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.

Hea-sahel.org

HEASAHEL household economy analysis analyse de l'économie des ménages

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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.

Acknowledgements

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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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Contents

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 NET[1] 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)

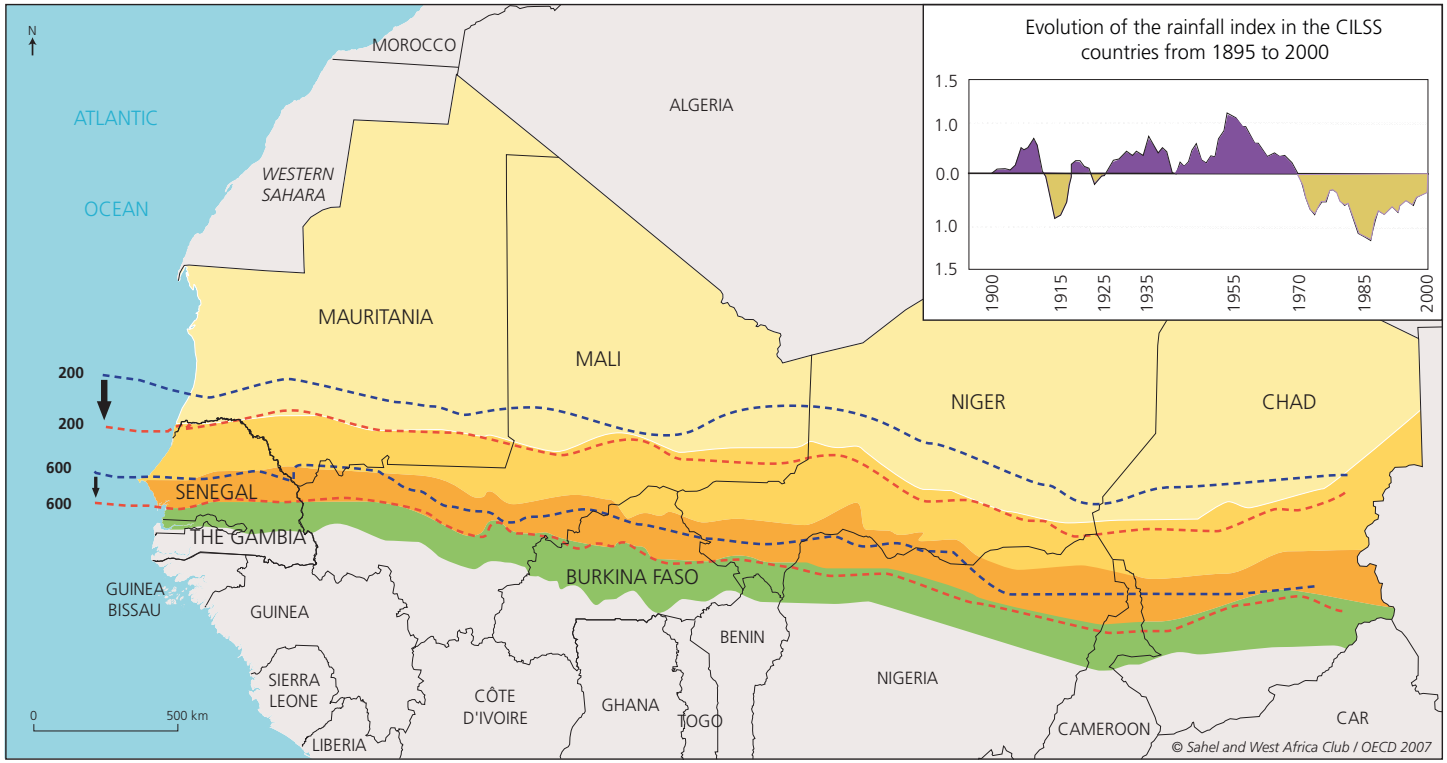
200 **Average isohyet 1940–1967**

200 **Average isohyet 1968–2000**

Current climate zones

- **Saharan**
- **Sahelian**
- **Sahelo-sudanian**
- **Sudano-sahelian**

Border

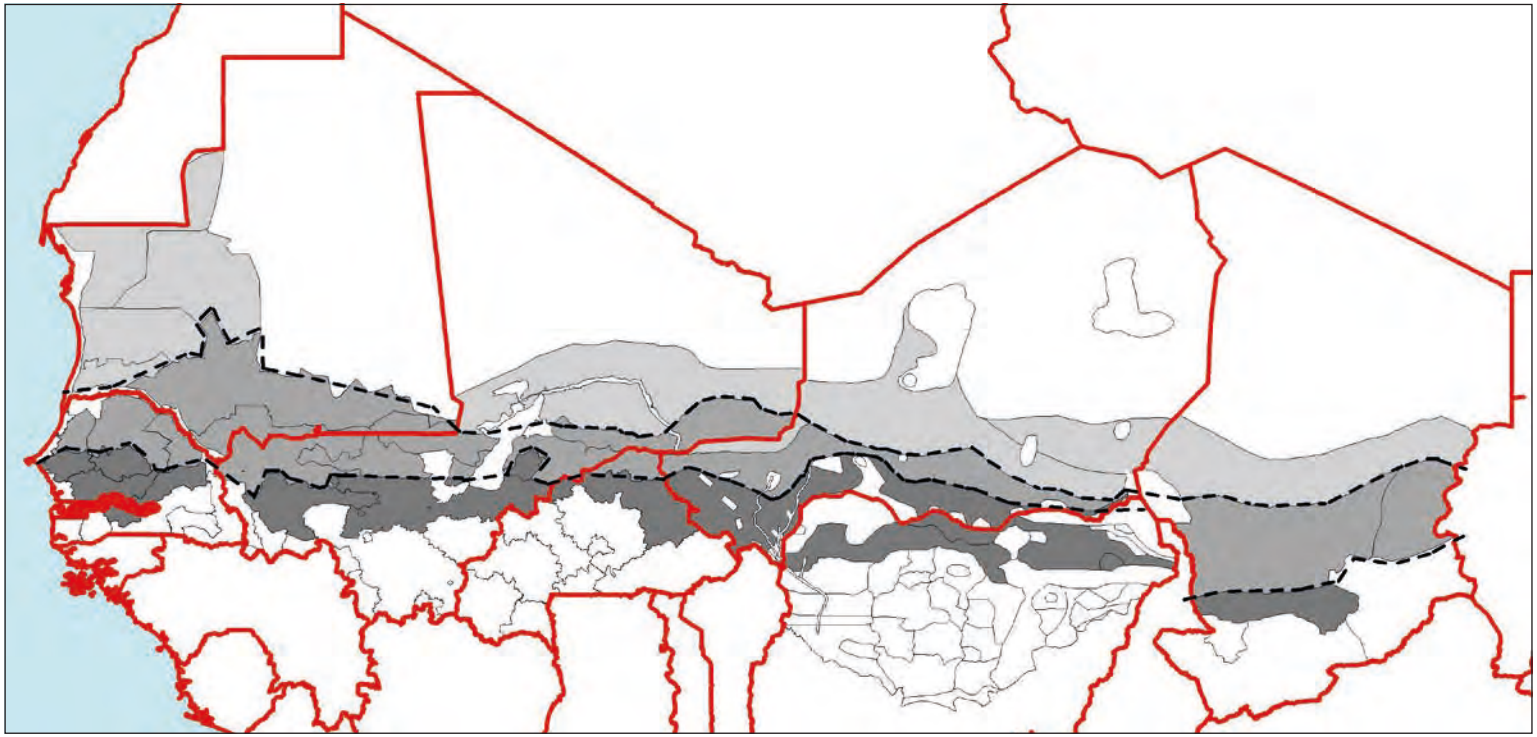


Source: *Vulnerability in the Sahelian Zone*. Philipp Heinrigs and Christophe Perret (SWAC/OECD) Regional Atlas on West Africa, Chapter 15. OECD

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



LEGEND

- Pastoral
- Agropastoral
- Rainfed agriculture (sahelian)
- --- Boundaries between the three general zones

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.

