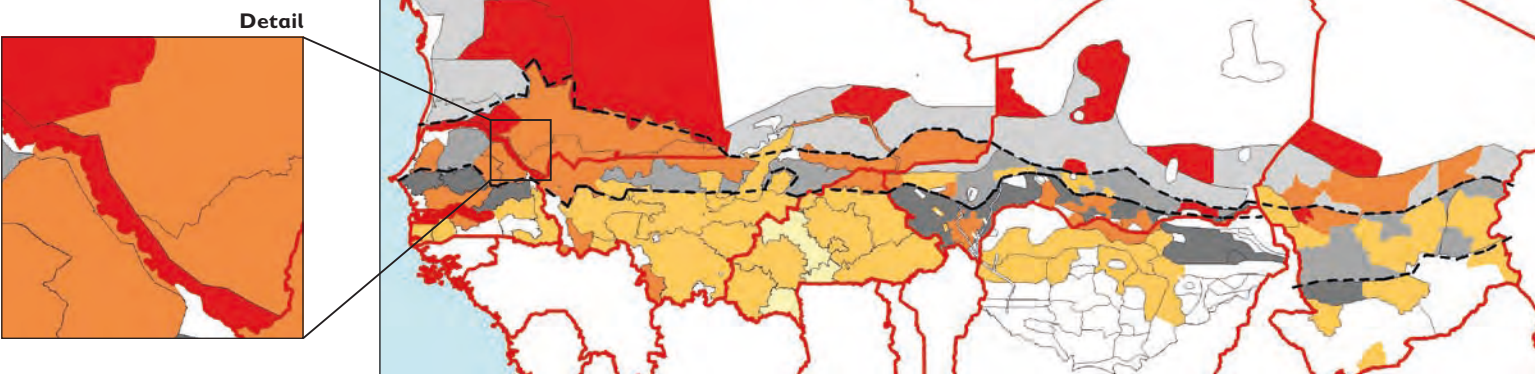
in-kind). Similarly, due south in Niger the Very Poor among the Dakoro Bororo Pastoralists (DBP) are at 74% market dependency not only because of food aid and private food gifts but because of substantial in-kind grain payments from working for agropastoral neighbours. Again, in the Senegal River Valley zone in Mauritania (MR08) overall agricultural production is low, but the Very Poor gain a significant proportion of their food through in-kind payments, collected wild foods and gifts. In pastoral Tarkhint in Mali (TAR) the Very Poor receive 20% of the food they consume in payment in-kind (grain purchased by their employers), gifts and food aid.

For the Salale camel pastoralists in northern Chad (SAL) there is a quite different explanation of the lesser market dependency of poorer people. Very unusually for poorer pastoralists in the Sahel, the Very Poor consume

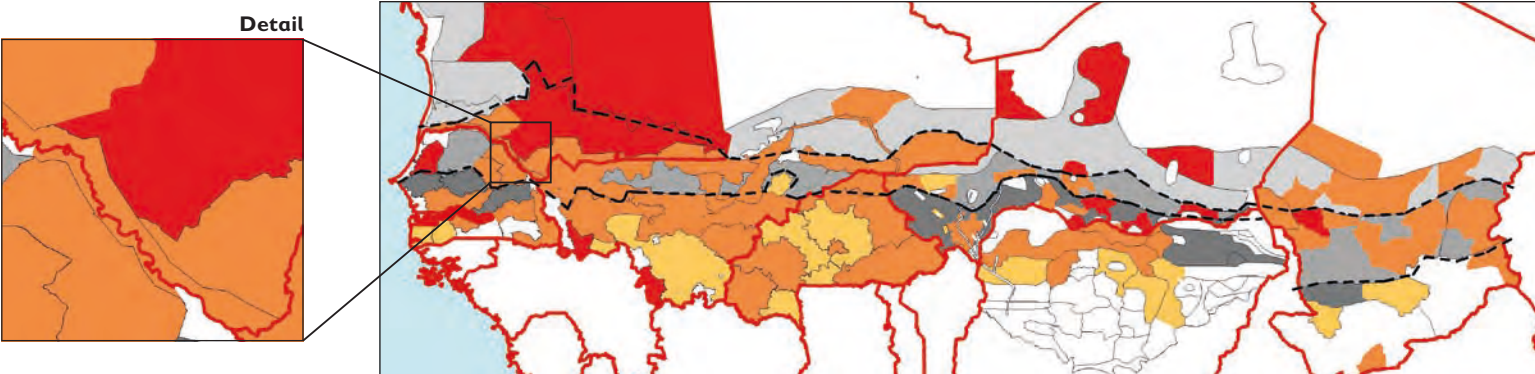
more than a quarter of their calories as milk from their own camels, such is the size of their holding. Meanwhile, the Better Off consume nearly 40% of calories as milk, but they also purchase enough grain to bring them far above the 100% minimum calorie requirement mark. In the Monguel area (MON) of the agropastoral belt in Mauritania the Better Off also purchase enough grain to consume far above their minimum calorie requirement, and this greatly increases their proportional market purchase. In these cases, one suspects that part of this apparently high household consumption may in fact be due to unrecorded gifts or payments in-kind to poorer kin; and there is possibly a similar case in this respect in the Senegal River Valley Walo: Agropastoral, Outmigration and Remittances zone in Senegal (MTW).

MAP 6: PURCHASE + IN-KIND PAYMENTS AS A PERCENTAGE OF TOTAL CALORIES CONSUMED

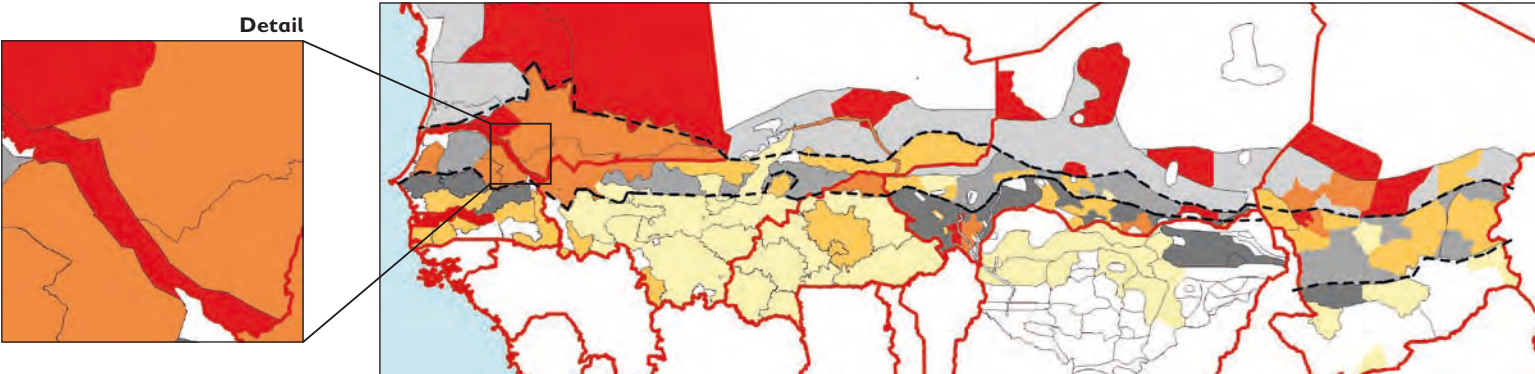
Average households



Very Poor households



Better Off households



LEGEND

% total kcals consumed

- 0-25
- 26-50
- 51-75
- 76-100

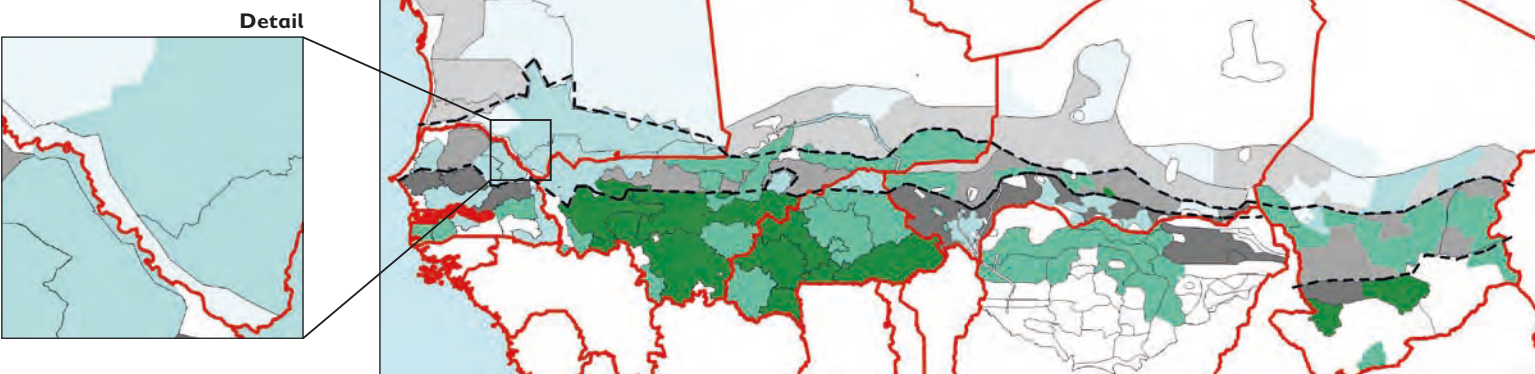
COMMENTARY MAP 6: PURCHASE + IN-KIND PAYMENTS AS A PERCENTAGE OF TOTAL CALORIES CONSUMED

Map 6 shows a slightly more complete picture of food obtained as a transaction, in the sense that receiving grain directly as a wage is a substitute for buying it in the market. This essentially relates to poorer households, who provide the workers. The marked difference between Maps 5 and 6 is that for the Very Poor, it is the agropastoral and pastoral zones that tend to show a higher contribution of in-kind food. The explanation we can offer is that in these less densely populated areas there are fewer markets and the distances to travel for food supplies, and the associated cost of transport, are greater than in the more densely populated agricultural zones. It may therefore be an advantage in terms of potential cost and time for poorer people to receive their wages as food which they would otherwise have to buy with a cash wage.

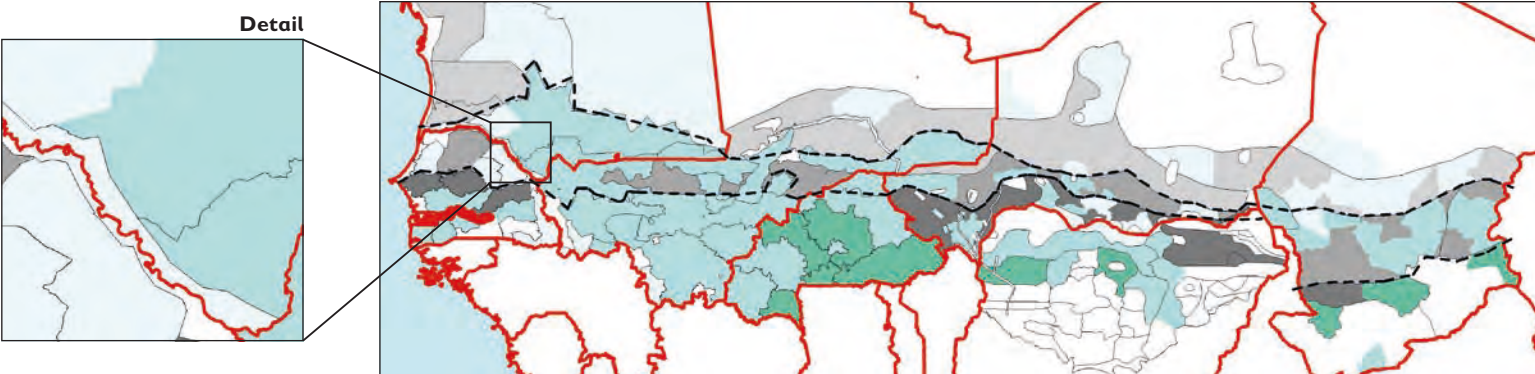
For agricultural employers, there may be an incentive to pay in-kind directly from their grain-stores rather than paying a cash wage. But pastoral employers must pay in-kind from sacks of grain they have transported from the market. The wage may reflect this cost, or it may be discounted as goodwill for a contracted herdsman who may well be a close kinsman, but who in any event is entrusted with the care of the employer's most vital assets. Nevertheless, most wages are paid in cash virtually everywhere, since workers everywhere need cash for more than grain, and cash provides flexibility in the timing of purchases.

MAP 7: CONSUMPTION OF OWN CROPS AS A PERCENTAGE OF CALORIES CONSUMED

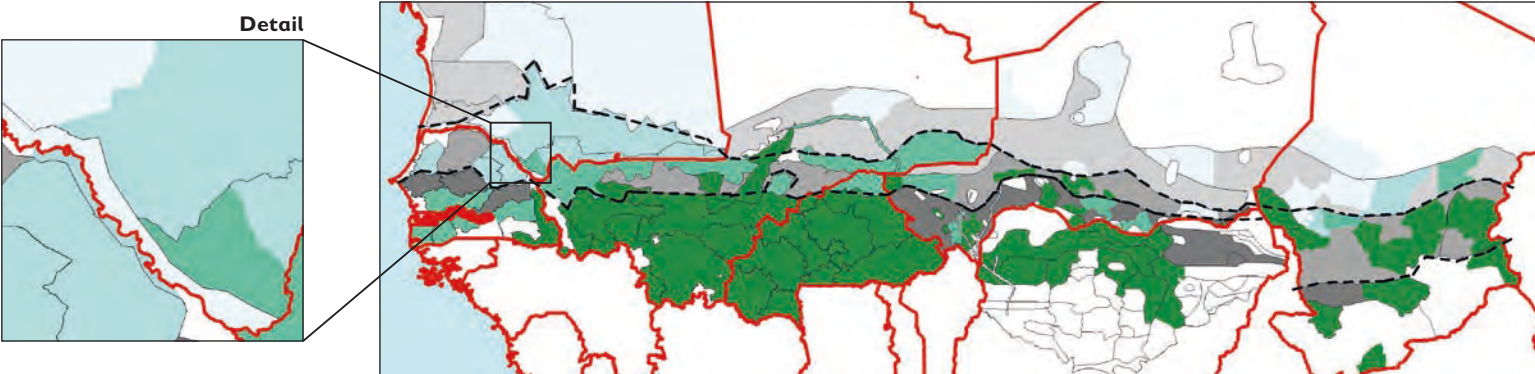
Average households



Very Poor households



Better Off households



LEGEND

- % kcals consumed
- 0-25
 - 26-50
 - 51-75
 - 76-100

COMMENTARY MAP 7: CONSUMPTION OF OWN CROPS AS A PERCENTAGE OF CALORIES CONSUMED

As mentioned in relation to Map 5, self-sufficiency is almost the obverse of market dependence. If we began with the latter, it was because the message of market dependence appears particularly important but is not always fully appreciated by decision-makers and others. But this is in no way to suggest that food production is somehow of lesser importance. It is, on the contrary, the basis of Sahelian rural economy, and even in most of the successful rainfed cash-cropping areas it would be hard to find a farmer who did not put a good half of their land under food crops (that is, where the cash crop itself is not surplus grain). It is because so many households are so far from being able nevertheless to feed themselves from their land that the quest in HEA, reflected in this Atlas, is to understand how they do manage to get enough basic food and how they manage to meet their other life and livelihood needs: that is, how they make ends meet.

There is clear confirmation here of greater crop production per capita in the more humid southern areas, which are somewhat beyond the *sahelian* ecology proper. If this production seems very skewed towards the Better Off, the fact is that the values in the Average map are bolstered by the sometimes substantial production of the Poorer.

In two countries, Chad and Mali, the greater self-sufficiency among the Better Off stretches quite far north into the agropastoral band. In Chad, one such area is the Western Agropastoral and Fishing zone (TD08) at the side of Lake Chad, where both flood-retreat and irrigated farming are practised

on fertile sedimentary soils. In western Mali the Yelimane Agropastoral Millet, Sorghum and Rice area (YEL) and the Diema Agropastoral Millet, Sorghum and Transhumant Herding area (DIE) are productive enough to show deep green on the Average map – Diema in particular is a very substantial producer of millet. All three are also notable for the high proportion of the income of the wealthier coming from remittances (see Map 22), and this is reflected in relatively high investment in hired labour as well as livestock.

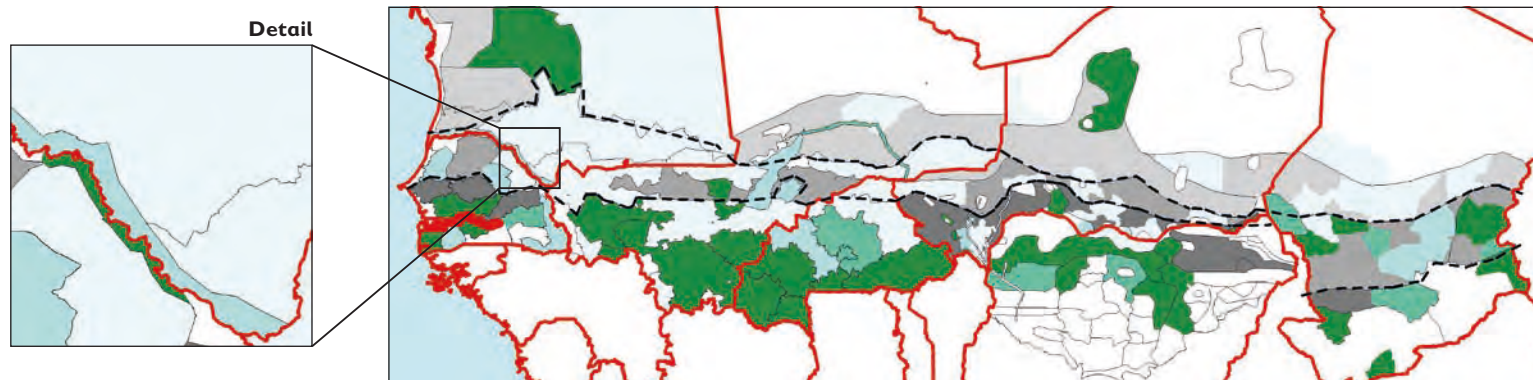
More generally in the agropastoral band, the limit to crop production is rainfall, whether in its meagre volume or its irregularity, rather than soil fertility or farmers' efforts. Once or even twice in a decade there are exceptional rains, and then these areas produce such bumper crops that they dominate the market more than the production of the ordinary agricultural zone further south. The problem is that in rather more years in a decade the rains are poor, so that cultivation is more of a gamble for the bigger producers here than further south, and reliance on livestock earnings becomes paramount.

Looking further at the Average map, we notice again two contiguous zones in south-west Burkina Faso that stand out as less self-sufficient (ZME2 and ZME3, Southwest Fruits, Cotton and Cereals, and West Cotton and Cereals). As noted for Map 5, here it appears that the amount of land households devote to the cotton cash crop diminishes their cereal production.