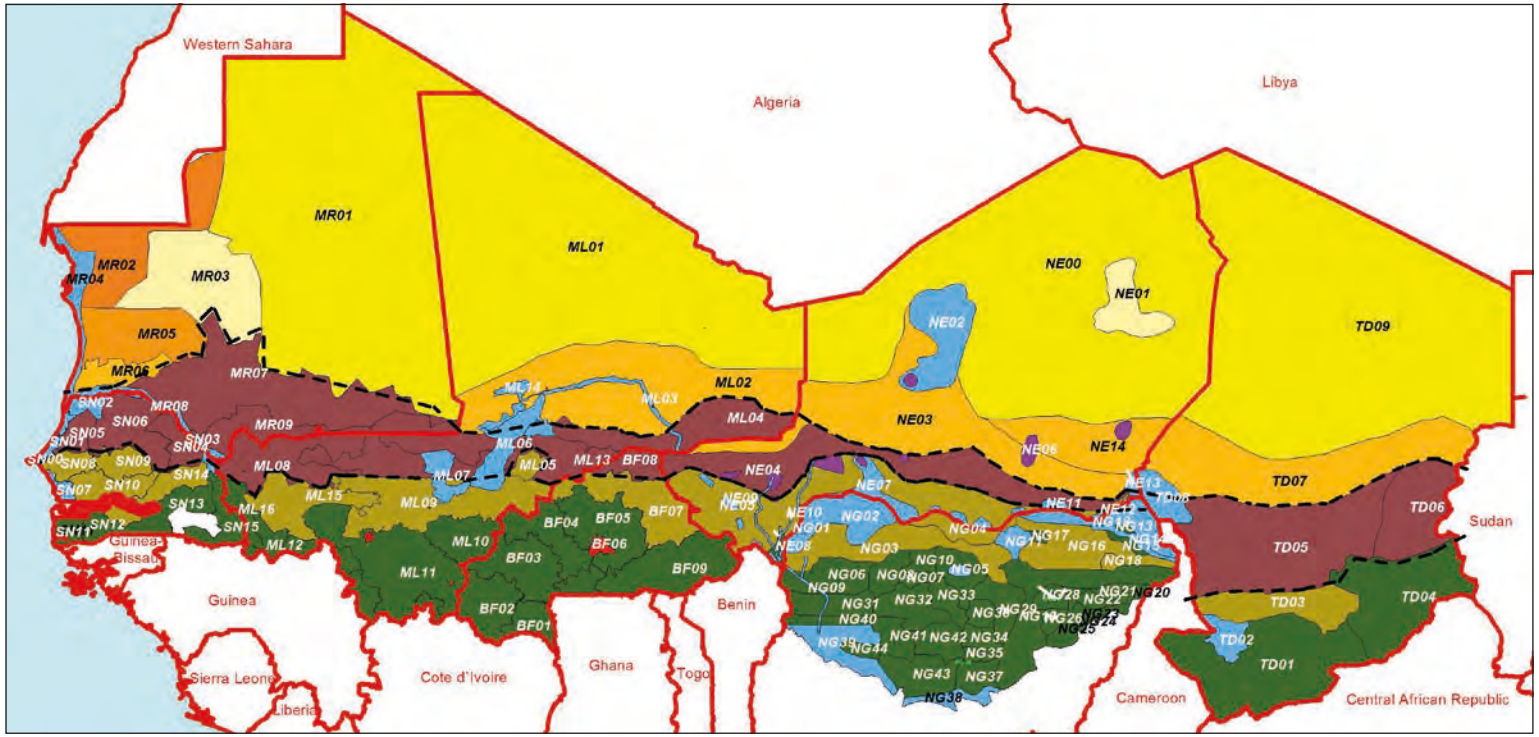
As mentioned above, the national livelihood zoning was done independently in each country, and over the years adjustments have been made to better match similar zones across national frontiers. However, one mismatch remains to be tackled: the broad brown band of agropastoralism across the map is interrupted 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).

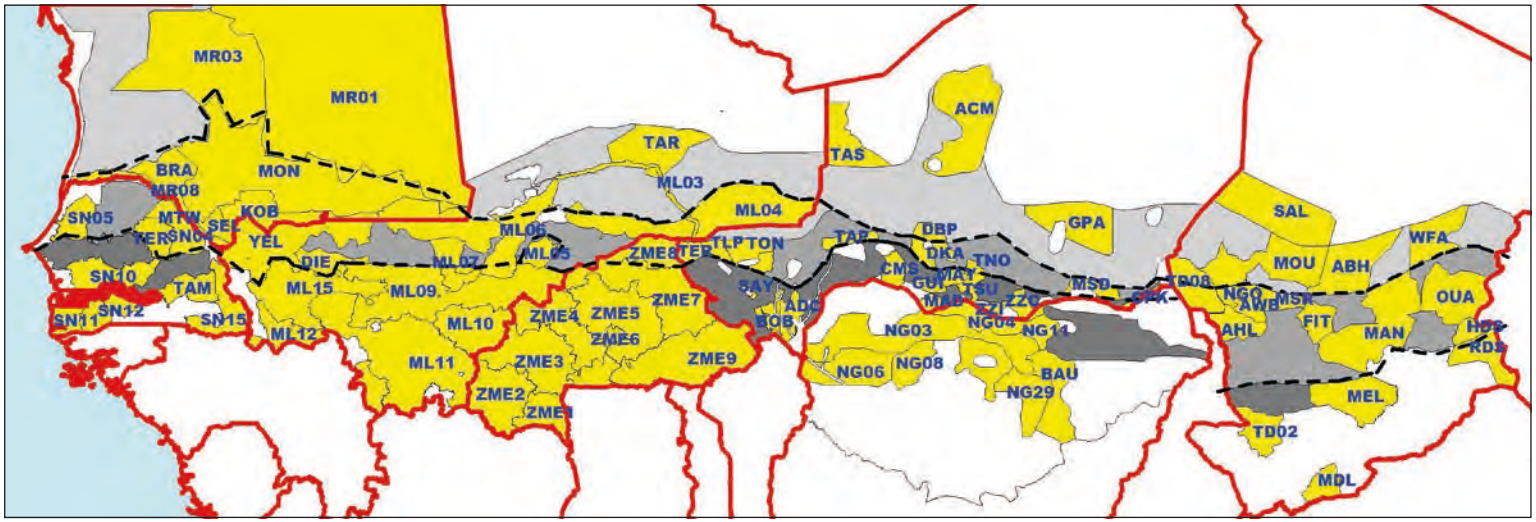


1.3 Coverage and geographical representativeness of the HEA studies

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 (Aïr 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



LEGEND

- **Livelihood Zones (LZs) (and parts of LZs) with full baseline**

Grey-shading indicates livelihood zones that are part of the following general sahelian zones:

- **Pastoral**
- **Agropastoral**
- **Rainfed agriculture (sahelian)**
- **--- Dotted lines indicate boundaries between these three general zones.**

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: AMERTI LEMMA/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.

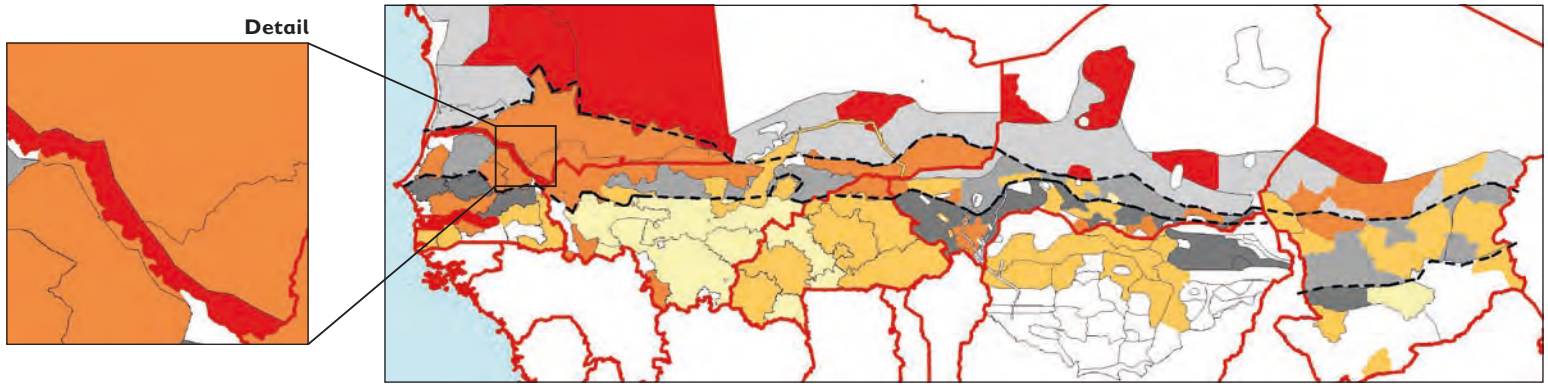
If this last notion seems more urban than rural, that too would be to follow the farmers' lead. The United Nations (UN) forecasts that urban living will be the situation of the majority of Africa's populations by the middle of the 21st century, and across the Sahel hundreds of thousands of rural people 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.

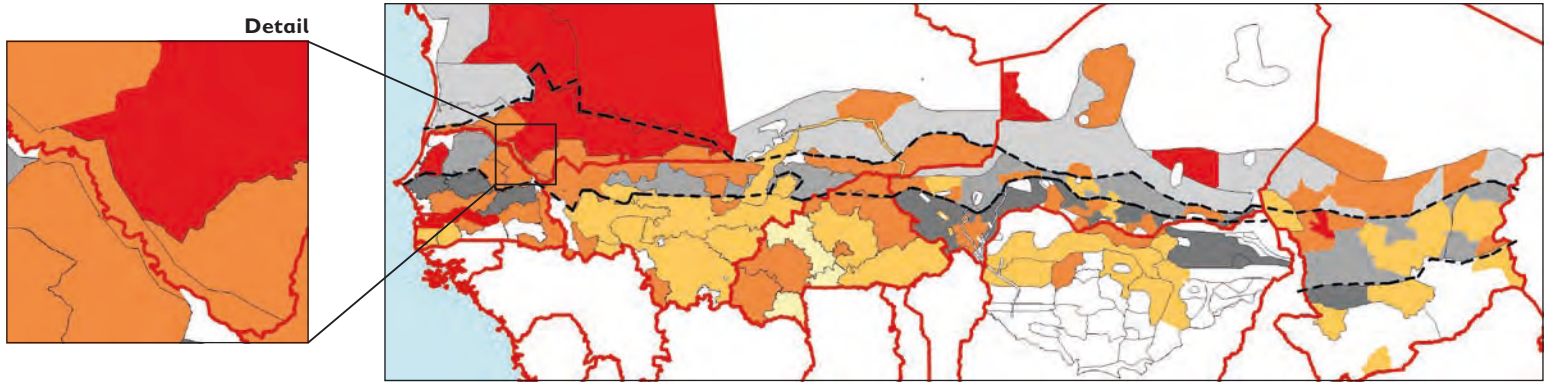
MAP 5: MARKET DEPENDENCE FOR FOOD

(Percentage of kcals consumed that are purchased)

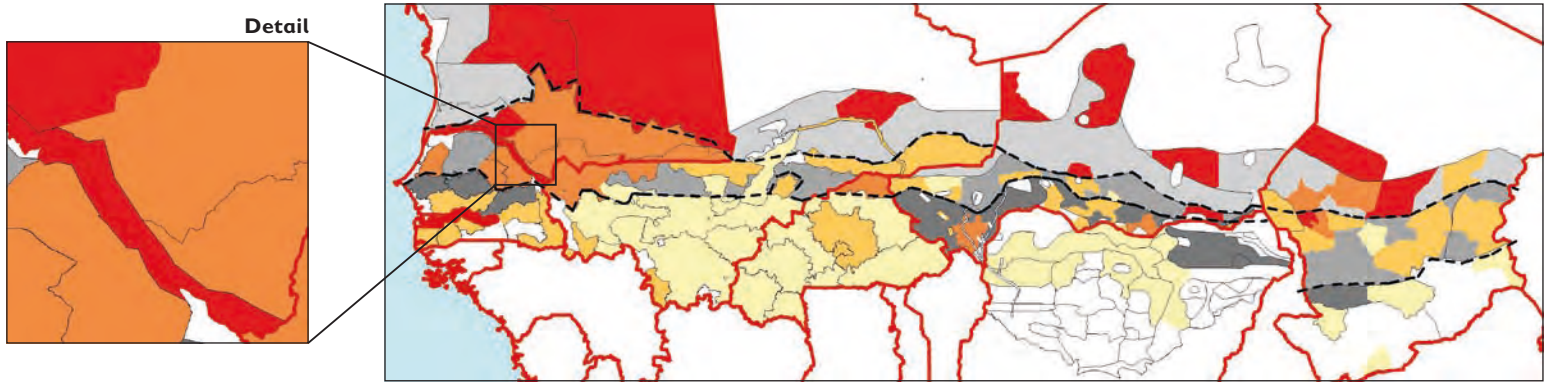
Average households



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.

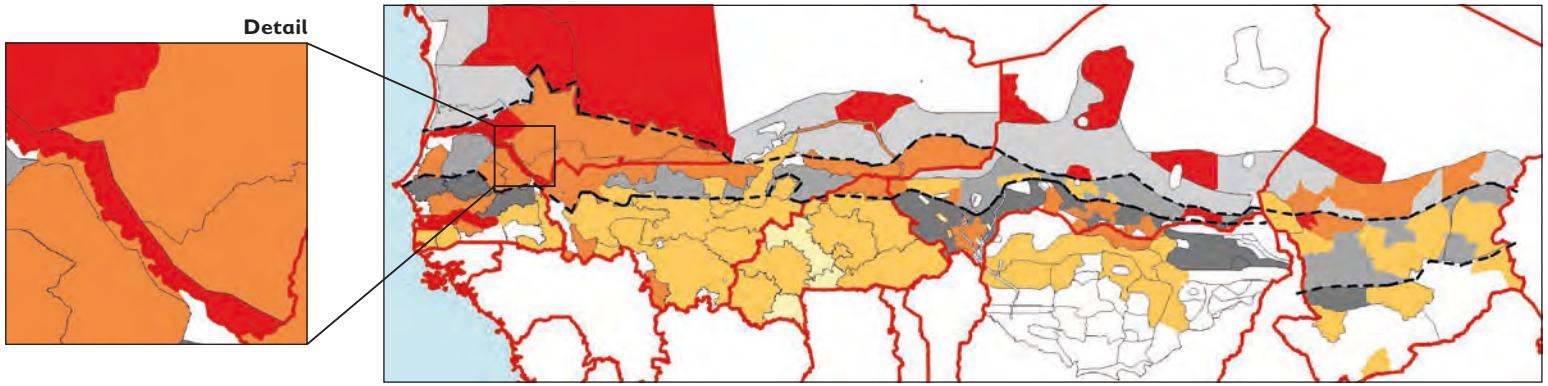
Finally, there are some cases that are counter-intuitive, where the Very Poor depend less on the market than the Better Off. The answer to this conundrum brings up interesting aspects of how people obtain food. In the Aïr Mountains of northern Niger (Aïr Massif Irrigated Gardening zone – ACM) food production 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.