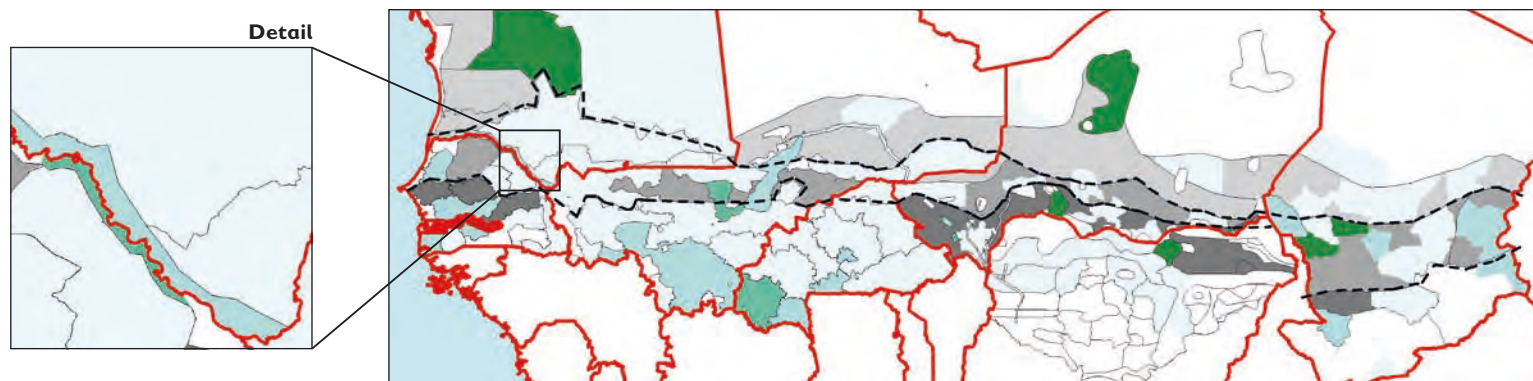
MAP 8: CASH INCOME FROM CROP SALES

(US\$ per person per year)

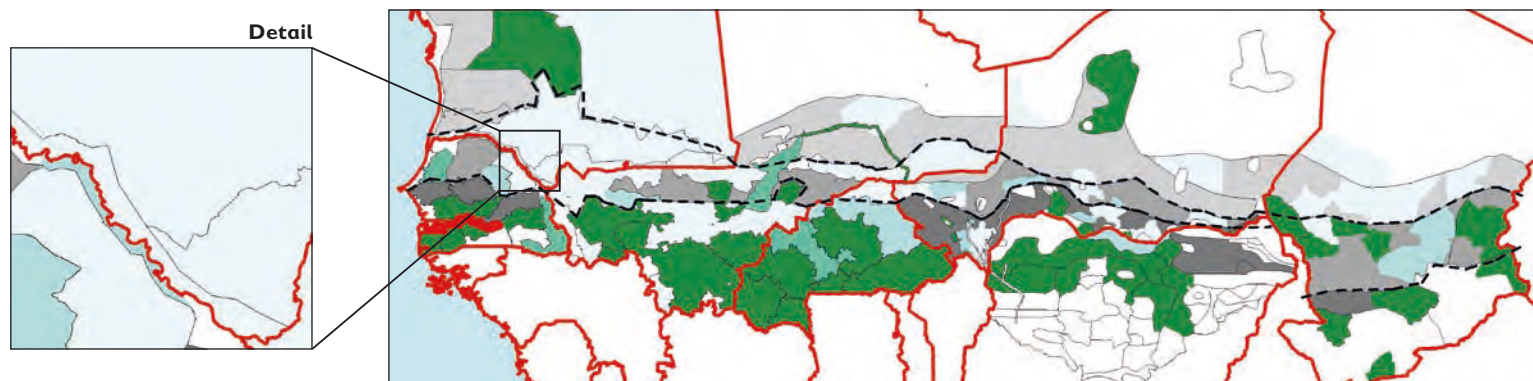
Average households



Very Poor households



Better Off households



LEGEND

US\$ per person per year

- 0–20
- 21–40
- 41–60
- >60

COMMENTARY MAP 8: CASH INCOME FROM CROP SALES

Food crops and cash crops are here considered together. One might say they would all be cash crops if they were sold, but normally 'cash crops' are thought of as those grown mostly or exclusively for sale, for example sugar cane, tobacco, onions in bulk, or sesame. To this should be added market garden produce. For food crops such as cowpeas and groundnuts there is a division: where production is modest, households consume all or most of the crop. But where the crop is produced in quantity, it is usually with the express intention of selling the greater part. At the same time, these days producers of surplus cereal tend to sell most of their surplus rather than store it as security against drought. Cowpeas (*niébé*), the universal pulse, are usually intercropped with cereals (this is not true for groundnuts) and so a big cowpea crop is usually associated with a big cereal crop. For our general analysis, however, we must define a crop either as a food crop or a cash crop. The definition we have arrived at is that any crop is a cash crop if more than half of production is sold in more than half of all the livelihood zones studied across the region.²

It is no surprise that more cash income from crops is a markedly southern phenomenon, given the generally more favourable ecological conditions there for agriculture. Here, apart from surplus cereals, a variety of cash crops bolster the rural economy, from cotton to sugar cane to fruits. But several zones in the north and middle of the map also stand out, the more so because even the Very Poor are shown with comparatively high income from crop sales. The secret is in ground water from various sources, and it is worth dwelling on this phenomenon because it is the base of an unexpected number of livelihood zones in this semi-arid part of Africa. We have already mentioned the economy of Air Massif Irrigated Gardening zone (ACM)

for Map 5: here it is water drawn from wells using camels and donkeys that provide irrigation, and a Better Off farmer with not much more than 1.5 hectares can produce upwards of six tonnes of onions, as well as other vegetables (tomatoes, Irish potatoes) and a sack or two of wheat, as well as maintaining enough perennial moringa trees to yield a tonne of the prized proteinous leaves. Even the Very Poor make most of their living in the same way, although they typically only cultivate one-third of a hectare. There is little paid work on offer on other farmers' fields, and little else they can do for much profit except to sell firewood.

A far larger onion industry, the biggest in the Sahel, is found in the vicinity of the centre-south border of Niger with Nigeria. Here, in the Southern Market Gardening Tarka Valley area (CMS) an extensive shallow water table allows for the irrigated production of as much as 200,000 tonnes of onions in a single district over two cycles per year, together with tomatoes and other garden produce and some rainfed cereals. Even the Very Poor, with their quarter of a hectare of irrigated land, make significant money from sales of over 2.5 tonnes of onions. On the Nigerian side of the border further east, in the Hadejia Valley Mixed Economy zone (NG11) in Jigawa State, there is substantial rice production and market gardening from '*fadama*' irrigated and flood-retreat agriculture on a river flood-plain. In the completely different environment of the desert of western Mauritania, in the Oases, Wadis and Pastoral zone (MR03) even the Very Poor can earn enough cash income from a dozen productive date-palms and a small market garden to pay for one-third of the large proportion of their annual food calories that must come from purchase.

² On this basis, the following are the food crops: millet (pearl millet – *Pennisetum glaucum*), sorghum (including the type *berberi* in Chad), maize, fonio (*Digitaria sp.* – a grass variety with very small seeds), rice, wheat, cowpeas, voandzou (*Voandzeia* or *Vigna subterranea* – bambara nut) and melon seed. The cash crops are: groundnuts, onions and shallots, cotton, sugar cane, tobacco, cassava, sweet potatoes,

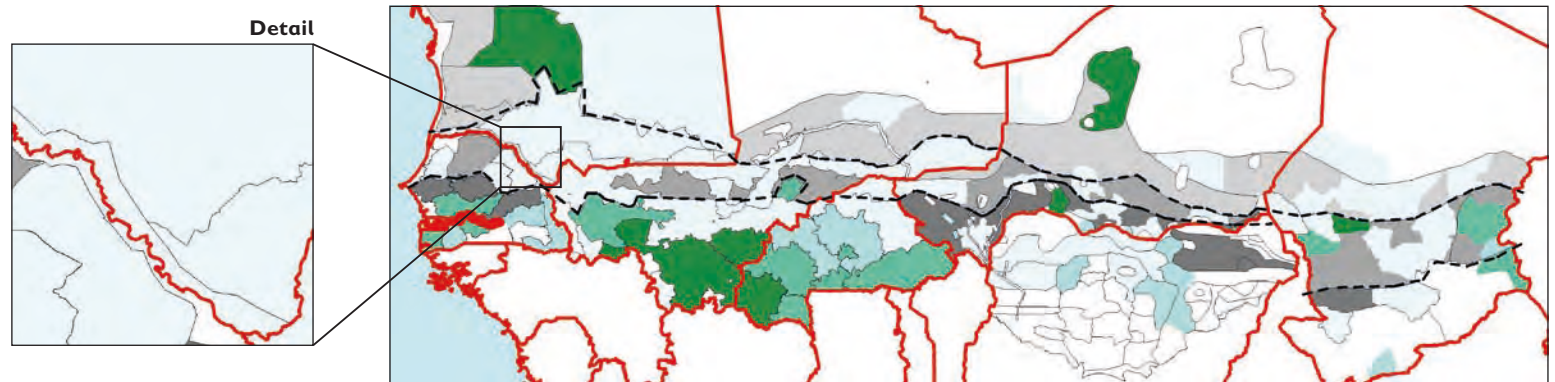
Irish potatoes, sesame, soya, chilli and sweet peppers, cashews, moringa leaves and seeds; all vegetables or market garden crops including cabbages, tomatoes, okra, aubergines, sorrel; and fruits: mangoes and avocados.

Two other northern zones with particularly high crop incomes are in Mali. There is the irrigated rice scheme near Niono on the Niger River (ML07) where again even the Very Poor make significant sales. And there is the Dogon Plateau (in Bandiagara) (ML05) where, in the rocky terrain, farmers have managed to create micro-dams for irrigation, again especially for an onion crop, in this case in the form of shallots. But poorer farmers cannot depend as much on this crop and must look for other income: agricultural and construction work, selling firewood and collected wild foods, handicrafts, and providing transport in the form of borrowed ox carts or just donkeys. A fourth zone is the riverine area in Matam in north-east Senegal (MTW)

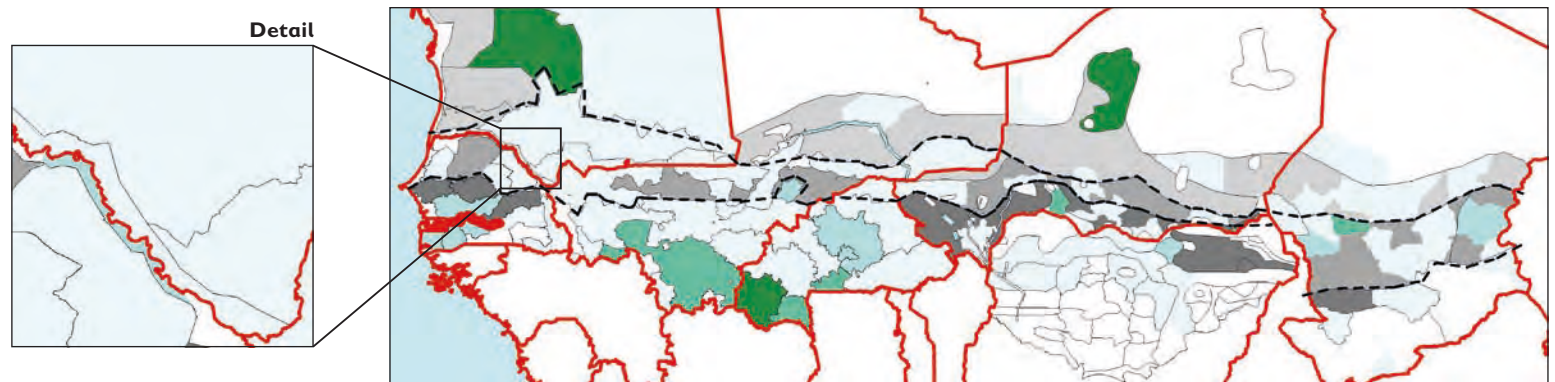
where irrigated and flood-retreat crops, notably rice and sweet potatoes, give high returns. In Chad, we have already mentioned for Map 6 the irrigated and flood-retreat zone (TD08) beside Lake Chad in the west. Far to the south, in the Southwest Rice zone (TD02) it is again irrigation and flood retreat from the River Logone that provides the opportunity to earn high incomes from both rice and surplus sorghum. In eastern Chad too, the Mangalmé Agropastoral area (MAN) shows high cash incomes from crops, benefiting from flood-retreat cultivation as well as seasonally moist wadis. There is a balance of cereals (especially sorghum), oilseeds and garden crops, notably okra, which is dried and transported to distant markets.