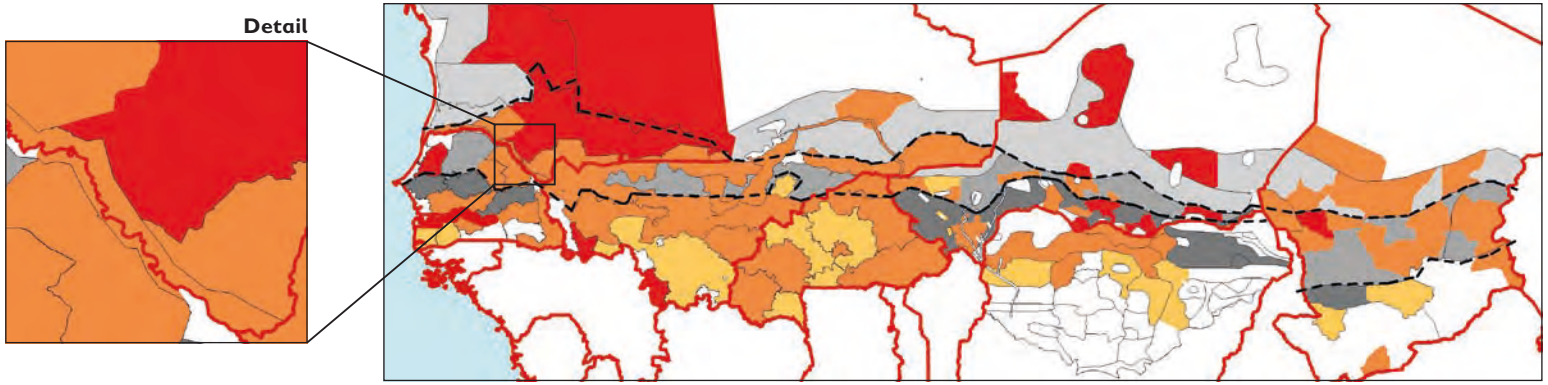
For the Salale camel pastoralists in northern Chad (SAL) there is a quite different explanation of the lesser market dependency of poorer people. Very unusually for poorer pastoralists in the Sahel, the Very Poor consume more than a quarter of their calories as milk from their own camels, such is the 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

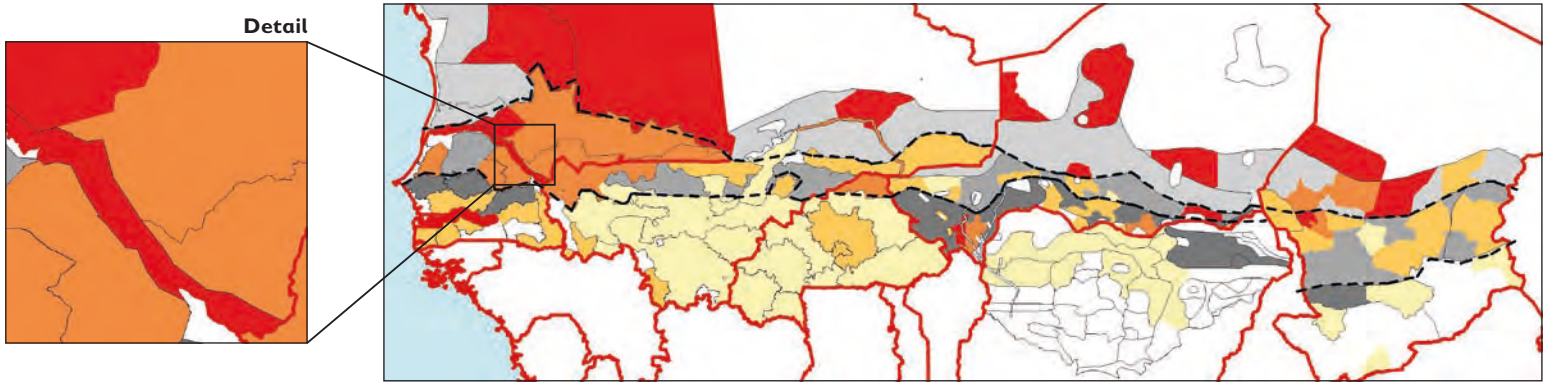
Average households



Very Poor households



Better Off households



LEGEND

% total kcals consumed

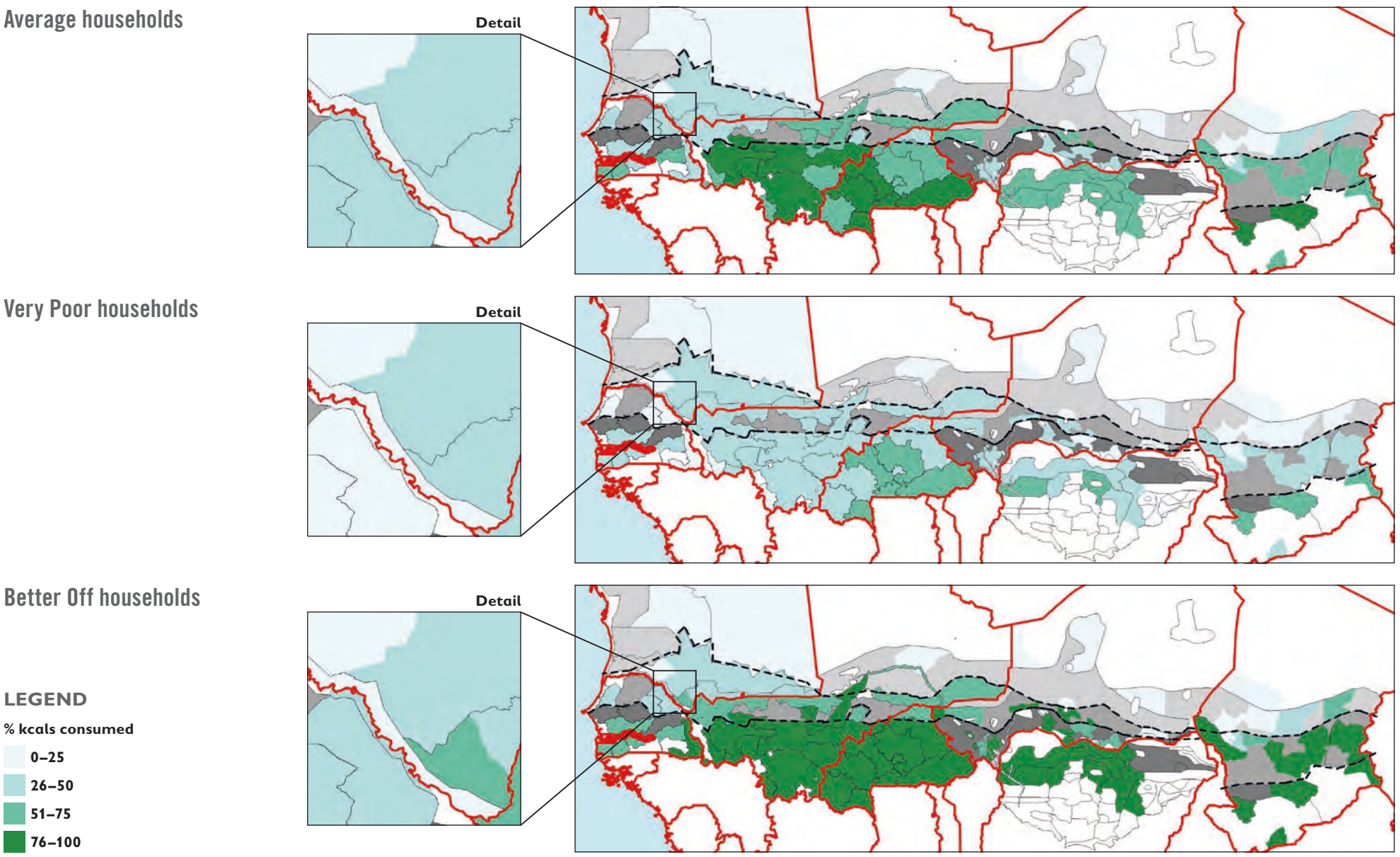
- 0–25
- 26–50
- 51–75
- 76–100

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



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.

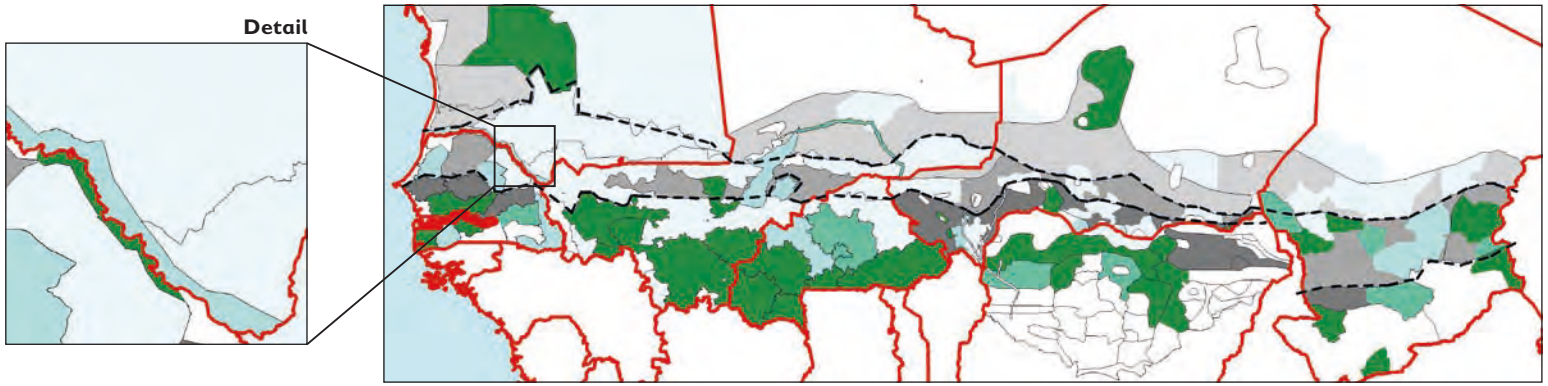
More generally in the agropastoral band, the limit to crop production is rainfall, whether in its meagre volume or its irregularity, rather than soil fertility or farmers' efforts. Once or even twice in a decade there are exceptional rains, and then these areas produce such bumper crops that they dominate 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.

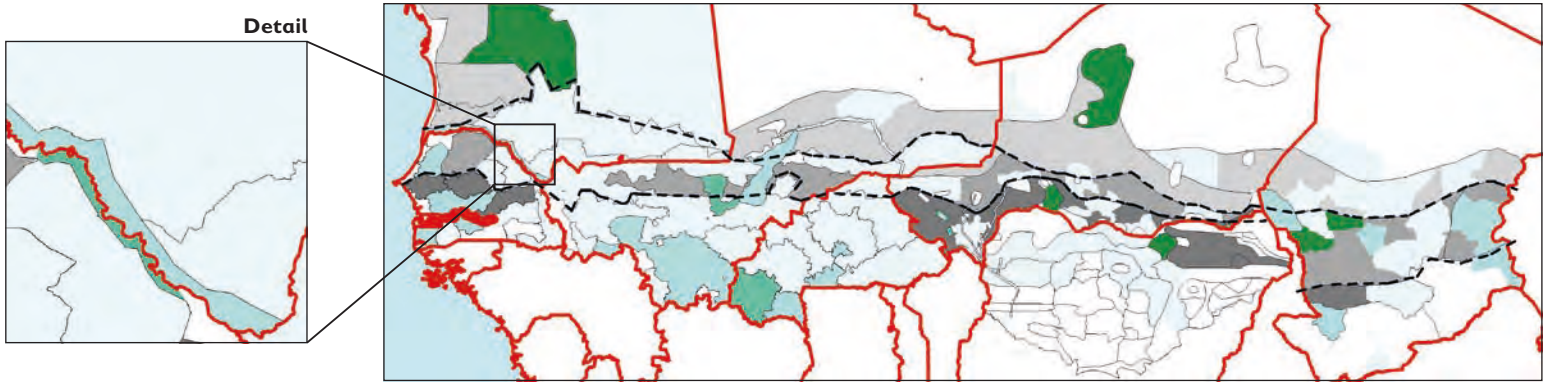
MAP 8: CASH INCOME FROM CROP SALES

(US$ per person per year)

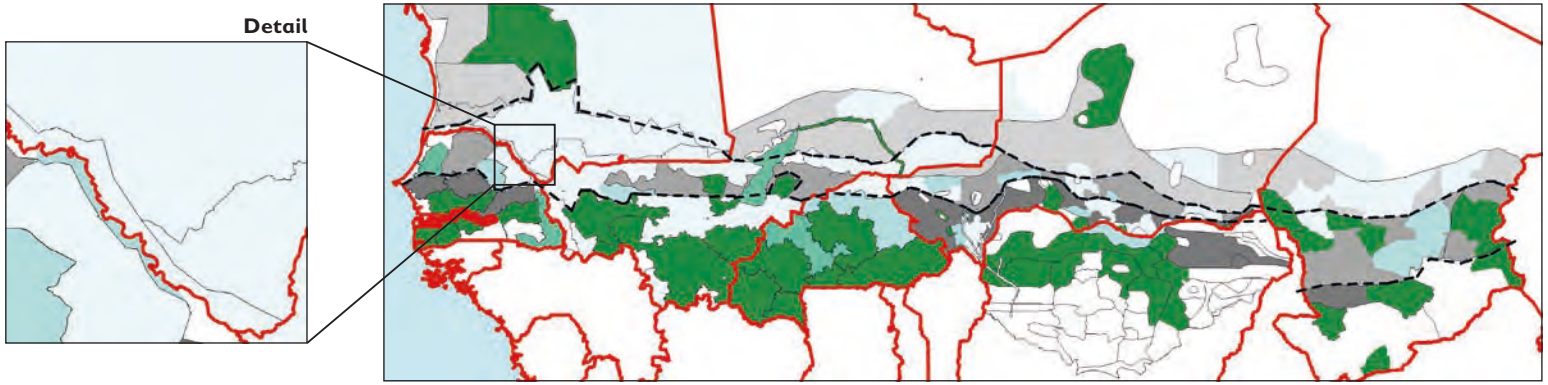
Average households



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 Aïr 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.

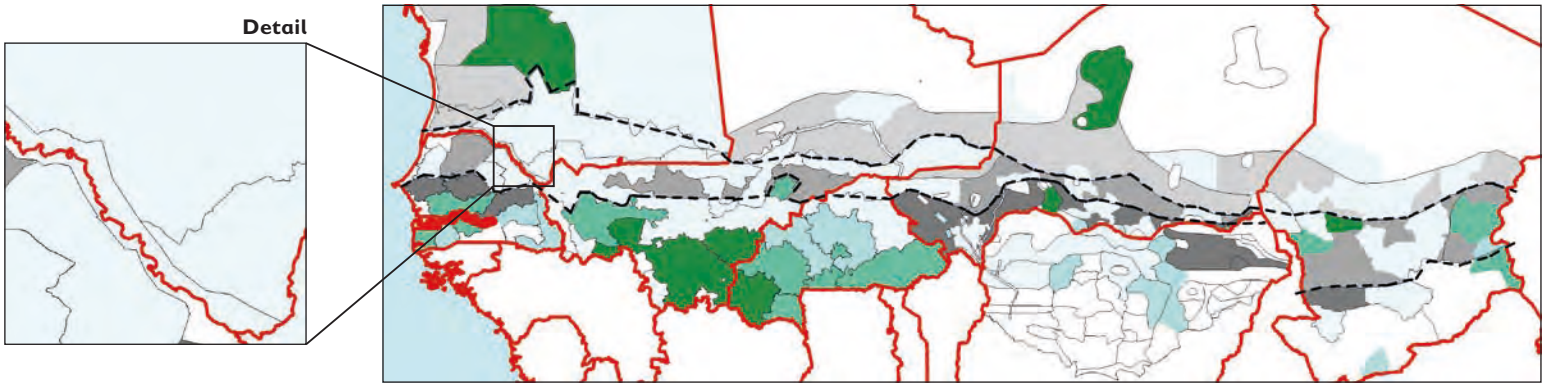
A far larger onion industry, the biggest in the Sahel, is found in the vicinity of the centre-south border of Niger with Nigeria. Here, in the Southern Market Gardening Tarka Valley area (CMS) an extensive shallow water table allows for the irrigated production of as much as 200,000 tonnes of onions 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 subterraneana* – 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.