MAP 9: CASH CROP SALES AS A PERCENTAGE OF TOTAL CASH INCOME

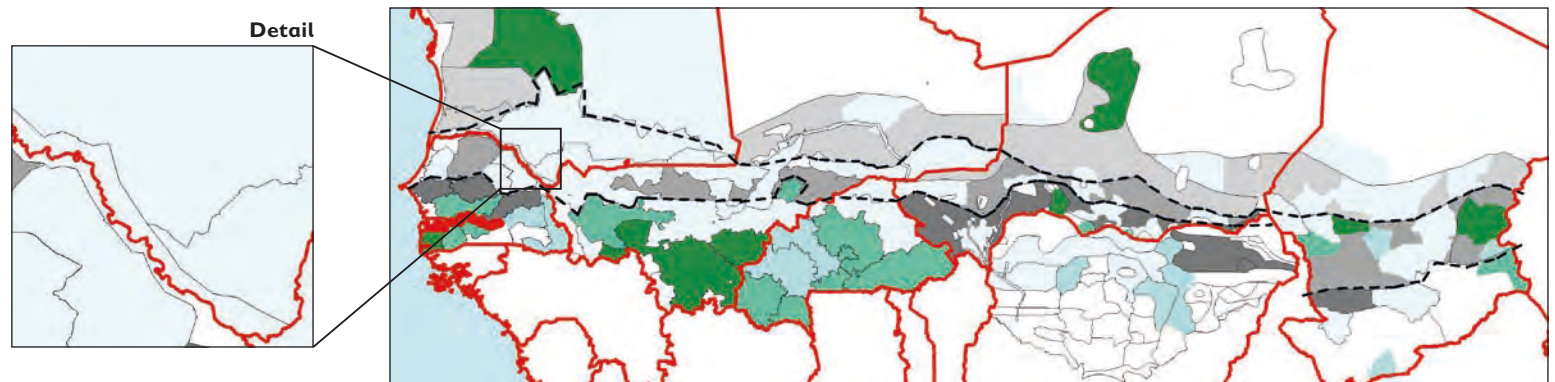
Average households



Very Poor households



Better Off households



LEGEND

% total cash income

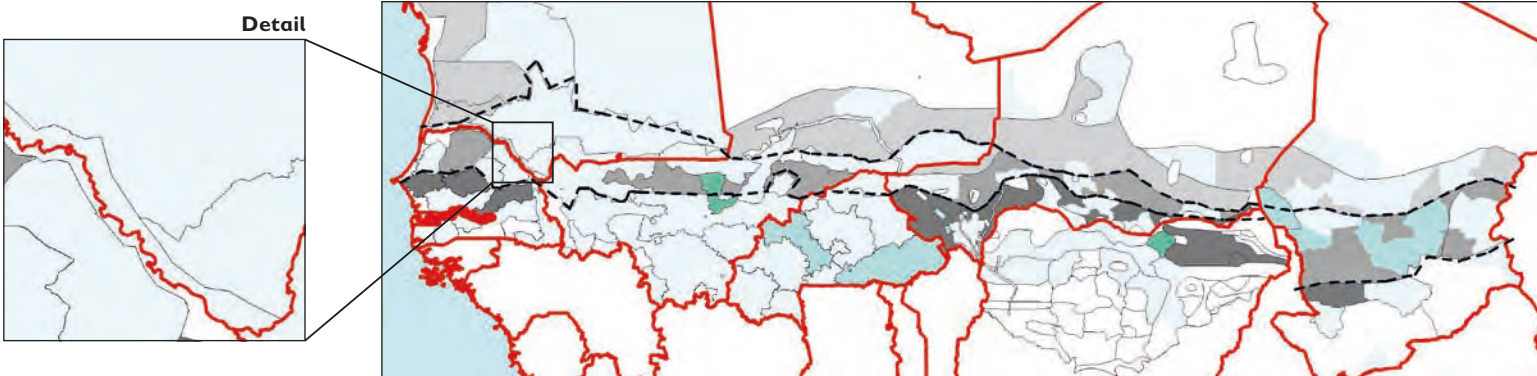
- 0-15
- 16-30
- 31-50
- >50

MAP 10: FOOD CROP SALES AS A PERCENTAGE OF TOTAL CASH INCOME

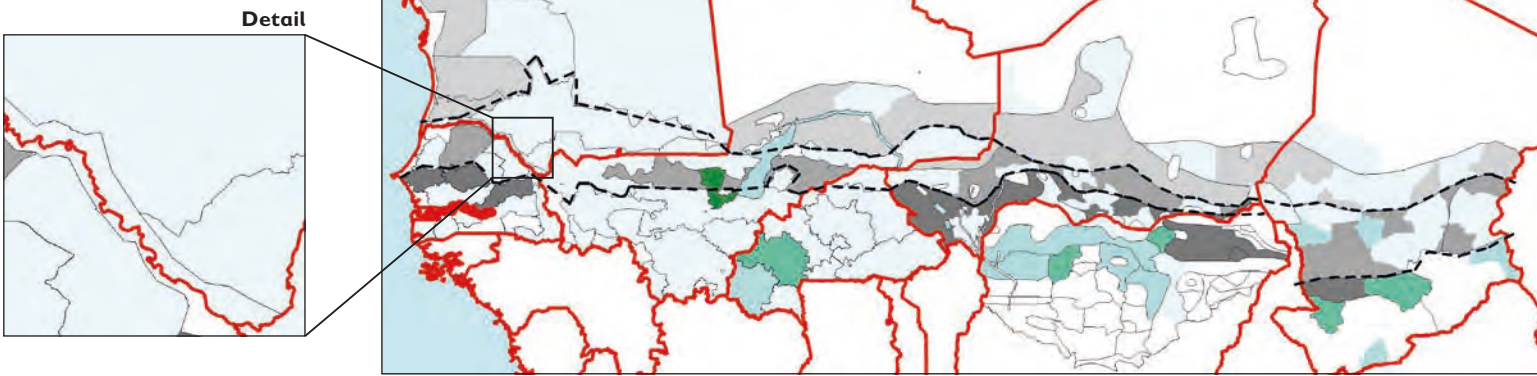
Average households



Very Poor households



Better Off households

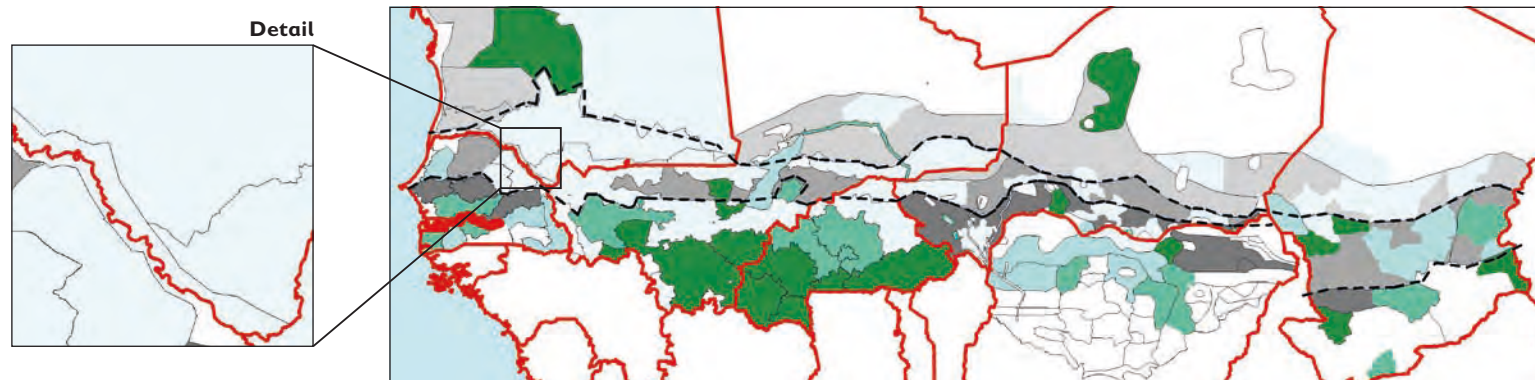


LEGEND
 % total cash income

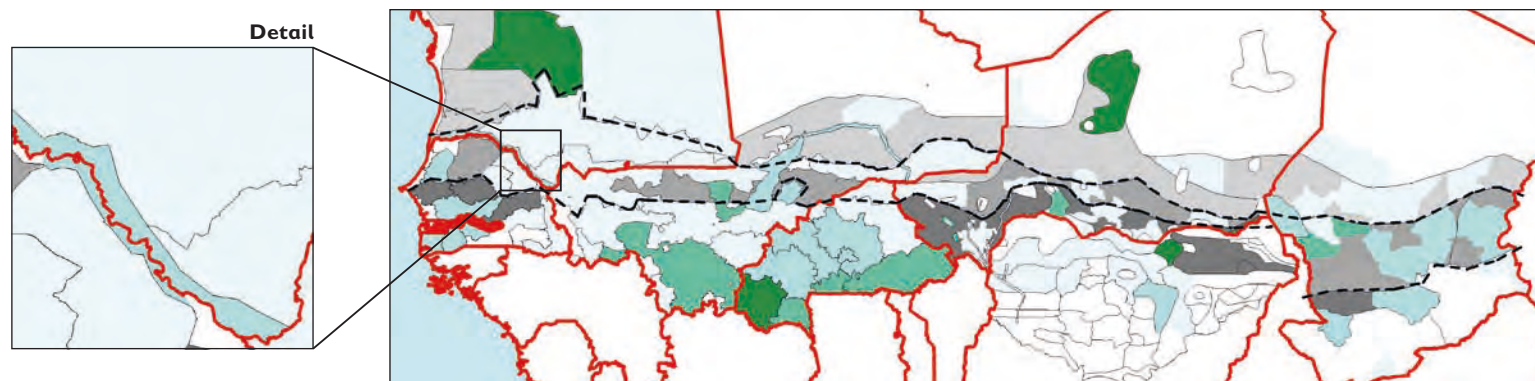
- 0-15
- 16-30
- 31-50
- >50

MAP 11: ALL CROP SALES AS A PERCENTAGE OF TOTAL CASH INCOME

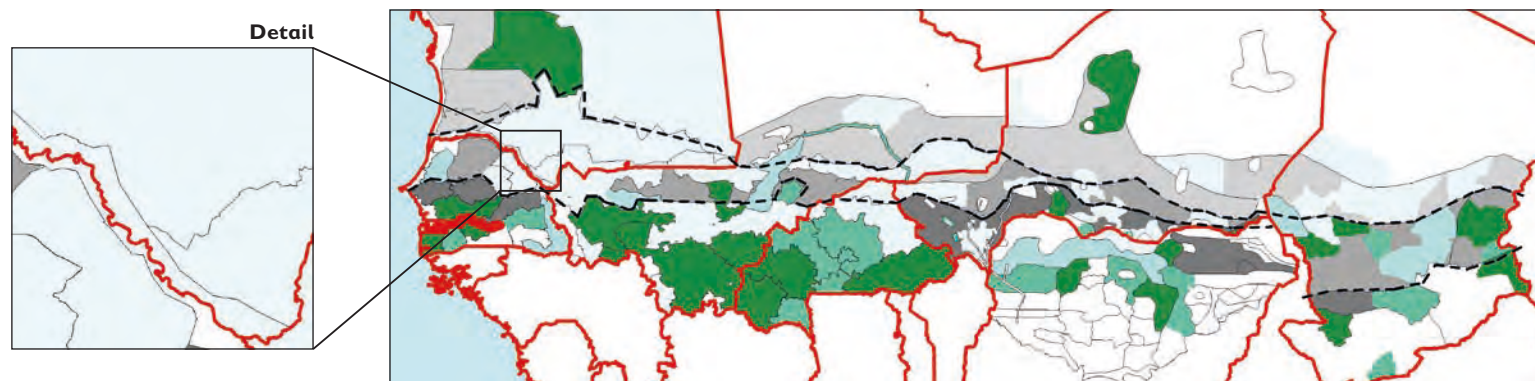
Average households



Very Poor households



Better Off households



LEGEND

% total cash income

- 0-15
- 16-30
- 31-50
- >50

COMMENTARY MAP 9: CASH CROP SALES AS A PERCENTAGE OF TOTAL CASH INCOME; MAP 10: FOOD CROP SALES AS A PERCENTAGE OF TOTAL CASH INCOME; MAP 11: ALL CROP SALES AS A PERCENTAGE OF TOTAL CASH INCOME

These maps look at crop earnings in a different and disaggregated way. We see where cash crops have a particular influence and where food crop sales are more important.

Regarding cash crops we have already discussed several zones for Map 8. In Map 9 we also see more clearly other cash crop zones. In southern Mali (the Sorghum, Millet and Cotton zone ML10 and the Southern Maize, Cotton and Fruits zone ML11), and in south-west Burkina Faso (Southwest Fruits, Cotton and Cereals ZME2), it is especially the combination of surplus cereals and cotton that brings in the money, although falling cotton prices over the years have given cereals the upper hand. Poorer households are in fact far from self-sufficient in cereals, and cotton at least brings in cash which helps prevent them from selling their grain at harvest to meet debt repayments and other pressing needs. In the Burkina Faso zone even the Very Poor make more money from selling cash crops than from all other sales and activities combined. They sell no grain at all, and the cash mainly comes from cotton, although with a good addition from mangoes and cashews. On the other hand, in southern Chad even a decade ago cotton alone would have dominated incomes and the area would have shown up dark green on the maps, while today 'cotton' doesn't even specifically feature in the name of the Southern Staple and Cash Crops zone (TD01), here represented by the MDL area.

In Map 10, if we look for areas where food crop surpluses make up the greatest proportion of cash earnings – at least for the Better Off – we hardly find them. This is remarkable for such a wide, mainly agricultural region, insofar as it is represented by the HEA baseline areas. The exception is the Malian Office du Niger zone (ML07), where there is virtually a monoculture of rice on a large managed irrigation scheme. Irrigated rice is at the base of a couple of other areas, mentioned earlier, where up to 50% of Better Off

income comes from food crops: the Hadejia Valley (NG11) in northern Nigeria and the Southwest Rice zone (TD02) of Chad. Here, clearly, rice is a cash crop and food crop combined.

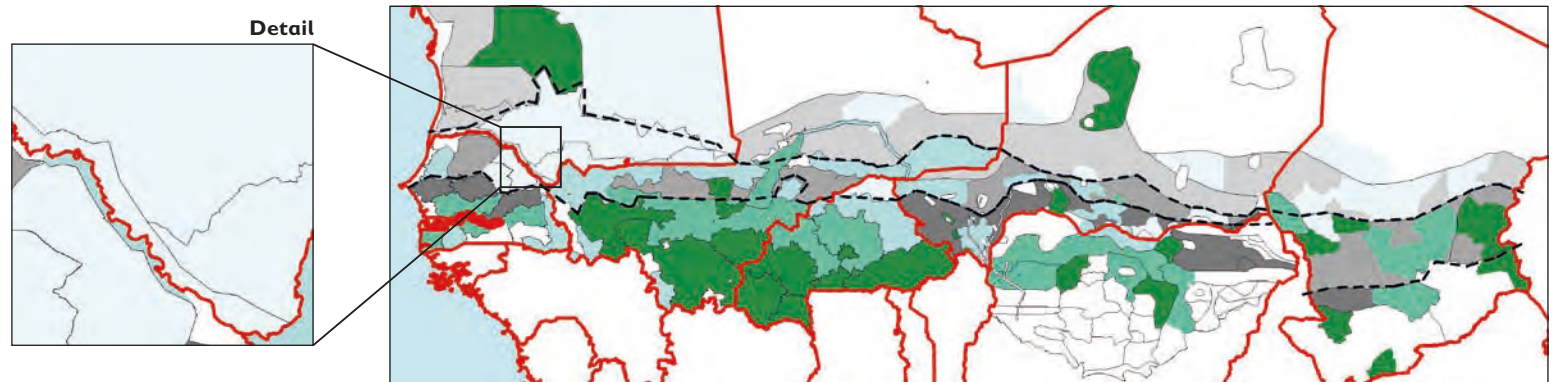
Of course there are zones with relatively high production of grains other than rice, notably towards the south, but this does not seem to translate into the highest earnings. The pattern of high crop earnings in Map 11 is influenced more by cash crops than food crops. It is cash crops that win, even though a sizable area in each country is a net importer of surplus grain from higher-producing zones.

We are not really able to explain this conundrum on the basis of the information available, except perhaps as a testament to the high profitability of cash crops. However, three factors may be pointed to: first, the HEA coverage has been somewhat biased towards food insecure areas, so that a full coverage might redress the balance in respect of earnings from food crops. But second, despite periodic price falls on the international market, notably for cotton, it may be that cash crops are generally a safer bet in respect of producer prices than cereals (except rice). For when there is generally good rainfall in the Sahel region, there is the risk that local big producers will find the market glutted and prices exceptionally low long after the harvest period. But with growing urban demand and a better regional road network to distant areas of demand, this is perhaps less of a market phenomenon today than in former decades when, for instance, in southern Mali there was a major, internationally funded programme to support grain prices in years of relatively high production. Third, as will be seen in Map 14, in some areas such as central Niger, livestock earnings rival or exceed crop earnings even where the basic economic activity is rainfed cultivation. This is a reflection of the very high value of meat in the cities rather than the low value of grain.

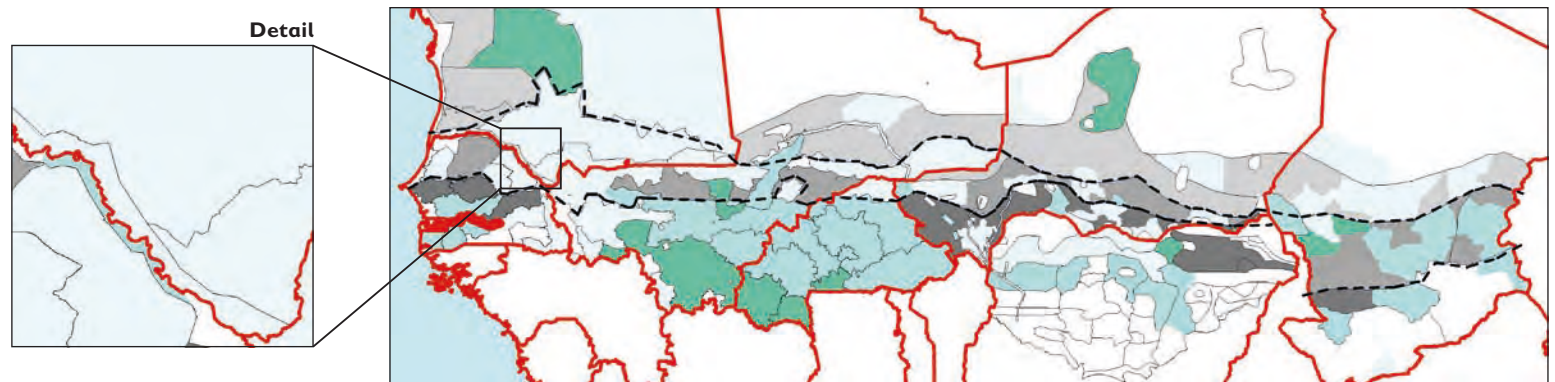
MAP 12: TOTAL INCOME FROM CROPS

(Percentage of 2,100 kcals per person per day)

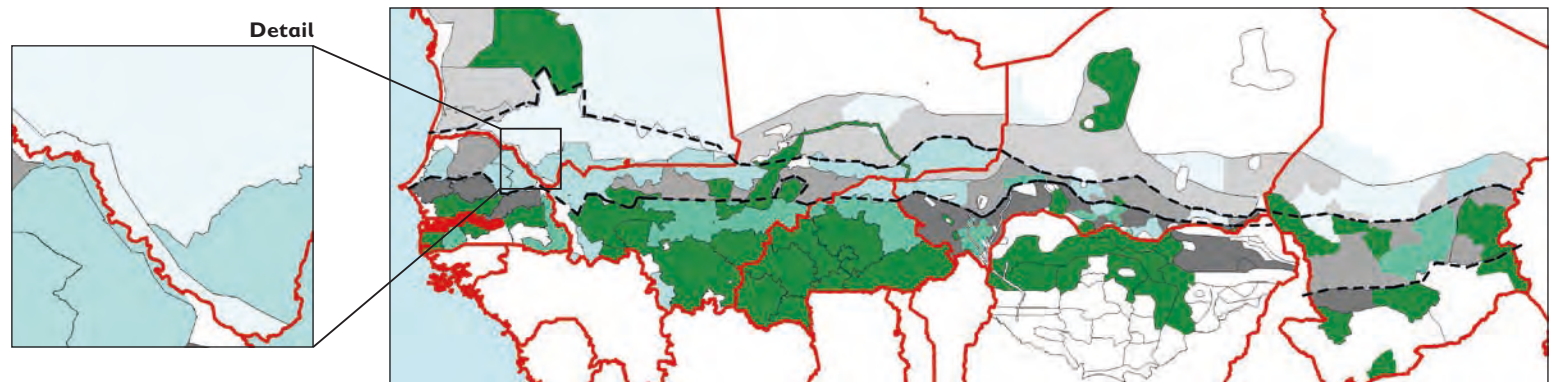
Average households



Very Poor households



Better Off households



LEGEND

% kcals per person per day

- 0-50
- 51-100
- 101-150
- >150

COMMENTARY MAP 12: TOTAL INCOME FROM CROPS

It will be observed that the measure here is in terms of calories; this calls for an explanation. What do we mean by 'total income'? Households may be considered to have two kinds of 'income' from their crops: there is the food from their fields that they consume directly – 'food income'; and there is the cash income they earn from the sale of their crops. (The cash earnings made from off-farm sources do not feature here, but are considered in later maps.) The question tackled is: how can we assess the *overall* value to households of their agricultural production? To do this we need a way of combining cash earned from crop sales, including food crop sales, with that other cardinal food 'income', home consumption of own food crops. The method is to convert all to a single unit value of reference, in this case calories. Thus, what is calculated is the number of actual calories consumed directly from own production plus the calories that could be purchased if all the cash earnings from crops sold were converted into the most common staple cereal at local reference prices. Then the total of all these calories is expressed as the percentage satisfaction of the required 2,100 kcals per person per day. This, therefore, is a way of showing and comparing the overall value obtained from crops produced – the 'total income'.

We take this map on its own terms, and although it essentially confirms the indications from the cash income maps, we can add further observations. These maps contain strong patterns and few surprises as long as we remember that both food crops and cash crops (and market garden crops) are included. Pastoralists who do not cultivate at all have no crop income, of course. Apart from that, and with exceptions discussed earlier, as we would expect there is very generally a low total crop income for the Very Poor: in most places almost the definition of their poverty is that they cultivate little land and get relatively little income from it, whether from cereals consumed or sold, or cash crops sold. Nevertheless, such 'income' as they do get from food crops is not exclusively from home consumption. As previously observed, it is common for even Very Poor people, who in a normal season may produce not even two months' worth of staples, to sell some of their cereal harvest. The principal reason for this is to repay credit taken in the lean months before harvest – the *soudure* – if, as is all too likely, they have no savings left from the casual employment or self-employment that are their principal sources of

cash. The credit taken is mainly used to buy food, but also for seeds for crop cultivation and to pay for other pressing necessities. But the current year's credit must be repaid if the borrower is to receive further credit in the next hard period, and that is sufficient incentive to sell some grain rather than put it in the household store.

There is a definite southern emphasis to the locations of high total food income, underlining the overall better production conditions in the south due, in good part, simply to higher rainfall or to flood-retreat cultivation possibilities, as in eastern Chad. Northern exceptions tend to be where there is irrigation. Cultivation in Diema (DIE) in western Mali is entirely rainfed, and the rainfall is not particularly generous at that latitude; yet the zone produces generous amounts of millet (and is the cultivating zone where the Better Off own most oxen – on average ten head, surely used mainly for ploughing).

One or two zones stand out where total income for the Very Poor is in the high-medium range. The reason, as we have seen, is that they are in zones where they can grow their own cash crops:

- in Niono (ML07) in Mali, irrigated rice, the most valuable of cereals (although for the reason given in the Map 8 commentary we classify rice as a food crop);
- in the Air Mountains (ACM) in northern Niger, the highly prized onions;
- in southern Burkina Faso and Mali where propitious rainfall and soils mean that Very Poor households can choose to grow a range of cash crops: cotton, rice, groundnuts, sesame and cowpeas (valuable for sale as well as for home consumption);
- in the Oases and Wadis zone (MR03) of western Mauritania where date-palms rise in the desert.

There is perhaps less to say about the Better Off, whose production (with Middle households) dominates the Average map. They are the bigger landholders and have the means to maximise production using chemical fertilizers and other inputs and hired labour. They are also the people who by one means or another have their hands on most of the irrigated fields or market gardening land in the relevant zones. In short, they are the people who produce most food surpluses and most cash crops.

3 The contribution of livestock to household economy

The great value of livestock in Sahel economies has long been enhanced by market demand from the coastal areas of West Africa, a demand greatly increased in recent decades by burgeoning city populations and their appetite for meat. There are many ordinary farming areas in the Sahel where earnings from livestock sales give the Better Off and Middle households one-quarter to one-half of their total annual earnings, mostly rivalling or exceeding their income from crop sales.

It is these households who own the vast majority of the livestock in the villages: quite commonly 100% of the cattle and more than 70% of the sheep and goats, even in pastoralist communities. Despite many small-scale projects to encourage poorer households to raise more goats or sheep in order to secure more income, there does appear to be a limiting factor difficult to overcome, as suggested in the commentary for the next map. There seems to be a paradox: it is difficult for poor people to maintain an increase in

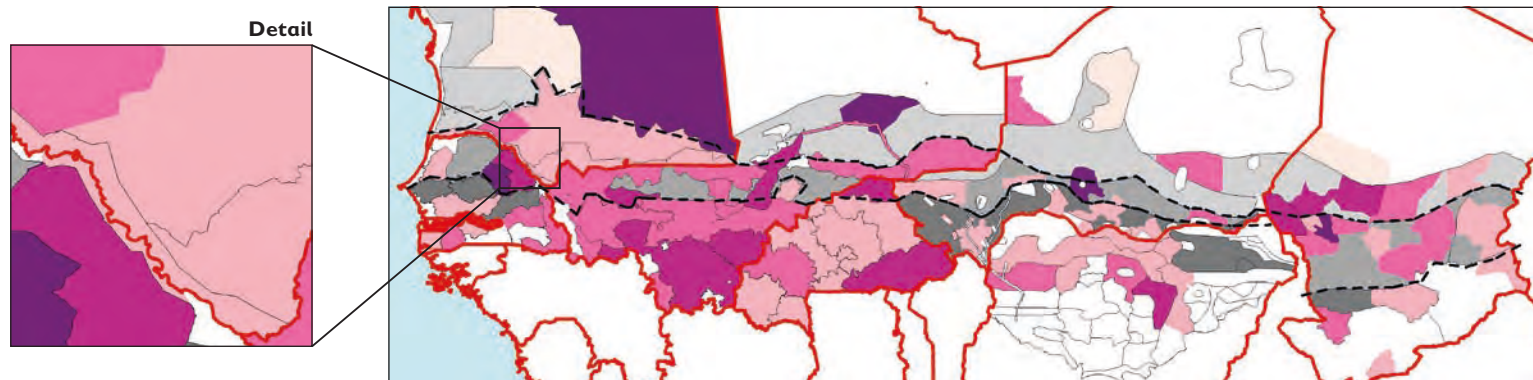
wealth-generating stock, not because of fodder or labour requirements but because their very poverty so incessantly demands the sale of the animals beyond a very small core number.