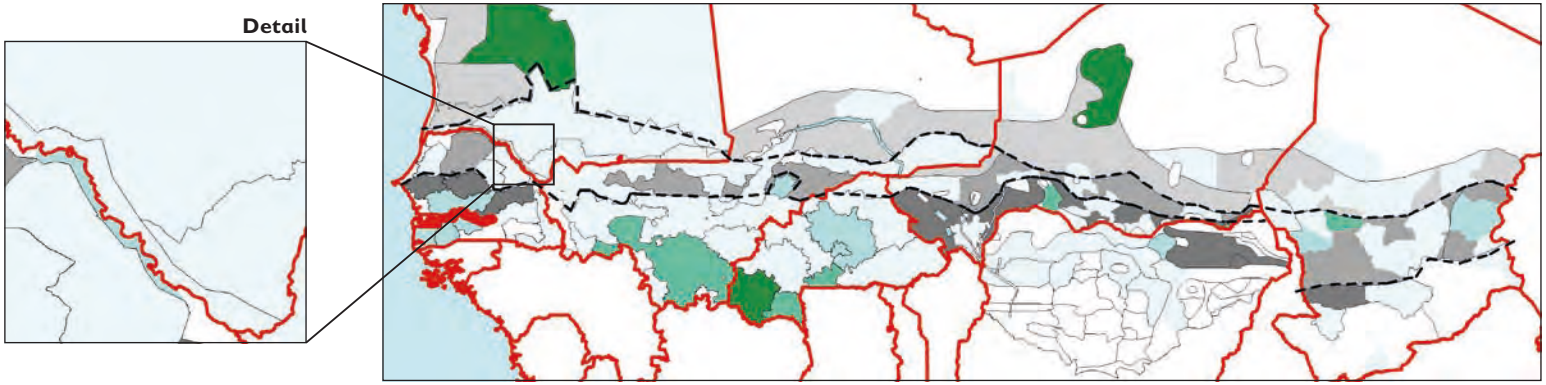
Two other northern zones with particularly high crop incomes are in Mali. There is the irrigated rice scheme near Niono on the Niger River (ML07) where again even the Very Poor make significant sales. And there is the Dogon Plateau (in Bandiagara) (ML05) where, in the rocky terrain, farmers have managed 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 oxcarts 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