By the same token, for poorer people the possession of livestock is precious, however modest the numbers: it is the sale of one or two goats or sheep, or a few chickens, or even eggs, that helps to pay for that last bag of grain before the harvest, or for a pressing debt, or for essential household needs. It follows that the loss of a single goat is a big blow to a poor family. For this reason, as well as to boost the national economy, government and agency investment in this crucial sector – in veterinary services and watering resources, and in subsidised fodder and subsidised livestock offtake during pasture failure – should be regarded as a priority rather than just as a baby brother to agricultural investment.

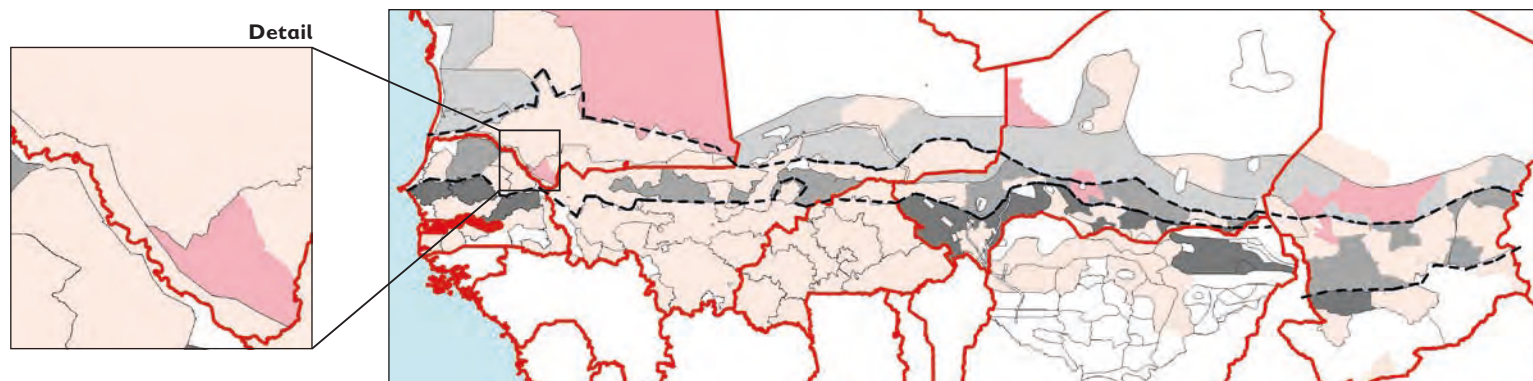
MAP 13: CATTLE OWNERSHIP (INCLUDING OXEN)

(Cattle and oxen owned per household)

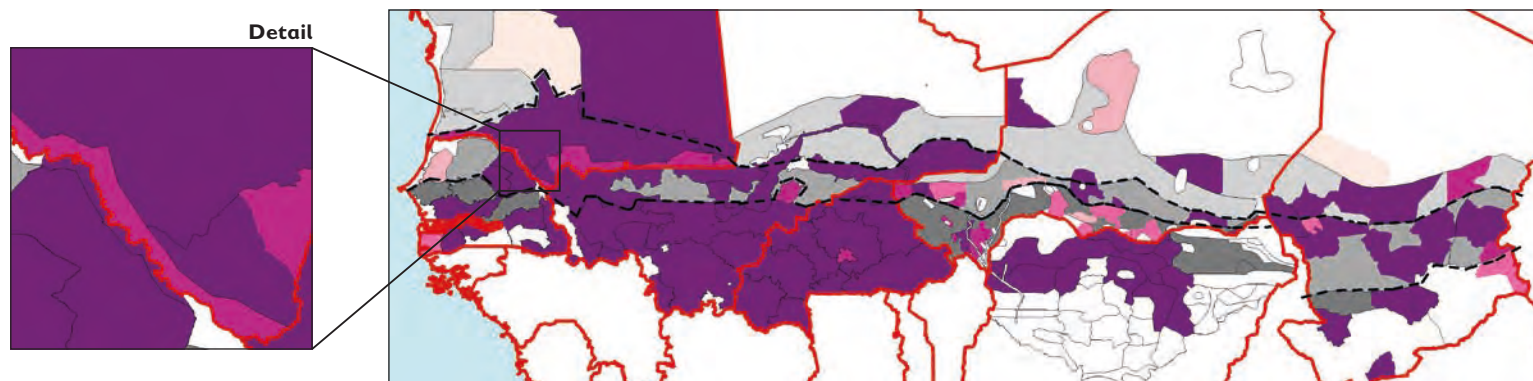
Average households



Very Poor households



Better Off households



LEGEND

Cattle and oxen owned per household



COMMENTARY MAP 13: CATTLE OWNERSHIP (INCLUDING OXEN)

This map offers one surprise, perhaps, and that is how far north cattle are kept: pastoralists who own cattle as well as camels (as their large stock) far outnumber pastoralists who own only camels. We see significant cattle ownership as far north in Niger as the Transhumant and Nomadic Tassara area (TAS) and in roughly the same latitude in north-west Mali in the Tarkhint (Tilemsi Valley) area (TAR). In the area studied for the Pastoral Nomads zone (MR01) in Mauritania, there is a balance of cattle and camels – for the Better Off around 40 of each. But in this case, as we have pointed out earlier, evidence from this southern area is taken to represent the whole pastoral nomads zone stretching far to the north. In fact, it is certain that the farther north one looks, the more that camels dominate and cattle can only be kept where there are exceptional resources for grazing and watering in relatively close proximity. Much further south in Senegal, cattle are utterly dominant among the Fulani transhumant pastoralists of the *ferlo* zone of (FER): here the Better Off are by far the biggest cattle owners among all of the zones of the Sahel where HEA baseline studies have been done, with herds typically of around 125 head.

Otherwise, more generally, two things should draw our attention. One is the fact that the Better Off in the majority of *farming* areas – agropastoral as well as agricultural – own herds of more than 15 head of cattle: this is substantial wealth, and underlines the importance of livestock in farming areas, which is discussed in the commentary for Map 16 on livestock sales. Such cattle ownership is sometimes seen by outsiders as being simply a statement of wealth, a symbolic act. But cattle are more than that. Apart from being a sort of repository of rural savings, capable of yielding interest in the form of births (but also capable of sudden depletion through disease or drought losses) cattle also provide milk, a cherished and important element of the diet, and also traction power for ploughing and transport. On the transport front, in

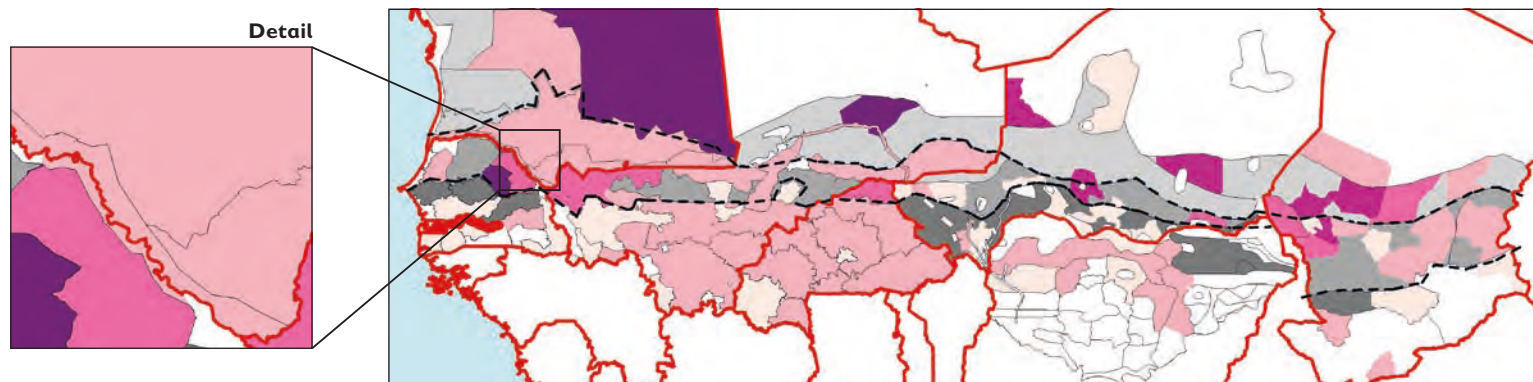
many places the operation of an oxcart can be a business in itself: wealthier owners often lend carts to poorer men who make money transporting people and goods to market and crops from fields, sharing the profits with the owner.

Indeed, the second thing to draw our attention is that poorer people rarely have cattle at all: if a household owns a single cow, it is at least not one of the Very Poor households. There are countless farming villages where 100% of the cattle are owned by the Better Off and Middle households. Ownership of cattle is far more skewed than ownership of land, but there is a relationship. There are costs to keeping cattle, especially in assuring their feeding, and most especially in more densely settled areas where commons grazing is very limited. The more land you cultivate, the more fodder you get in the form of crop residues. But in addition you need to be in a position to buy fodder at critical times, usually grasses collected for sale by poorer people, sometimes marketed residues from commercial groundnut oil processing or cotton processing plants. And in many areas you need to be in a position to contract with a professional herder (very often from a neighbouring Fulani village) to take most of the cattle on grazing migration away from fields under cultivation. There is also the cost of acquiring cattle, and this may help to explain the very low rates of ownership by poorer people. Their usual way of buying a cow (or heifer or ox), in the rather rare instances that they do, is to multiply first their flock of small stock, until they can sell enough to buy the cow. However, there are nearly always pressing calls for expenditure, and therefore pressures to sell a goat here, a sheep there, because there are no other savings, so that the purchase of larger stock never materialises. The other way to acquire an animal is through one or other of the traditional loan systems common around the Sahel. You look after animals for a wealthier neighbour and if all goes well and births are successful, you may be given one of the young. But this is more often for small stock than for cattle.

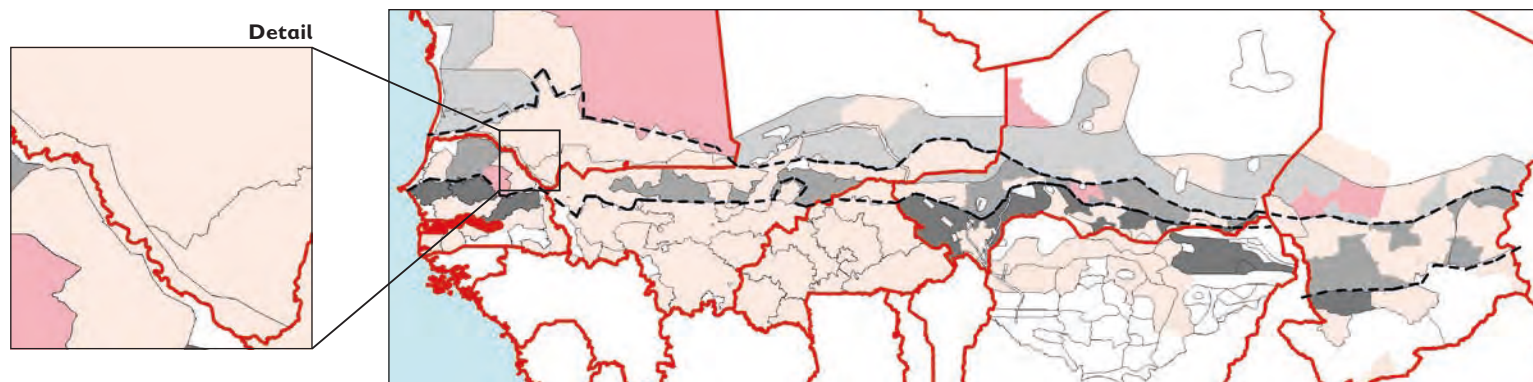
MAP 14: SHEEP AND GOAT OWNERSHIP

(Sheep and goats owned per household)

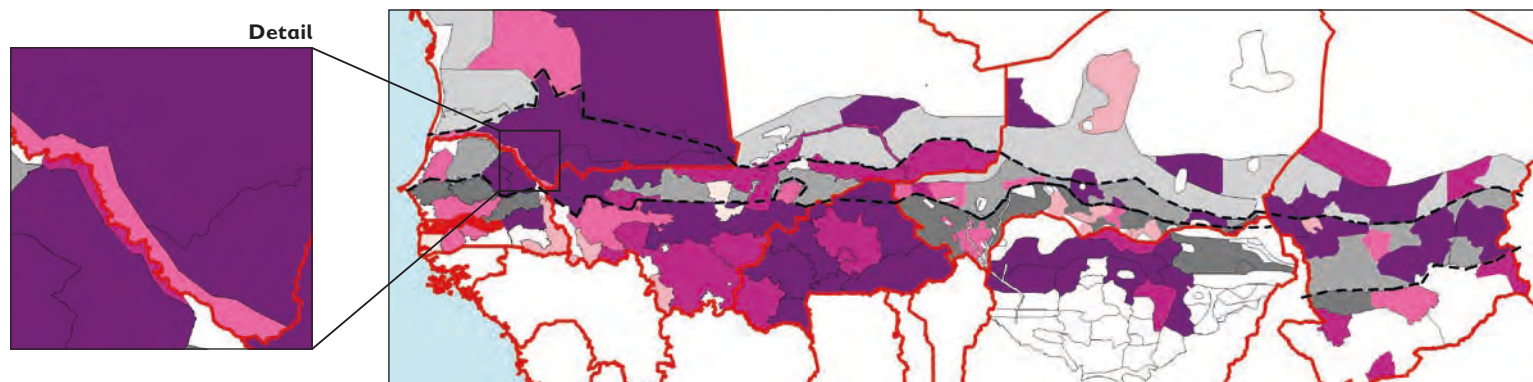
Average households



Very Poor households



Better Off households



LEGEND

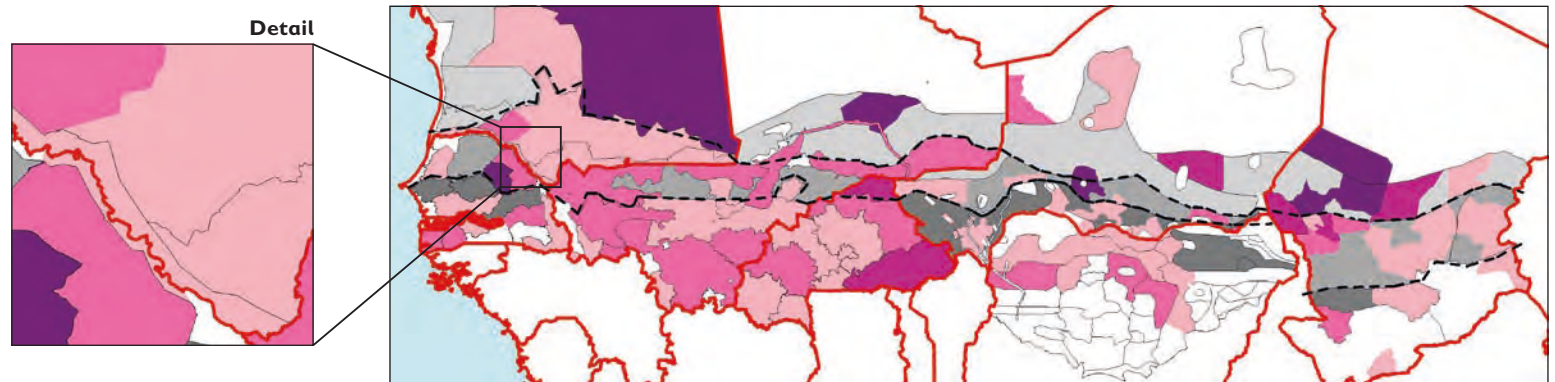
Sheep and goats owned per household



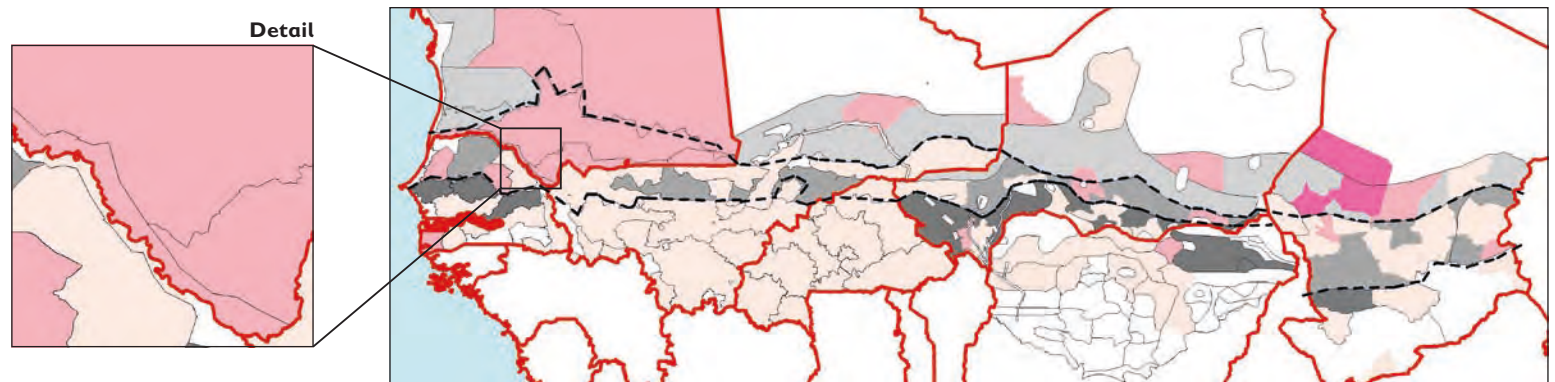
MAP 15: TOTAL LIVESTOCK OWNERSHIP

(Tropical livestock units owned per household)

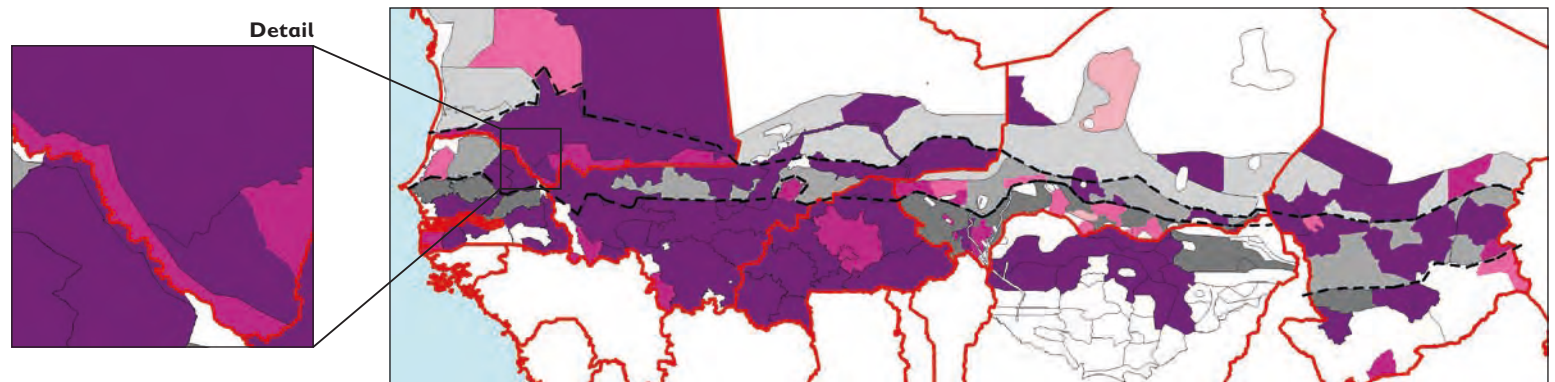
Average households



Very Poor households



Better Off households



LEGEND

Tropical livestock units per household
(1 camel = 0.7 cattle = 0.1 sheep/goats)