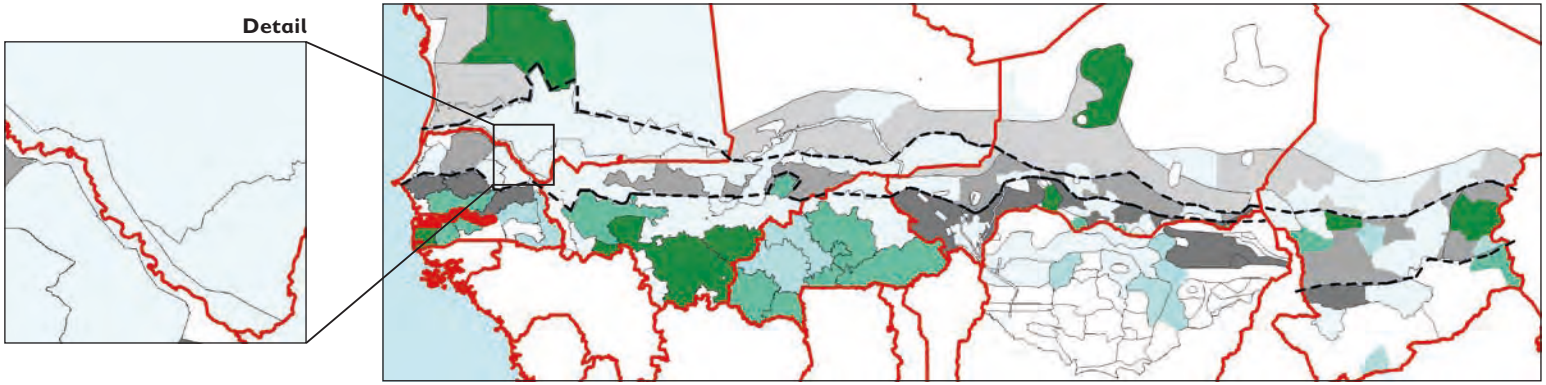
Average households



Very Poor households



Better Off households



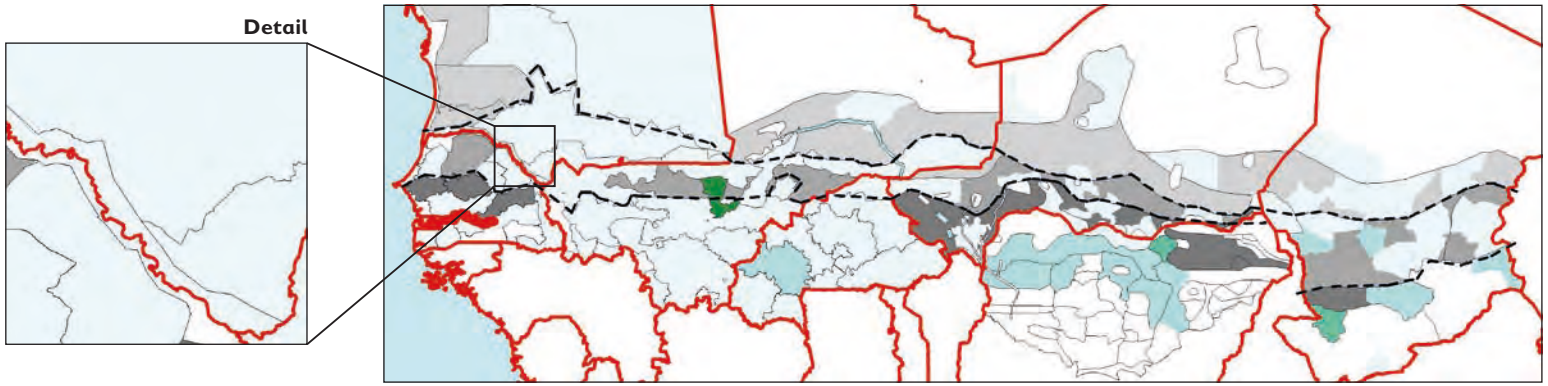
LEGEND

% total cash income

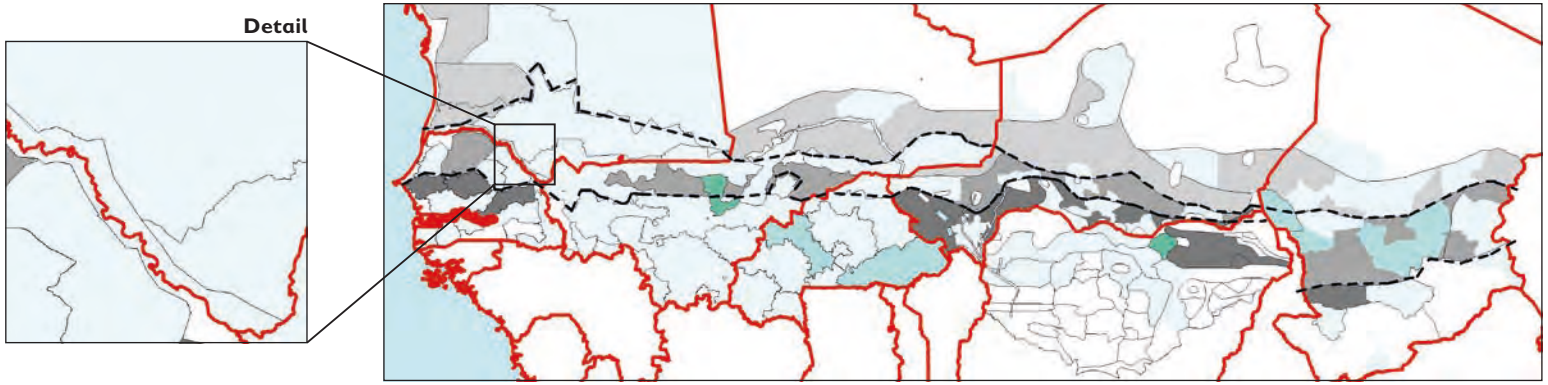
- 0–15
- 16–30
- 31–50
- >50

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

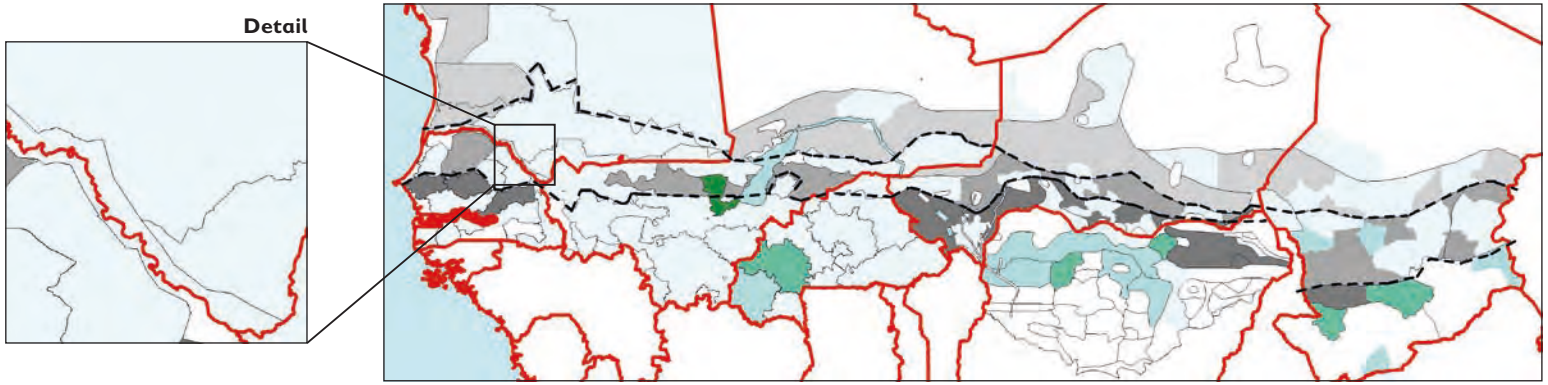
Average households



Very Poor households



Better Off households



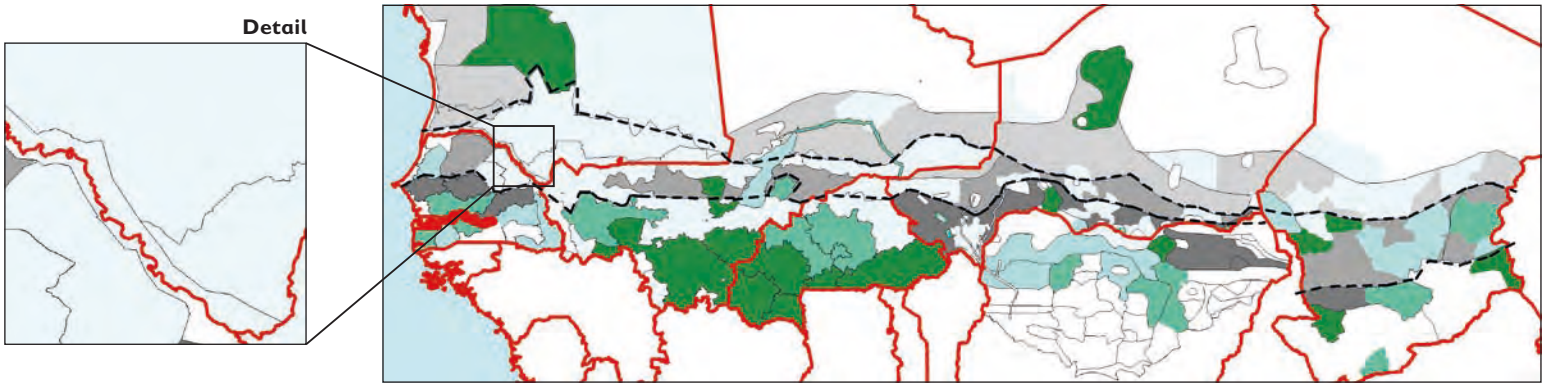
LEGEND

% total cash income

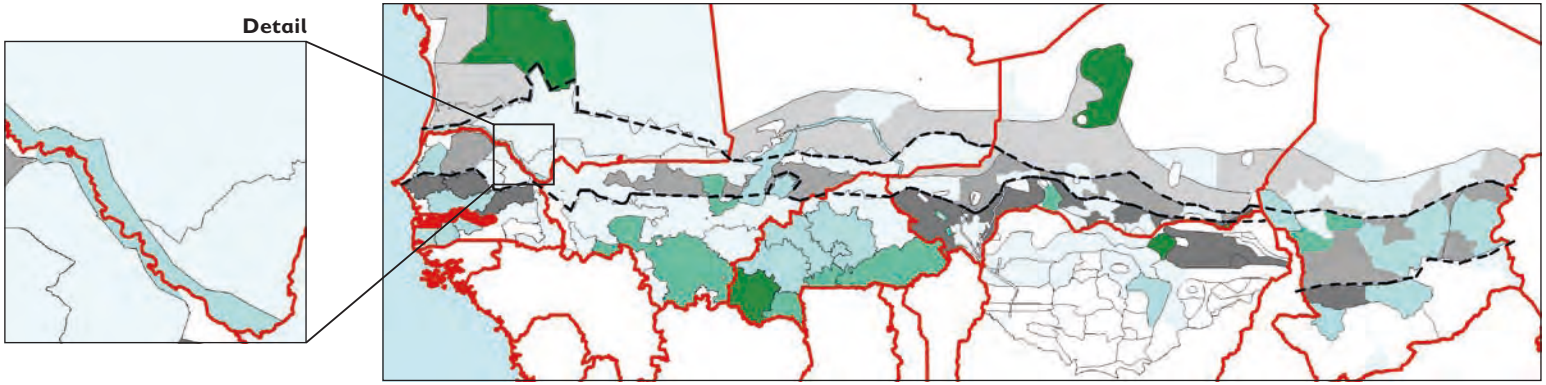
- 0–15
- 16–30
- 31–50
- >50

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

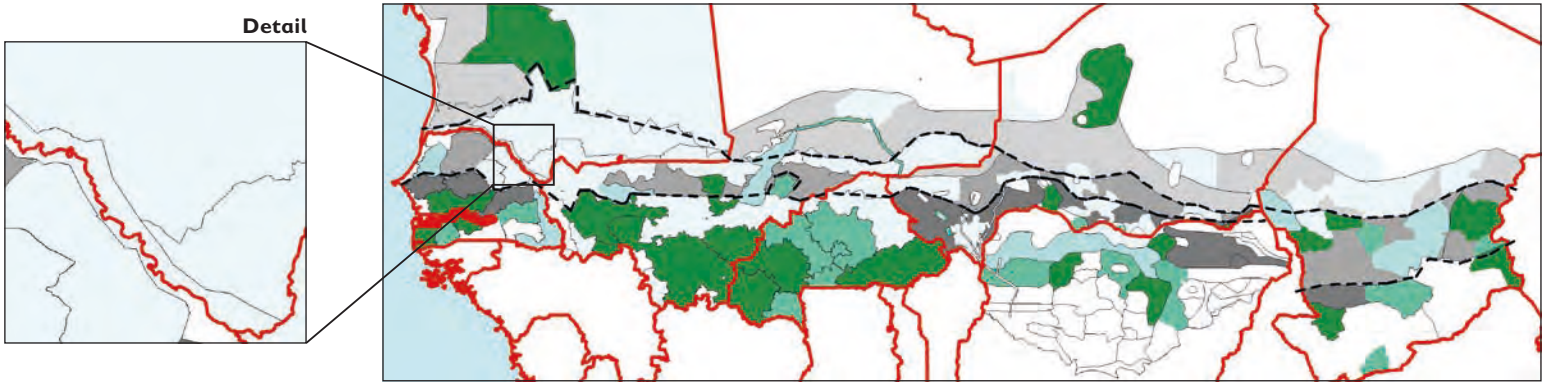
Average households



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.