COMMENTARY MAP 14: SHEEP AND GOAT OWNERSHIP; MAP 15: TOTAL LIVESTOCK OWNERSHIP

There is singularly little difference between these maps and those in Map 13 on cattle ownership, except where pastoralists own no or few cattle. The reason is simply that those who own cattle also own most of the sheep and goats, so that, again, ownership is highly skewed towards the Better Off and Middle households, commonly to the tune of over 70% of the small stock in a village. But it takes far less effort or periodic cash for feed to keep small

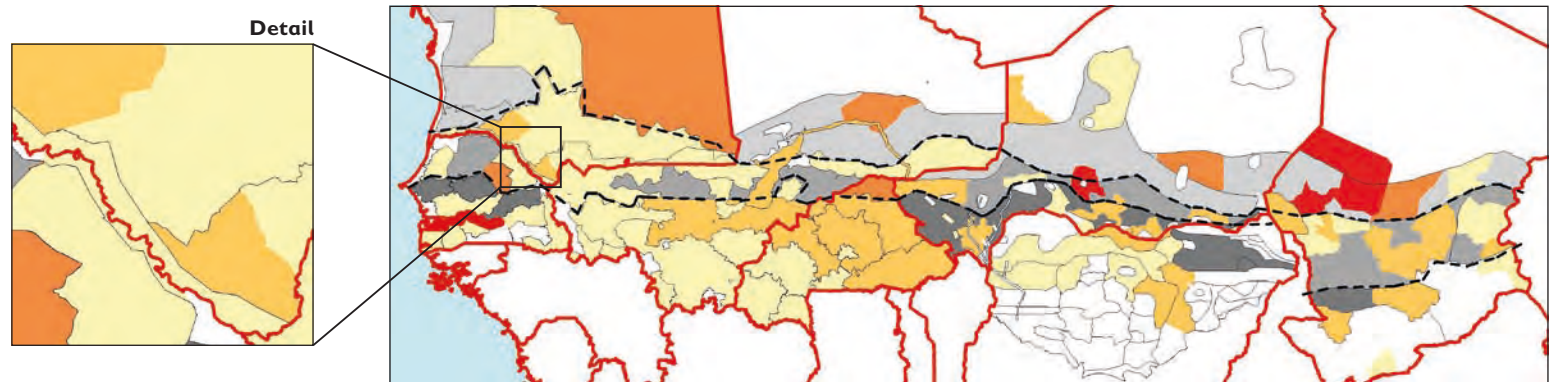
stock than cattle. So why do poorer people rarely keep more than a handful? We cannot say for certain, but we have suggested the reason under Map 13 in discussing cattle purchase. People attempt to keep a minimum of goats, including especially one or two breeding females, but there are frequent pressures to sell to cover pressing essential expenditure, or more occasionally and happily, to slaughter for a festival.



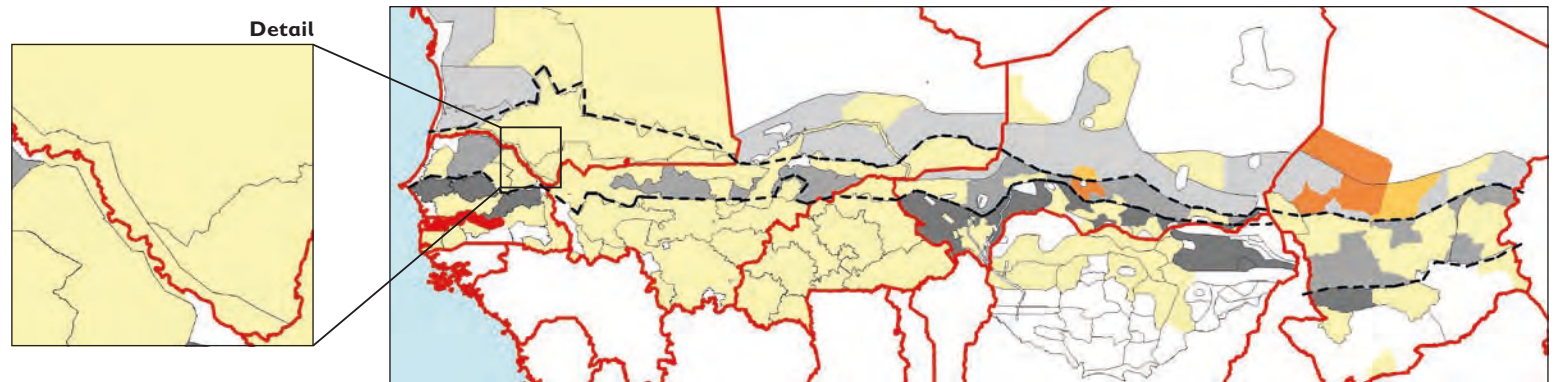
PHOTO: OSCAR NARANJO/SAVE THE CHILDREN

MAP 16: LIVESTOCK SALES AS A PERCENTAGE OF TOTAL CASH INCOME

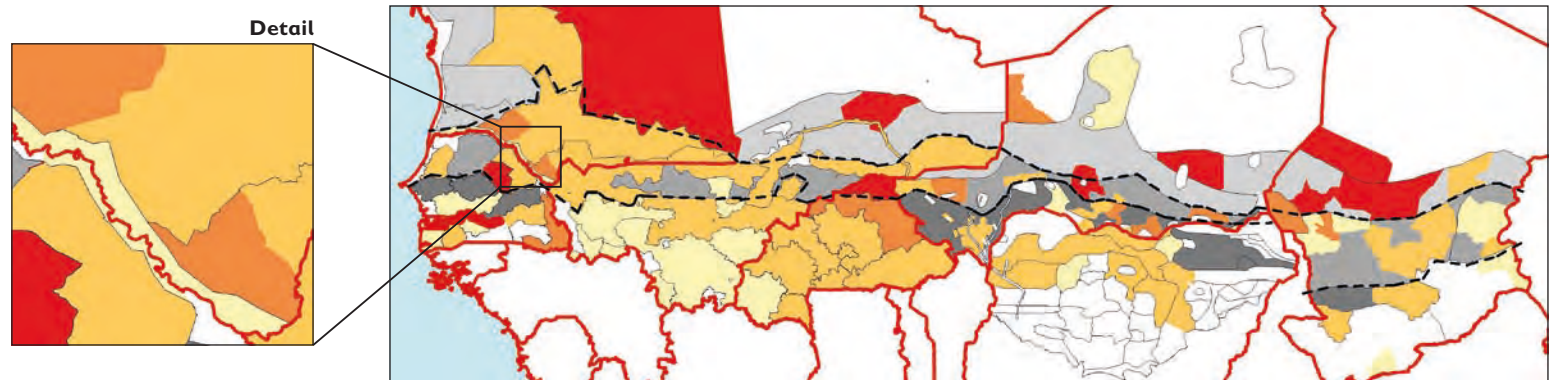
Average households



Very Poor households



Better Off households



LEGEND

% total cash income

- 0-25
- 26-50
- 51-75
- 76-100

COMMENTARY MAP 16: LIVESTOCK SALES AS A PERCENTAGE OF TOTAL CASH INCOME

We would expect pastoralists to stand out here, as they do on the Average and Better Off maps. But this is not only because all, or almost all, of what they produce is livestock. It is because in modern times most of them have obtained by far the greater part of their sustenance not from milk and meat but from cereals, for which they must sell livestock. However, if we were to see only the map for the Very Poor, we would, with one or two exceptions, have no special impression of pastoralists. The reason is that poorer pastoralists tend to own remarkably few livestock, very far from enough to afford them a living. They principally work as herdsmen for wealthier pastoralists, for cash wages or payments in-kind with grain that their employers have purchased, and both the cash and the grain they receive emanate directly or indirectly from sales of livestock by these employers. The exception that stands out on the map are the camel pastoralists of Salale (SAL) in northern Chad, where even the Very Poor own as many as eight camels (and the Poor twice that number together with some goats). These are sufficient to afford these households very nearly all of their required cash income through livestock sales, so that few work as herders for others. The grain requirement of the Very Poor is actually diminished by the fact that they obtain about 25% of the calories they consume in the form of milk, together with a little meat. Many of the Very Poor in pastoral groups elsewhere in the Sahel consume less than 5% of calories in the form of milk and meat.

We would also expect agropastoralists to stand out a bit, and this is the case for the most part. Champions are in Dakoro (DKA) in central Niger and Moundjoura (MOU) in northern Chad, just south of Salale. For them, the *pastoral* in 'agropastoral' is definitely where the money lies. Yet this seems true also of at least one zone in the general rainfed agricultural band, the North and East Livestock and Cereals zone in north-east Burkina Faso (ZME7). Indeed, it would not be too difficult to argue that they are in fact agropastoralists. On the other hand, the Oases, Wadis and Pastoral zone (MR03) in western Mauritania does not stand out in any of the three maps: the basis of the economy is emphatically the production of dates, not livestock. Perhaps more surprisingly, the cattle pastoralists par excellence of the Senegalese *ferlo* (FER) do not reach the highest category on the

Average map. This is not because they sell many crops, although their cereal harvest does give them 20–30% of their food calories; rather, it is because the livestock holdings, particularly the cattle, are highly skewed toward the 10% of Better Off households, and the poorer households have to make money by herding for the rich and, together with the Middle households, by selling the abundant wild foods and medicinal plants to be found in this area.

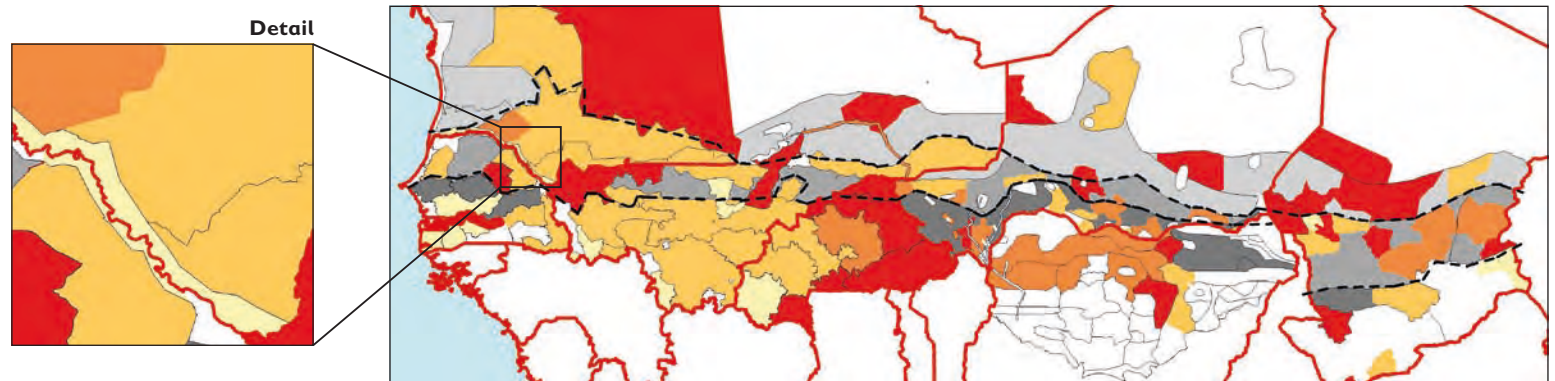
But then we see areas of the overall agricultural zone (ie, south of the agropastoral line) in the Average map, and more so in the Better Off map (especially in Burkina Faso), where ordinary farmers obtain one-quarter to one-half of their total annual cash income from livestock. There are two matching reasons for this. One is the high value of livestock on the market, which has, as we have observed, been for decades heavily influenced, if not dominated, by demand for meat from coastal countries, to which livestock – cattle, goats, sheep – are trekked, and these days increasingly trucked, in their hundreds of thousands every year. But a less positive reason for the remarkably substantial proportion of livestock earnings in the total income in a good number of farming areas is that they produce few surplus crops for sale. Many Better Off farmers, and most Middle wealth farmers, are not substantial herd owners, but the sale of even one or two mature cattle and a few small stock may exceed their earnings from crops and rival their earnings from all other sources put together.

We come back to the map for the Very Poor. Whether pastoralists, agropastoralists or crop farmers, they do not seem to make much money from livestock. Yet for a poor farmer, the possession of just a handful of goats and sheep, and indeed poultry, is significant. There are many areas where the sale of livestock rivals their earnings from crops. At the same time, by far the bulk of their earnings comes from neither of these but rather from paid labour and sales of firewood or mud-bricks, etc; and this is even more the case in agropastoral zones. In times of adversity, whether through a family misfortune or because of a season of poor crop production and therefore also of reduced agricultural employment, one important crutch they have to lean on is the sale of a few small stock.

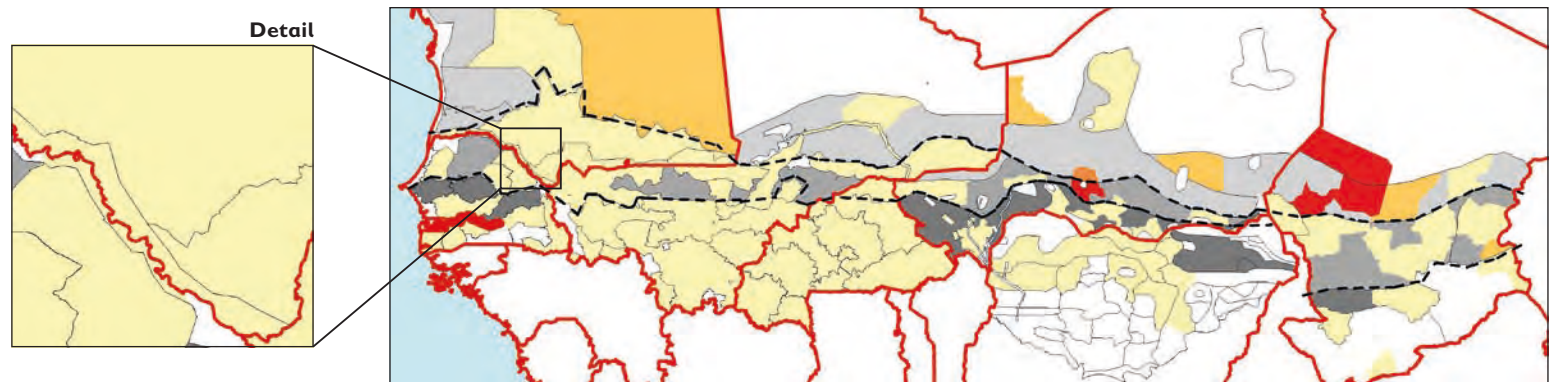
MAP 17: TOTAL INCOME FROM LIVESTOCK (FOOD + CASH)

(Percentage of 2,100 kcals per person per day)

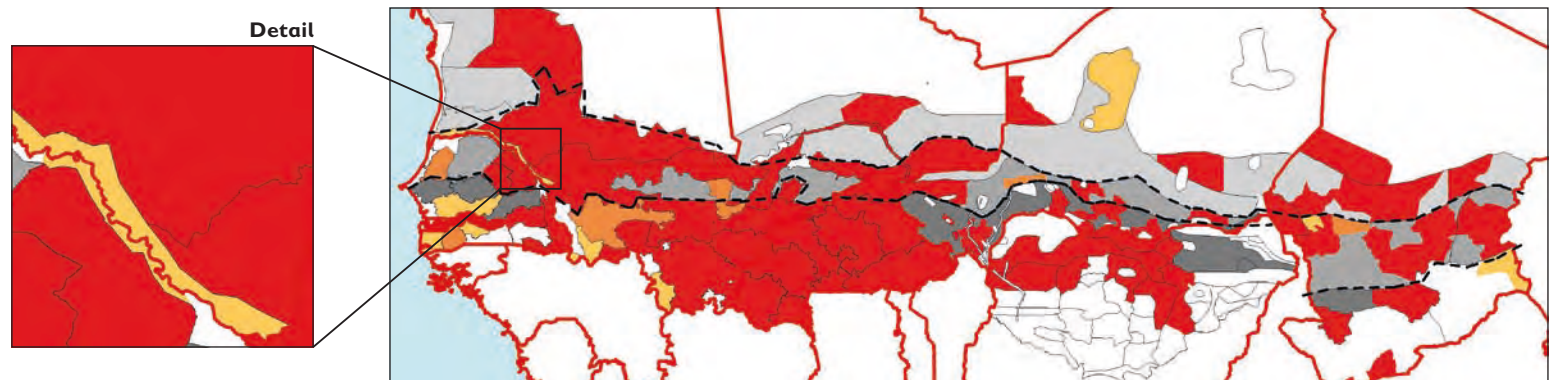
Average households



Very Poor households



Better Off households



LEGEND

% kcals

- 0-25
- 26-50
- 51-75
- 76-100

COMMENTARY MAP 17: TOTAL INCOME FROM LIVESTOCK (FOOD + CASH)³

'Food plus cash' essentially means milk plus cash, since slaughtering animals for meat is not taken lightly even by wealthy pastoralists, and meat contributes very little even to *their* calorie intake. For instance, in Tarkhint (TAR) in north-east Mali a Better Off household of 18 people will typically slaughter no camels and not more than one or two head of cattle in a year, to be shared with guests for a festival or other big occasion, and otherwise about a dozen sheep and goats, again mainly for visitors.

The main message here does not particularly relate to pastoralists, rather it is blazoned across the board – as seen in the contrast between the almost unvaried expanse of light yellow in the Very Poor map and the almost equivalent expanse of deep red in the Better Off map. We have noted this

already in the commentary for Map 15, namely the acute division between the poorer and wealthier halves of rural populations in terms of livestock ownership. The Very Poor (mostly closely shadowed by the Poor) do not own enough livestock to give them more than 25% of their total income (ie, their total income from all sources – see Map 25 further on). By contrast, it is more surprising that the Better Off, representing here also the Middle households, obtain such a major slice of their total income from livestock in the great majority of zones, which are not pastoral but agricultural, or agropastoral with substantial crops. Nearly all of this 'total income' is in cash, since milk consumption is generally quite limited even among the Better Off.

³ See Map 12 commentary for an explanation of 'total income'.

4 The contribution of paid labour and other income to household economy

For the great majority of poorer farmers and herders, the biggest single part of their cash income comes from working for others, mainly in the fields of wealthier neighbours, but also for other employers during seasonal work migration, whether for rural work or for house construction or other labour in the cities. Without this income they could not survive.

In the longer term, the majority of countries' populations are expected to live in cities, and the growth rate among the remaining rural populations might well decline. Then the combination of increasing access to land and an ever-higher value of rural products on the urban markets might increase even the poorer farmers' income from their own produce to the extent that their dependence on employment will decrease, even substantially. But in the short to medium term, with the land at their disposal, and without, for instance, massive irrigation projects, it is difficult to see how their own production can substitute for off-farm earnings. At the same time, pending much greater mechanisation of agriculture, it is difficult to see how wealthier farmers could maintain their success without continuing to hire the labour of their poorer neighbours. From the point of view of any government or agency intervention, the employment is informal and arranged between individuals by verbal agreement, and it would be a great challenge to try officially to increase and fix daily payment rates.

'Self-employment' is overall a lesser but still usually very important source of cash income. For poorer people this mainly means cutting and selling the firewood that nature offers, but also collecting and selling wild foods and other natural items; and it means brick-making, or selling handcrafts such

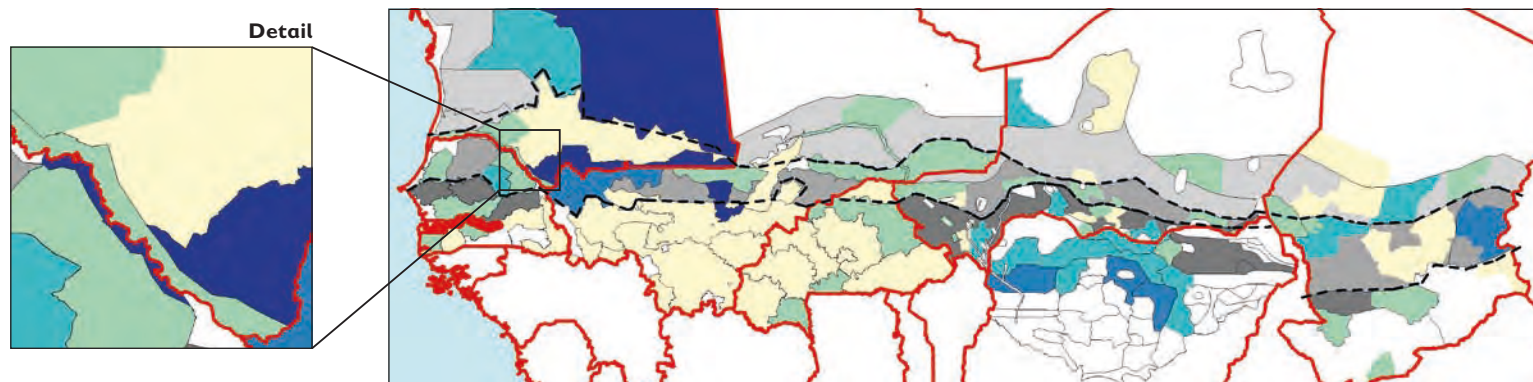
as straw mats and baskets, or simply fetching and carrying in markets. If we add petty trade, then the overall income for poorer households from self-employment far outstrips any gained from selling their own crops and livestock, and sometimes even outstrips income from paid labour. Prominent as they are in HEA quantified information, these forms of rural activity are less 'visible' than direct production on a farmer's own land or the livestock owned by a herder, and are usually all but invisible in national economic data. In the case of firewood-cutting and charcoal-making, authorities often worry that natural regeneration cannot keep up with the wood-cutting, and they try to limit the activity, however unsuccessfully, by banning sales, especially of charcoal.

It is not easy to see immediately how development investment can target such varied and scattered activities. But here, as also for some forms of direct employment, there should be scope for adding value to people's work through skills training, provision of tools and possibly some intervention in market chains. Skills training and tools would also help people on labour migration; for instance, in construction work a man with carpentry or masonry skills can earn at least twice as much as a man who can only offer his labour. At the same time, it may not be necessary to accept that poorer people must always be defined partly by their lack of capital equipment: adapted financial services and hire-purchase schemes could help individuals or groups towards economically viable use and eventual ownership of larger agricultural, processing or craft equipment and of transport in the form of bullock carts.

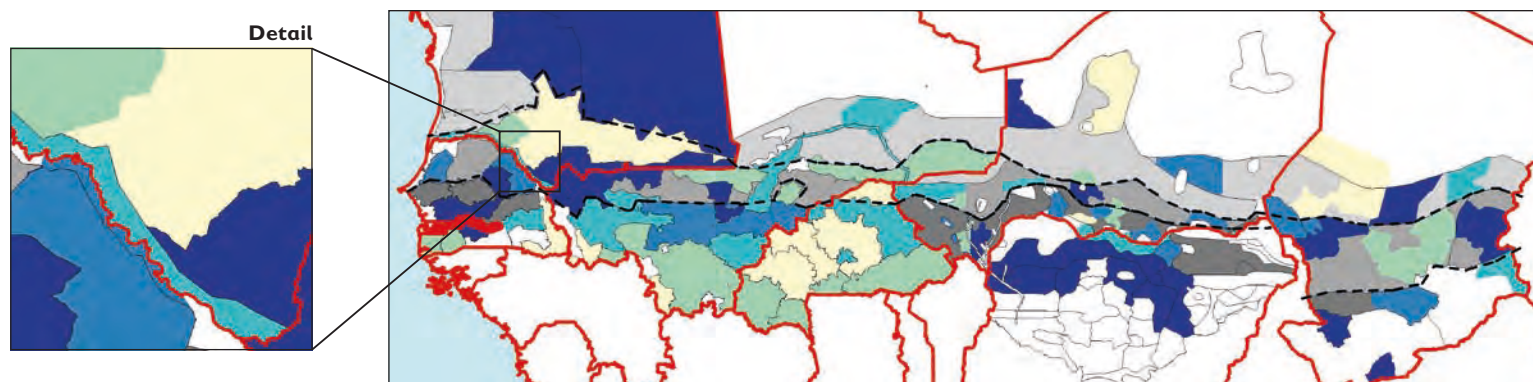
MAP 18: CASH INCOME FROM LOCAL LABOUR

(US\$ per person per year)

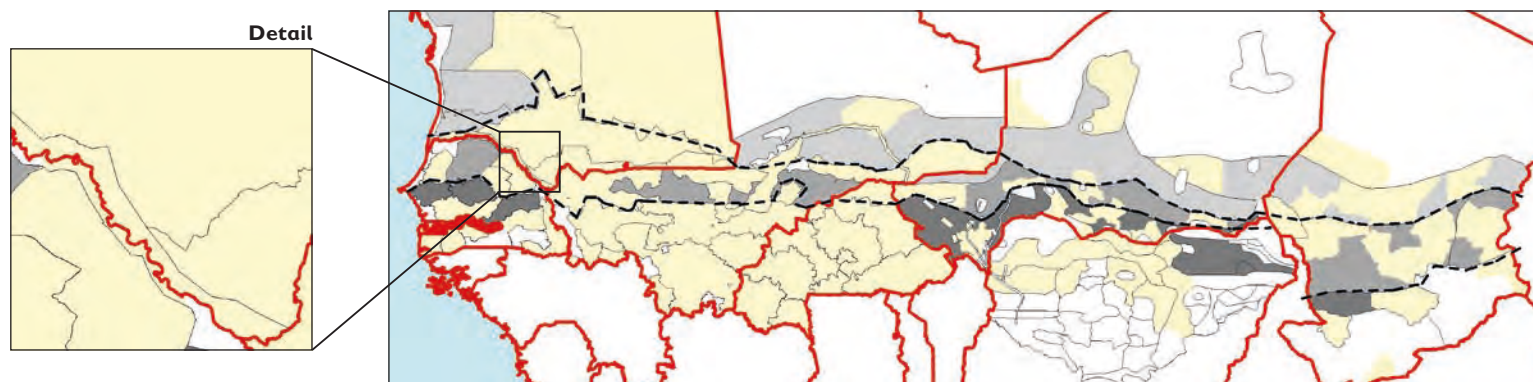
Average households



Very Poor households

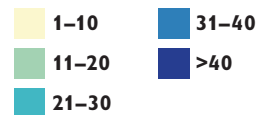


Better Off households



LEGEND

US\$ per person per year



COMMENTARY MAP 18: CASH INCOME FROM LOCAL LABOUR

'Local labour' mostly means daily paid employment on the smallholdings of wealthier local farmers, or employment as contracted herdsmen in a pastoral group. Essentially, it is members of Very Poor and Poor households who engage in that type of work, which is generally one of their most important sources of cash. Better Off fellow farmers or herdsmen are their main employers, and the lower map suggests that one never sees a member of a Better Off household as a daily worker or paid herdsman. It is also at least uncommon for Middle households, who are more often employers rather than providing employees.

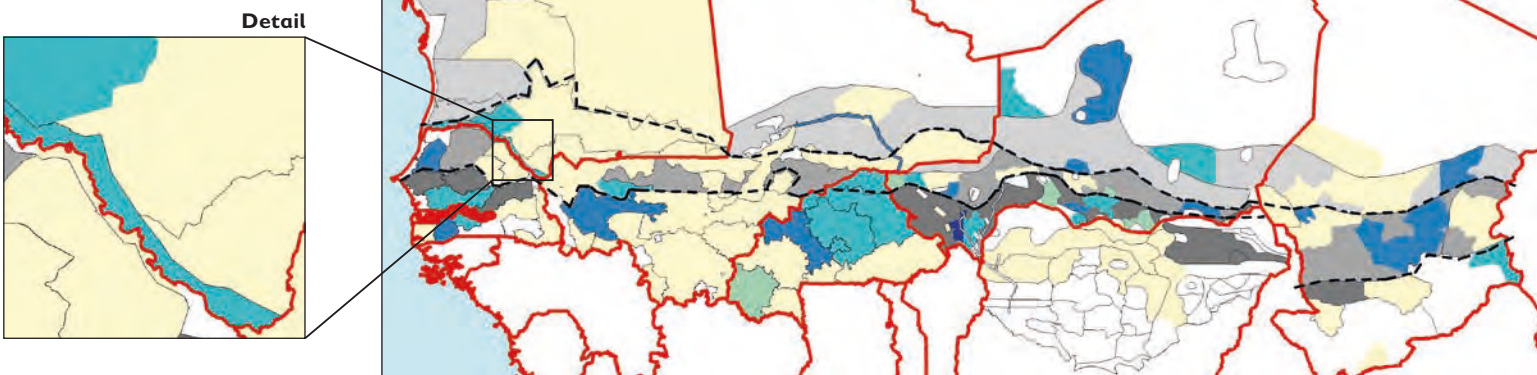
On the other hand, it is to be expected that the Very Poor are generally engaged in paid labour, and from the similarity of the Average map and the Very Poor map one can deduce that the Poor are also engaged in much the same way as the Very Poor. But otherwise those maps show a patchy pattern that does not immediately suggest a particular geographical logic across the region. Perhaps it is more enlightening to look at variations in a single country. We will take the Very Poor around Mali and refer to the detailed HEA baseline data that lies behind the maps. The chief elements in play must be not only how much local employment is undertaken by households but also local wage levels. In pastoral Tarkhint (TAR) the dependence of the Very Poor (and Poor) on local employment is very high in terms of the proportion of these earnings in their overall income. The reason is that although they are living in pastoral communities, as we have noted earlier they own remarkably few livestock, and in these isolated localities they are dependent on wealthier people within the local herding group not only to lend them extra livestock but to employ them, principally as herdsmen. The contracts are generally arranged on a monthly payment basis, and since herdsmen care every day for the livestock, we may calculate from the available income data that, taking into account extra payments for driving the herd seasonally on far-grazing migration, they are paid on average 11,500 fcfa per month (at the time of the survey, 1\$US was worth around 500 CFA francs) – this works out at about 400 fcfa per day. This is usually a year-round, guaranteed job, and includes

also some payment in-kind, and so herdsmen's earnings from local labour may be counted as substantial. On the other hand, dependence on the patronage of a single employer makes herdsmen vulnerable to rain and pasture failure that could drastically reduce not only their own small flock but also the herd of the employer, who in turn may be constrained to end the contract and get the work done by a family member.

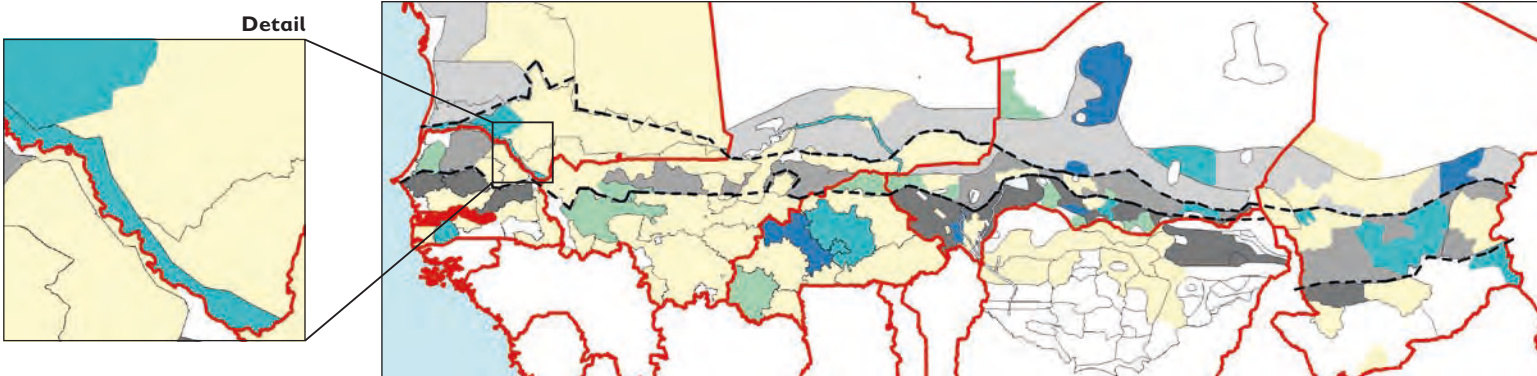
Moving to a contrasting scene, in the irrigated rice zone of the Office du Niger at Niono (ML07), to all intents and purposes a cash-crop area, the work is seasonal but the wages are far higher than in Tarkhint. This reflects not only the labour-intensive production system and therefore the high demand for workers, but also the value of the crop. Daily wages are commonly 2,000 fcfa, and rise to as much as 4,000 fcfa at the critical harvest time. Local labour earnings are therefore again a large proportion of the income of the Very Poor. Another case: in the productive, rainfed cereals and cotton-based Yorosso zone (ML10) in the south, daily wages are comparatively low at 500 fcfa. This is presumably at least partly a function of greater labour availability in this densely populated area, including incoming seasonal work migrants. Here, local Very Poor households depend far less on this work, having their own cash crop production, self-employment and sale of collected wild foods, etc. Finally, in the Yelimane Millet, Sorghum and Rice agropastoral and herding and remittances area (YEL), we find high daily wages again, around 1,500 fcfa. A strong dependence on remittances by the wealthier half of the population tends to drive up the overall cost of living in the area, as seen also further downstream on the Senegal River in the Matam Walo zone MTW in Senegal. Rural people living on remittances, even if not large amounts, are prone to employ others for all tasks from tilling and herding to domestic work and construction. Whatever the push-pull factors, it seems that high wages and high prices are a feature. From all their activities, the Very Poor in Yelimane earn over six times more cash per year than the Very Poor in Yorosso.

MAP 19: PERCENTAGE OF TOTAL LABOUR INCOME FROM MIGRANT LABOUR

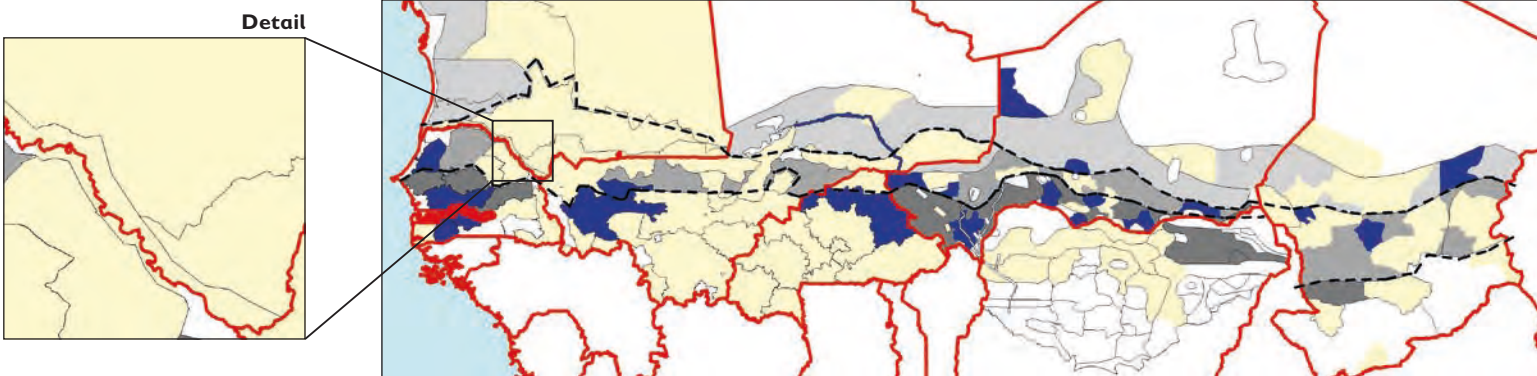
Average households



Very Poor households



Better Off households



LEGEND

- Migrant labour as a % of total labour
- 0-20
 - 21-40
 - 41-60
 - 61-80
 - >81

COMMENTARY MAP 19: PERCENTAGE OF TOTAL LABOUR INCOME FROM MIGRANT LABOUR

Migrating seasonally for work is a way for people to make use of the wider national or regional economy. Those migrating are usually people from poorer areas, or poorer people anywhere with very constrained livelihoods, or people facing a local production failure. The migration may be for harvest work in a neighbouring zone (especially on cash crops), or casual work in one of the country's bigger cities (market portering, water carrying, construction work, street hawking). Or it may be for any such activity far inside a neighbouring country, usually south of the Sahel, although pastoralists and agropastoralists sometimes go north into Algeria and Libya.

It is typically younger men who migrate, although not exclusively. They may have something of a guarantee of work with an employer whom they visit every year; or it may be much more of a gamble, seeking work in an area where they simply have a contact via a fellow migrant, or no local introduction at all. They may earn enough to send or bring home some cash savings and one or two sacks of grain from substantially cheaper markets than at home, or they may obtain some second-hand clothes or small electronic items to sell at home for a profit. Or, on the other hand, a minority may manage to earn only enough to pay for their transport (often undertaken with credit) and for their food and lodging on migration. A small minority may fail to earn anything at all and return only with debts. Temporary migration of this sort is not without its hardships and risks, both physical (including medical) and social (they may be treated almost like lower caste members, and their families back home must cope in their absence). But for many poorer households, temporary migration represents an essential contribution to just making ends meet. As a sign of the very thin margin of food security on which the poor operate, in the HEA methodology the absence of a household member even for a few weeks must be carefully accounted as a reduction in the annual food requirement for the household.

Two nearly proximate areas in western Niger (Tahoua – TLP, Tondiwiki – TON) are known for the villagers' greater tendency to migrate for work. Although it is said to be part of their history and culture, it is surely no

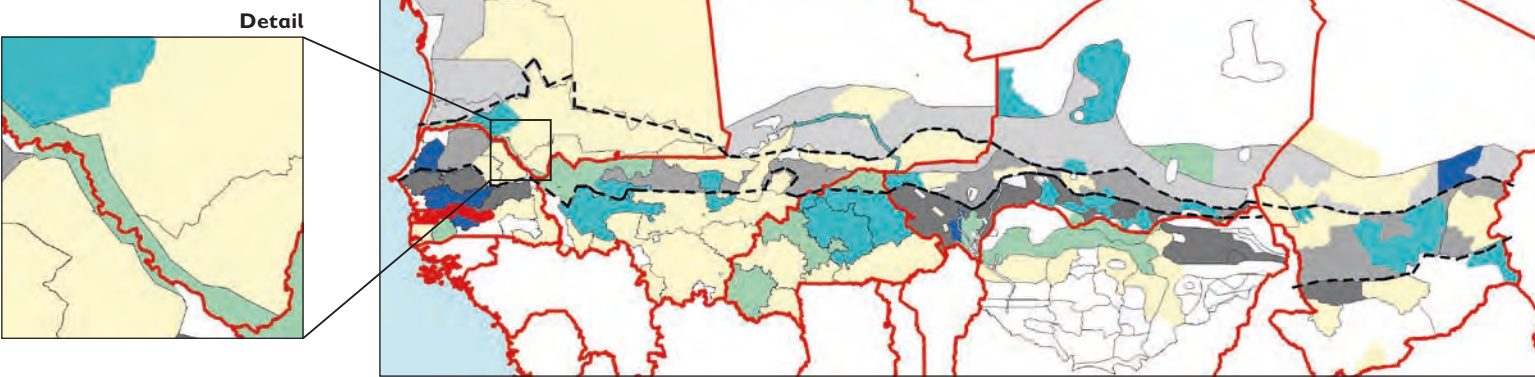
coincidence that these are areas also known for poor production conditions and food insecurity. And although the map suggests that they earn rather less than migrants from elsewhere, to obtain 21–40% of their income from migration is nevertheless very significant, considering the large number of poorer people involved. Also in Niger, there is an unusual example of women migrating rather than men, earning a very significant part of the household income in all the wealth groups. This is among the M'Bororo cattle pastoralists of Dakoro (DPB) in the centre of the country, where the main yearly work migration involves women, usually in groups (including wives and mothers), who travel west to Dakar/Thiès in Senegal on a more than 3,000 kilometre round-trip. Their particular cachet is their practice of traditional medicine, which is much demanded. Burkina Faso too shows up strongly for labour migration. The Central Plateau Cereals and Market Gardening zone (ZME5) is relatively productive and commercially active, but also particularly densely populated, which may be a clue as to why there is emphasis here on work migration. By contrast, in the agropastoral Monguel area (MON) of Mauritania, temporary migration for work is untypical of any wealth group, while remittances are important for all the groups, suggesting a substantial number of permanent migrants.

We have so far talked of poorer migrants. But the map of the Better Off at first sight suggests that it is they who have most interest in labour migration. This is deceptive. We have noted that wealthier people seemingly never engage in local casual work: therefore any migrant earnings are automatically a high percentage, mostly 100%, of their total income from paid work. Furthermore, paid work is generally a misnomer for what they do. Typically, young men from these households leave with enough capital for petty trading or other light commercial activities, sometimes with the intention of buying substantial amounts of clothing or other items to sell back home. One even hears it described in villages as a learning experience or adventure for them, if not a sort of rite of passage.

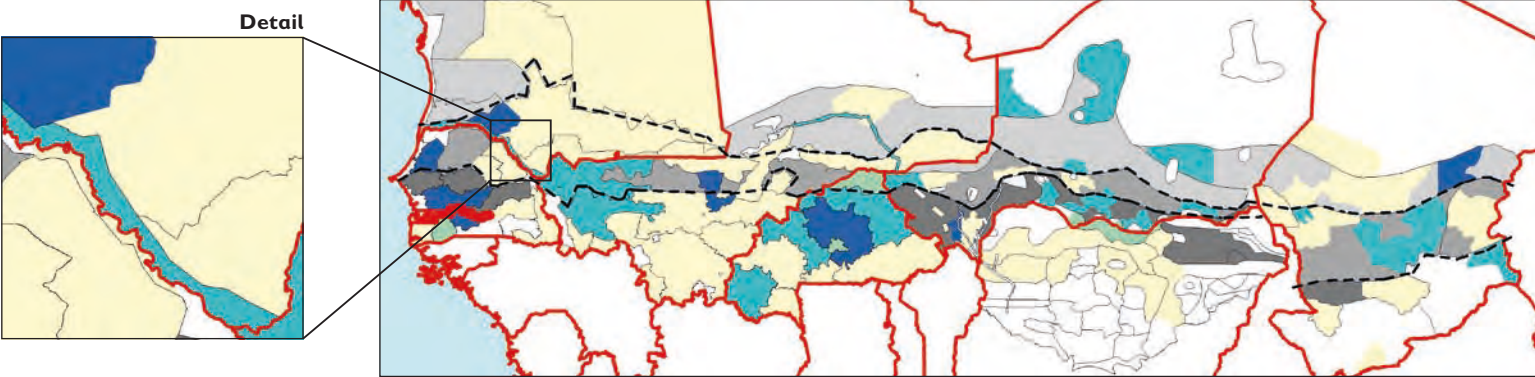
MAP 20: DURATION OF LABOUR MIGRATION

(Number of months per year)

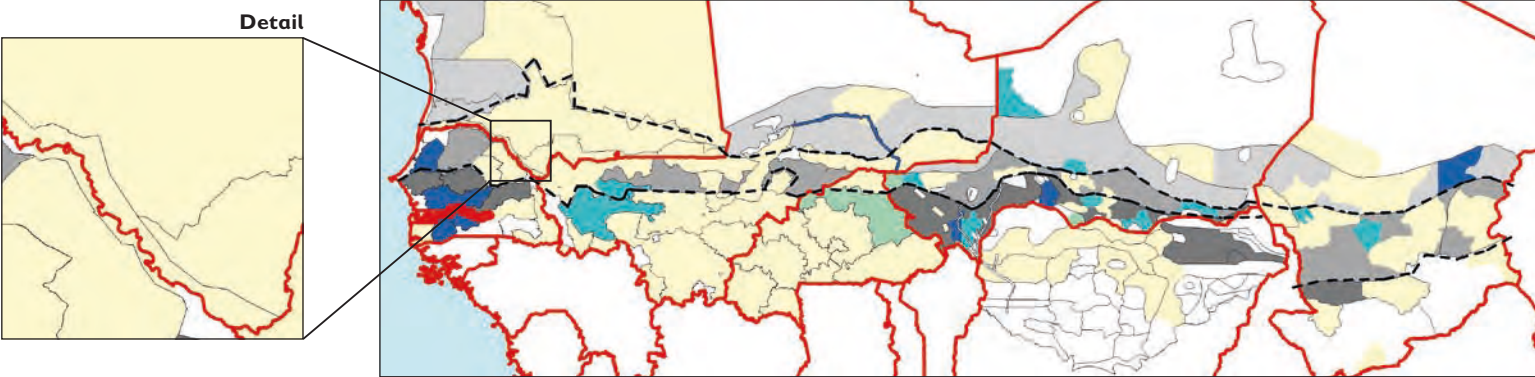
Average households



Very Poor households



Better Off households



LEGEND

- Number of months of migrant labour per year
- 0 (Yellow)
 - 1-2 (Green)
 - 3-4 (Light Blue)
 - 5-6 (Dark Blue)

COMMENTARY MAP 20: DURATION OF LABOUR MIGRATION

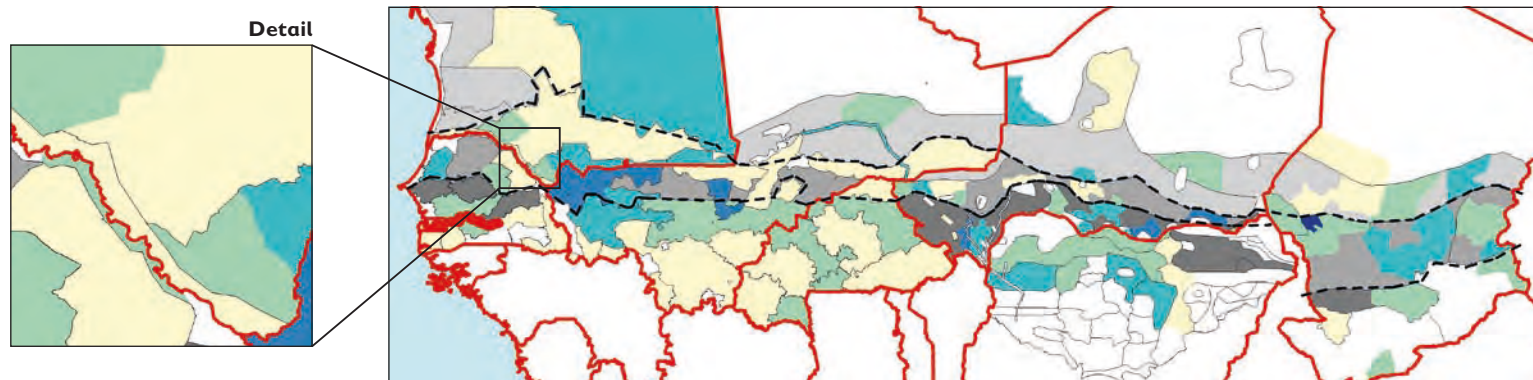
The period of temporary migration can vary from three weeks to three or more months. There is not a strong geographical pattern other than perhaps particularly long duration in several zones of Senegal. One cannot easily pinpoint a single main reason for the varying lengths of time. In some cases, it will simply reflect the relative need to maximise these earnings; in others, it may reflect the type of work done – eg, the difference between casual work and engagement for an agricultural season. But it does not necessarily reflect what may seem the most obvious reason, namely the distance travelled by

the migrants. This may well be the case for people travelling, for instance, from the Air Mountains zone (ACM) in north Niger or from the Tarkhint area (TAR) in north-east Mali. But it is not the case for the areas of Niger that are very near the Nigerian frontier – and it is northern Nigeria that is overwhelmingly the host of migrants from Niger. Similarly, the nearby cocoa plantations of Ivory Coast are a magnet for migrants from southern and central Mali.

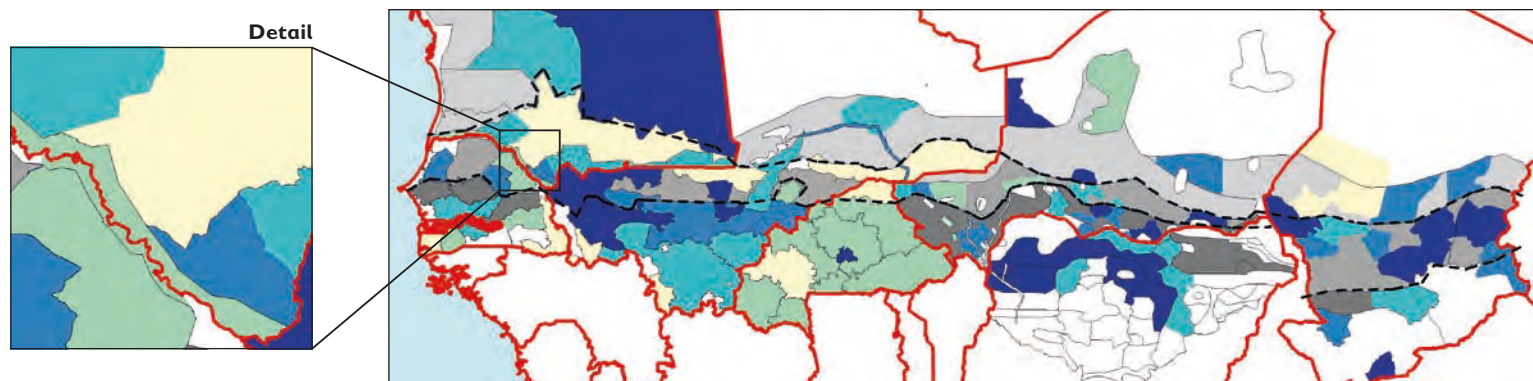
MAP 21: TOTAL INCOME FROM LABOUR (FOOD + CASH)

(Percentage of 2,100 kcals per person per day)

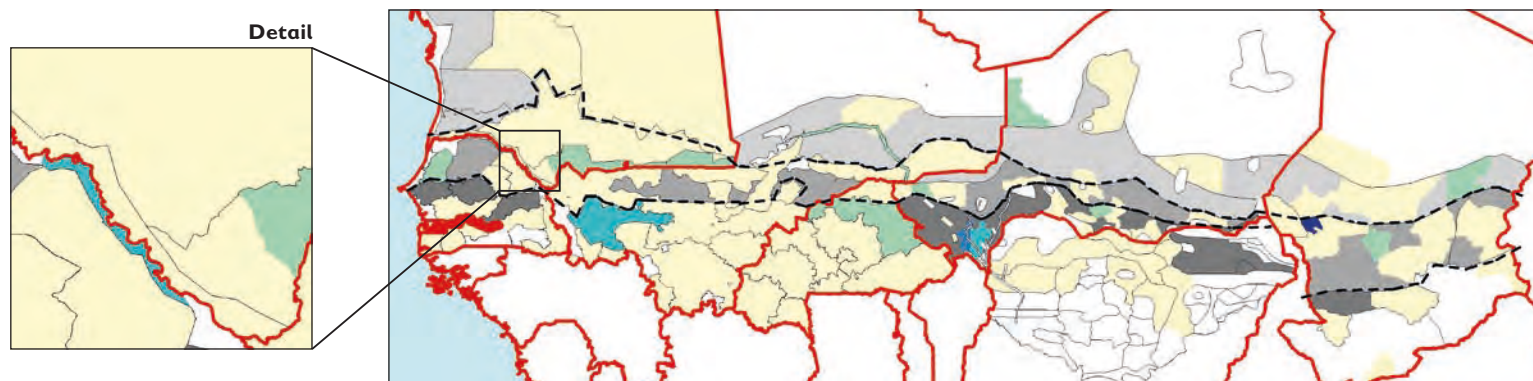
Average households



Very Poor households



Better Off households



LEGEND

% kcals	
0-20	61-80
21-40	>81
41-60	

COMMENTARY MAP 21: TOTAL INCOME FROM LABOUR (FOOD + CASH)⁴

In these maps, in-kind payment is combined with local and migrant labour earnings (including food 'savings' from migration as described for Map 19). There appears to be no substantial difference from the local labour maps in Map 18, pointing to the greater importance overall of local earnings as compared to migrant earnings.

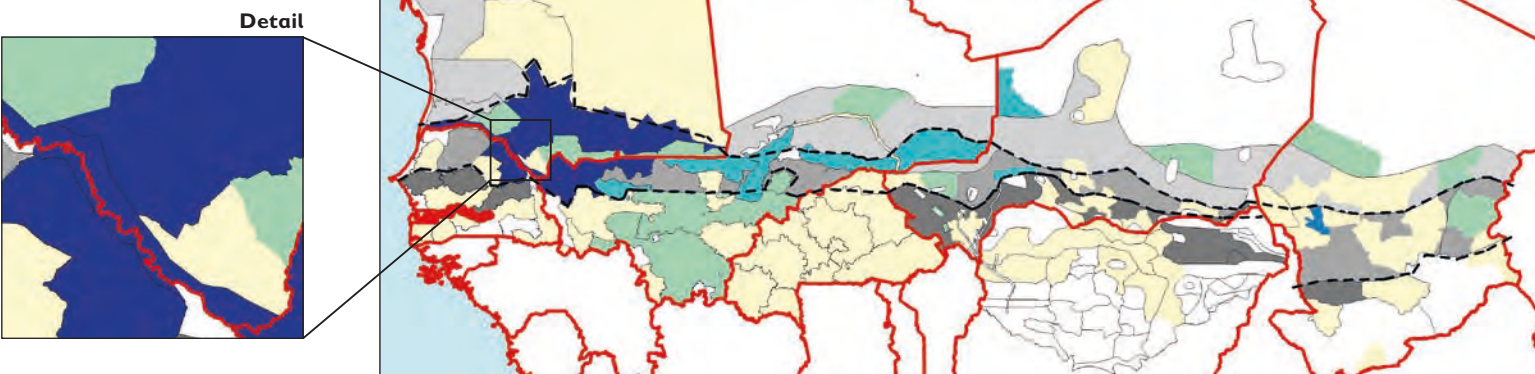


⁴ See the Map 12 commentary for an explanation of 'total income'.

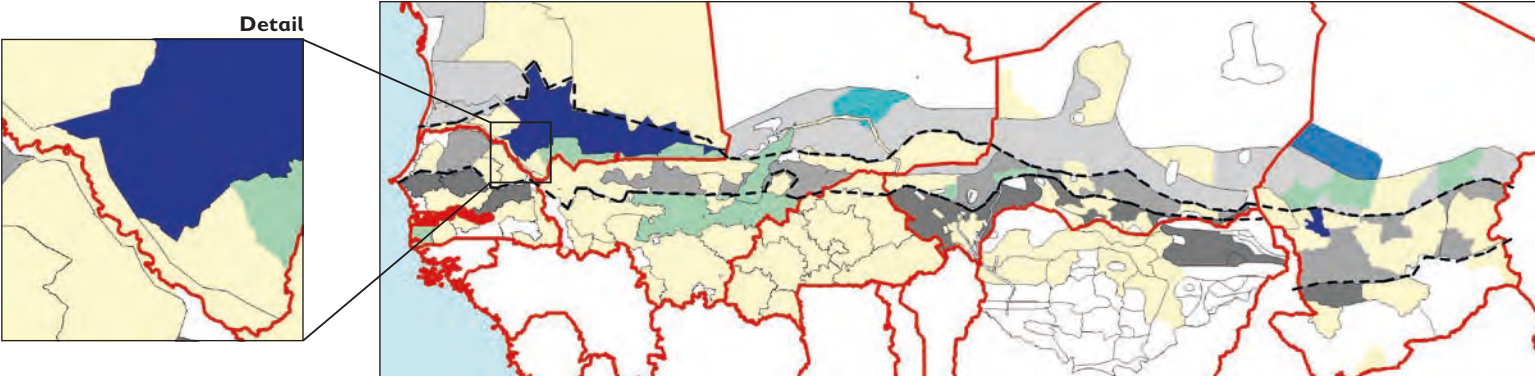
MAP 22: REMITTANCES

(US\$ per person per year)

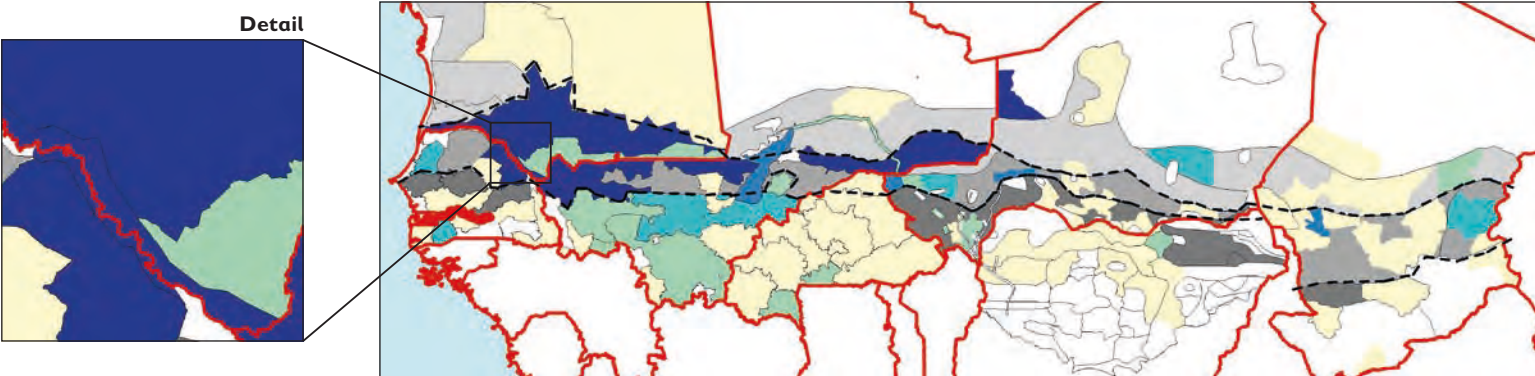
Average households



Very Poor households



Better Off households



LEGEND

US\$ per person per year

 0-15	 46-60
 16-30	 >60
 31-45	

COMMENTARY MAP 22: REMITTANCES

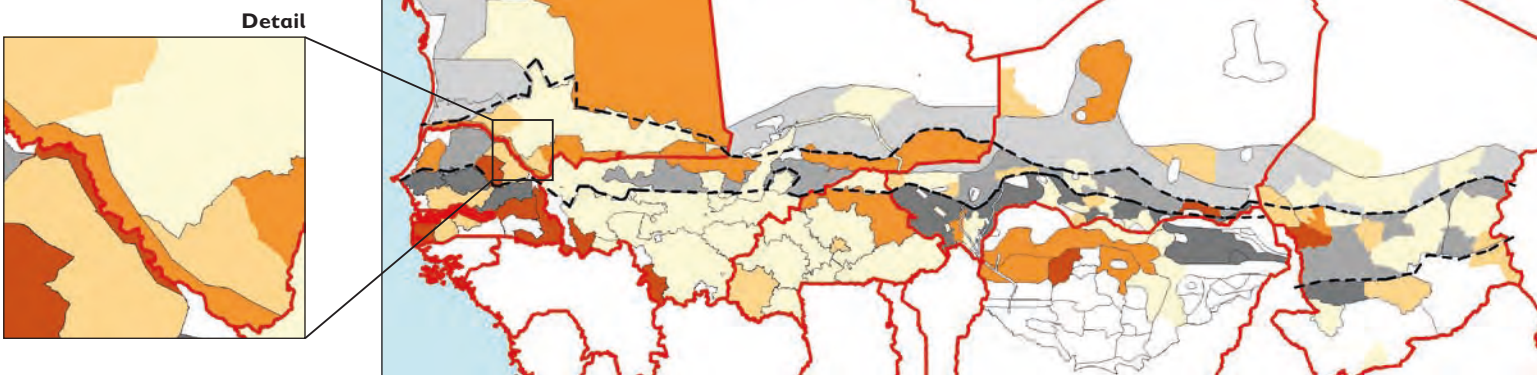
We have seen in Map 19 on migrant labour that Sahelians tend to operate in a much wider economic geography than their own zones, and this is also true in a different way for pastoralists, who may cover enormous distances on seasonal grazing migration, often crossing into neighbouring countries. But in yet another sense, remittances might be seen as an example, though limited, of the use of the widest geography. Remittances are cash transfers made, with greater or lesser regularity, to village households by family members residing and working long term elsewhere. 'Elsewhere' may be the country's capital, or a West African coastal country, or a city in Libya or Algeria. But the most striking example we see is among wealthier people in zones in the vicinity of the Senegal River in Mali, Senegal and Mauritania where there is a long tradition of migration to Europe, especially to France. Men stay and work for years, even decades, before returning to their home country, often to retire to a home built, and a family long maintained, by their remittances. Other areas where remittances are sufficient to bring colour to the maps are the Dogon Plateau of Bandiagara, Mali (ML05), the two locations in agropastoral west Niger (TLP, TON) also noted above for seasonal work migration, and the Brakna area (BRA) of the agropastoral zone (MR08) in Mauritania.

There are two general observations to be made. First, remittances are a minor phenomenon overall in the Sahel. This is perhaps surprising, given the millions of Sahelians who have settled in the coastal cities of West Africa. It suggests that the great majority of such migrants do not earn enough to more than maintain their own households where they live. Second, remittances are markedly associated with wealthier households. There may be a chicken-and-egg question here: do wealthier households tend to be the ones whose members do best on long-term migration because they have the means and the contacts and/or because they can pay for the secondary or higher education that confers advantages for migrants (even if they end up doing menial jobs in Paris)? Or alternatively, are these households relatively wealthy precisely because they have received remittances?

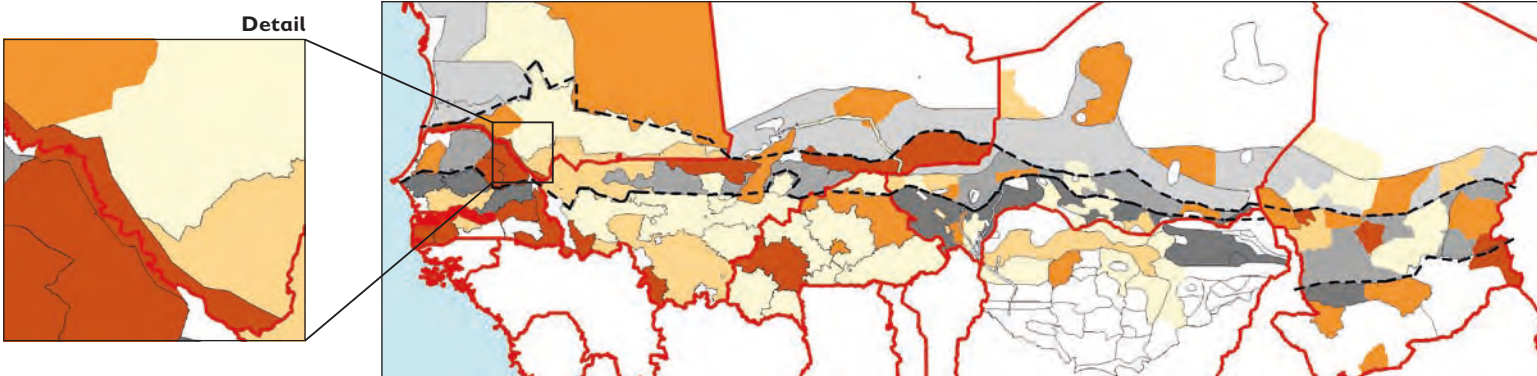
MAP 23: CASH INCOME FROM SELF-EMPLOYMENT

(US\$ per person per year)

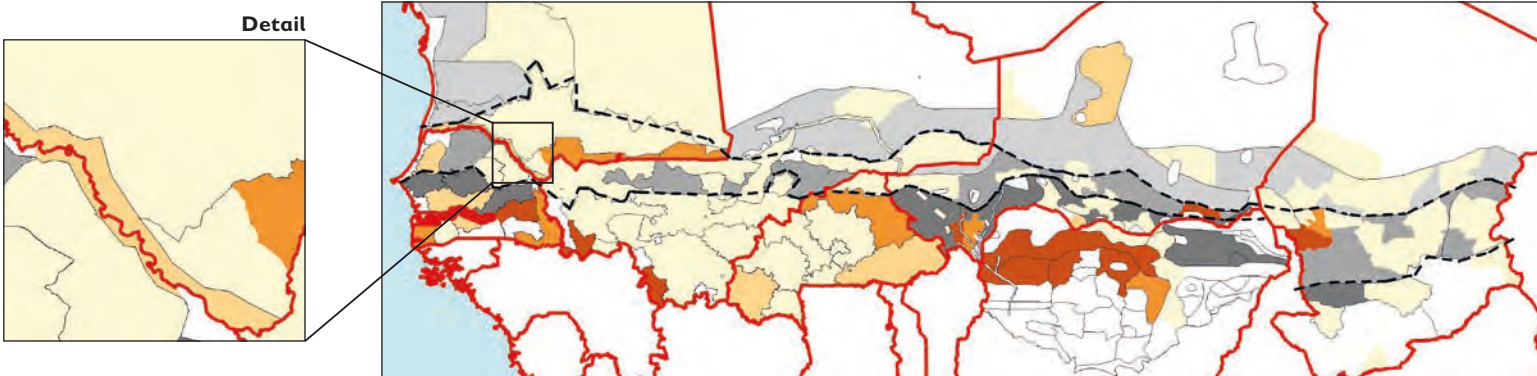
Average households



Very Poor households



Better Off households



LEGEND

US\$ per person per year

- 0-15
- 16-30
- 31-45
- >45

COMMENTARY MAP 23: CASH INCOME FROM SELF-EMPLOYMENT

If local agricultural or other daily employment is usually the biggest single source of cash income for poorer people, it is often followed closely by self-employment. Poorer people need to find as many ways as possible to make the best of their capacity to work. They look beyond the fields to any opportunity they can seize, and the following account of such activities testifies to their sheer busy-ness and enterprise.

By far the most common activity is cutting and selling firewood, or converting it to charcoal for sale. There is both rural and urban demand for this item, but it is the expanding urban market that seems to drive the business most. Piles of firewood and bags of charcoal are sold at rural markets, but perhaps more are sold by the roadside to truck drivers who may retail them at higher prices in town, and to car-driving purchasers to use at home. This allows rural people to trade indirectly with main towns that might be some distance away. The problem is getting your product to the roadside if you are cutting wood far away from the few main routes, and indeed this must limit the local geography of substantial wood cutting. A good number of rural wood sellers take their product straight into cities by donkey cart or ox cart; in Burkina Faso, for instance, people might travel a day and a night to get their load to Ouagadougou. But it is of concern that ever-greater market demand, and therefore ever more wood cutting, will progressively outstrip nature's capacity to regenerate the supply, despite legal restrictions to cutting on the one hand (often ignored) and some reforestation projects on the other.

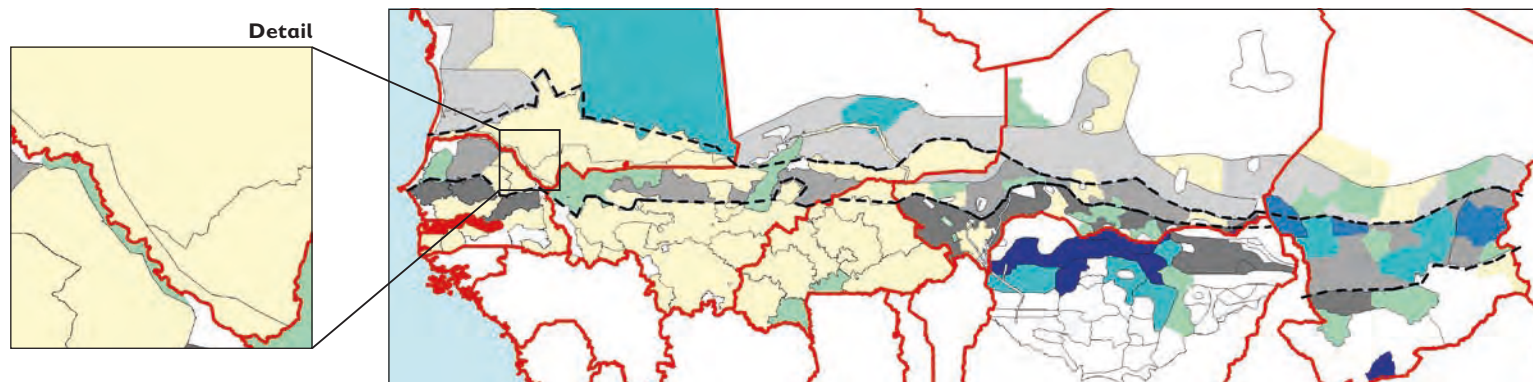
Wood is one 'free' resource offered by nature (although at the price of some labour). Depending on the ecology, other cut or collected items are fodder grasses, basketry reeds and bamboo. Among wild foods and products are baobab leaves and fruit (insofar as they are sold as well as consumed at home), other edible leaves, shea nuts (*karité*), locust bean (*nééré*), jujube, tamarind, mangoes, wild fonio (in the north) and gum arabic. Then in certain desert localities there is natron salt to dig out and sell. There is river and lake

fishing, and fish drying and smoking. At the secondary level of processing, there is mud-brick making by men, and hand-crafts made by women and men (reed mats and baskets, rope-making), and women hulling grain and processing groundnuts for oil and cake. Then there are special minority occupations: pottery, tanning, dyeing, cotton-spinning and weaving, hair braiding, embroidering, carpentry for beds and chairs, etc, specially skilled well-digging, and in certain villages bread-baking. At weekly markets we see still more income-generating activities: transport (from ordinary fetching and carrying to ox-cart services), women frying and selling doughnuts (*galettes*), men brokering livestock sales (usually categorised under 'trade').

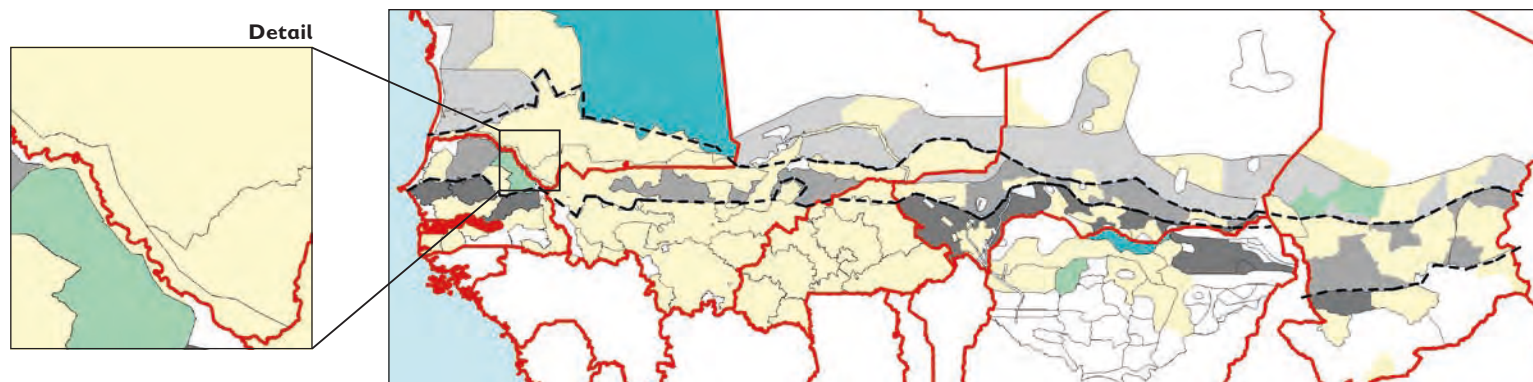
Some of the less onerous activities, or those requiring some capital, are performed by members of Middle and Better Off households. Looking at particular cases, in Burkina Faso, people in the Central Plateau zone (ZME5) and the neighbouring North and East Livestock and Cereals zone (ZME7) are notably engaged in surface (artisanal) gold mining; this involves even the Better Off, whether as employers or leasers of equipment. In the *ferlo* Transhumant Pastoralist and Cereals (FER) zone in Senegal, wild products are a major resource for poorer households, and for many Middle households also. Next door in the riverine zone, collecting and selling fodder grasses is big for poorer households, presumably because there are many customers who keep milking cows in the urban and quasi-urban areas along the river. But here there are also several of the other activities listed above, and in the Tambacounda Cereals, Groundnuts and Forestry zone (TAM) too it is the plethora of activities rather than a specialism that makes self-employment somewhat more important to household income than even local agricultural employment. By contrast, at the other end of the Sahel, in the three contiguous study areas in eastern Chad (MAN, RDS, HDS) it is quite specifically firewood and fodder grass that bring in the self-employment income.

MAP 24: CASH INCOME FROM TRADE (US\$ per person per year)

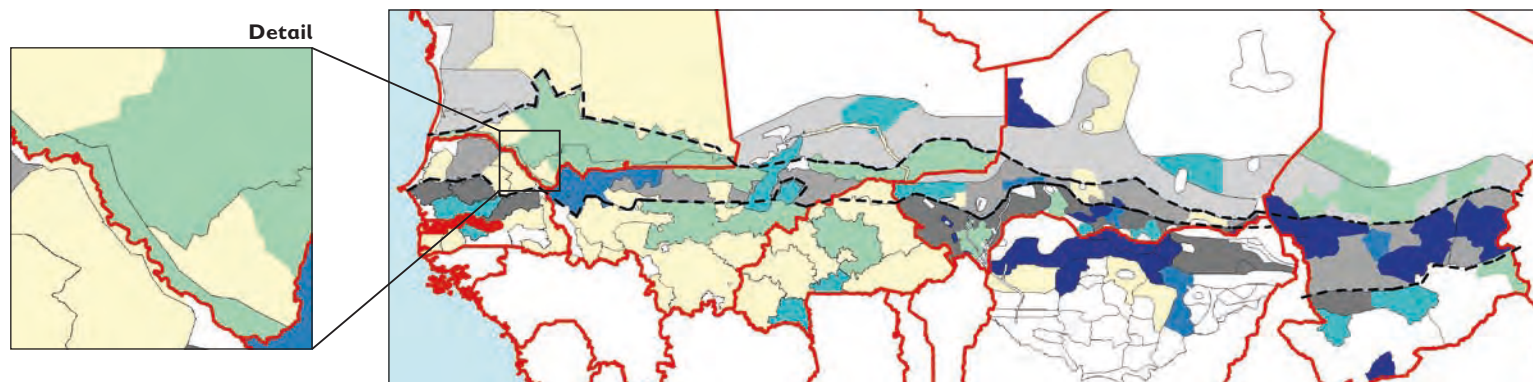
Average households



Very Poor households



Better Off households



LEGEND

US\$ per person per year



COMMENTARY MAP 24: CASH INCOME FROM TRADE

Trade here means the selling of items not produced by the seller. The trade might be on a very small scale, for instance carrying a small retail commodity between local markets to make a minimal profit on the difference in prices. But for someone else in the same village trade could be on a far larger scale – for instance a Better Off farmer buying grain from poorer neighbours at low prices immediately after harvest when they need to sell to pay pressing bills, and then selling later in the year at local markets as prices rise, or even organising transport to a more distant market centre where prices are higher still. The general message from the maps is that poorer people make little money from trade, and wealthier people make more, because they have the capital, time, attitude and sometimes education to give them major advantages. They may also be less risk averse than poorer people. A poor petty trader may have to decide whether the venture, with the effort required to gain a small profit, and the risk of loss, is worth pursuing as against the availability of a day's paid employment on someone's field: guaranteed profit, however hard the work, and perhaps with a meal thrown in.

Other than the glaring difference between Better Off and Very Poor in terms of income from trade, there is no clear pattern in the maps, even if there are

many zones where trade earnings are low across the board. The zones in Nigeria show up strongly not only for the Better Off but also in the Average section, while the Very Poor are no different to their counterparts in other countries. This suggests that in Nigeria at least, the Middle wealth group is also strong in trade, and indeed they do shadow the Better Off. A part of the comparatively high trade earnings in Nigeria is likely to be simply the overall cost of living in that country and the dollar value of the naira as opposed to almost all the Sahel countries, where the currency is the CFA franc. But it is also true that trading activity by wealthier rural people in the Nigerian zones is comparatively high. One major element for the Better Off is their involvement in the livestock market as intermediary brokers dealing with both local animals and animals coming in from Niger and Chad. The greatest demand is from the huge population in the southern part of Nigeria, and especially from Lagos and the other big cities, and the commissions from brokering reflect the high prices of livestock taken on by the transporting traders. It is a moot point whether the brokering activity should have been put under 'trade' or 'self-employment'.