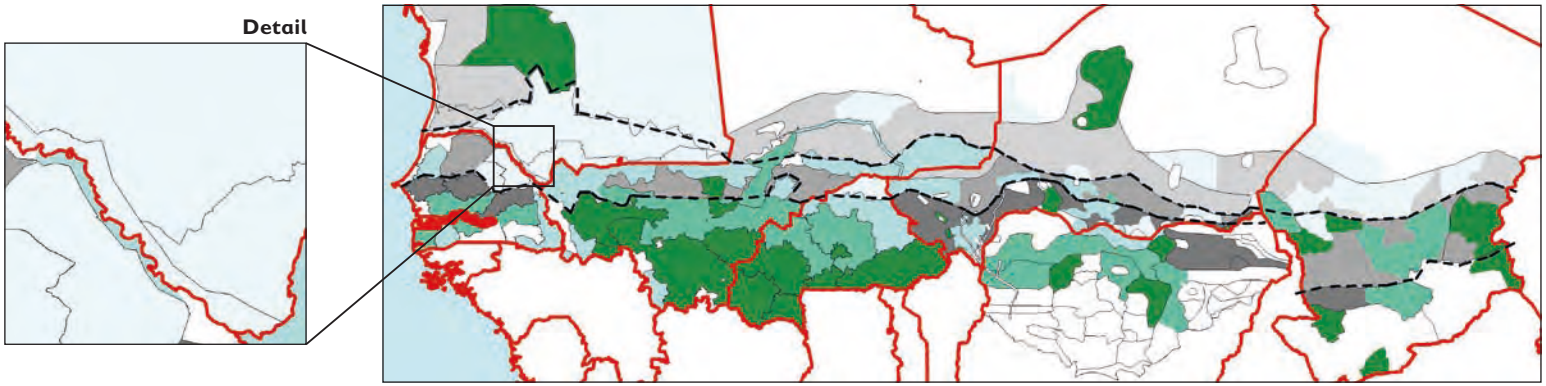
Of course there are zones with relatively high production of grains other than rice, notably towards the south, but this does not seem to translate into the highest earnings. The pattern of high crop earnings in Map 11 is influenced more by cash crops than food crops. It is cash crops that win, even 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.

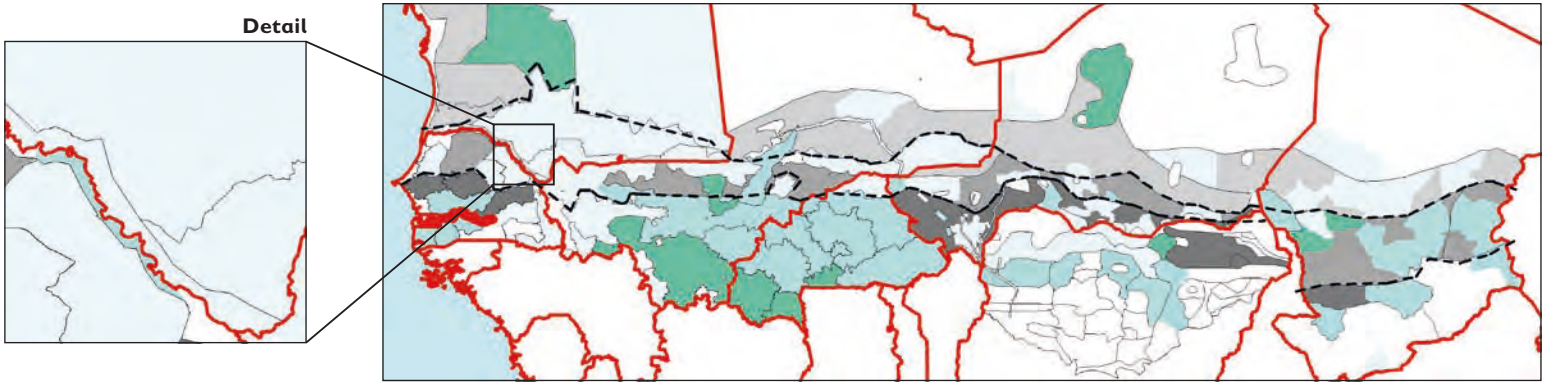
MAP 12: TOTAL INCOME FROM CROPS

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

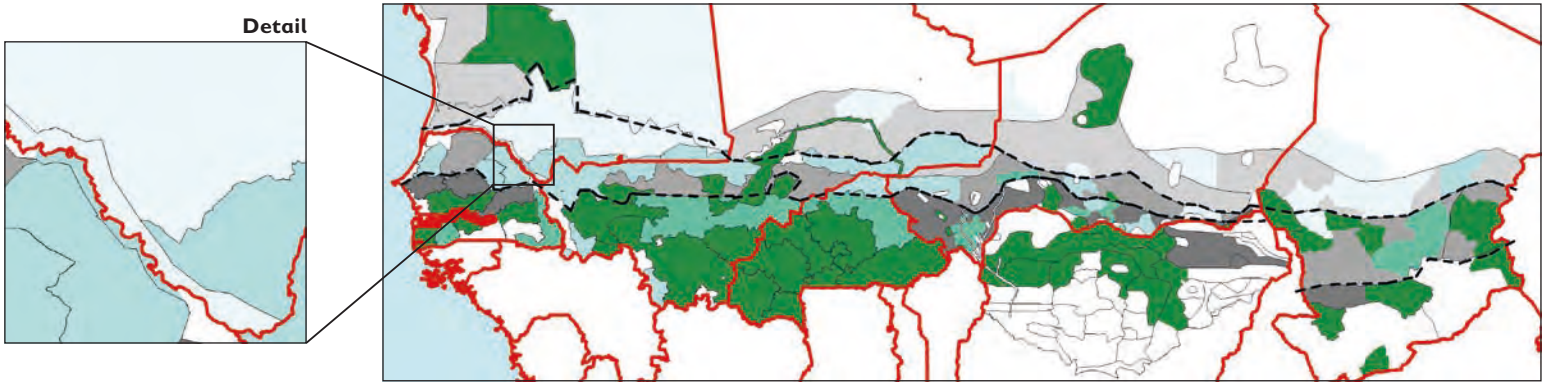
Average households



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 Aïr 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.

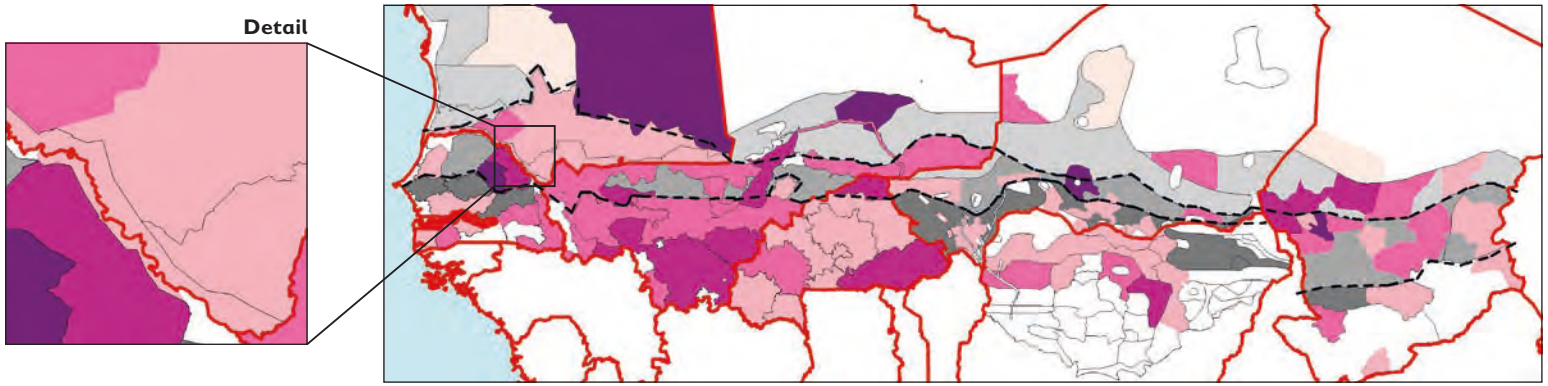
It is these households who own the vast majority of the livestock in the villages: quite commonly 100% of the cattle and more than 70% of the sheep and goats, even in pastoralist communities. Despite many small-scale projects to encourage poorer households to raise more goats or sheep in order to secure 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.

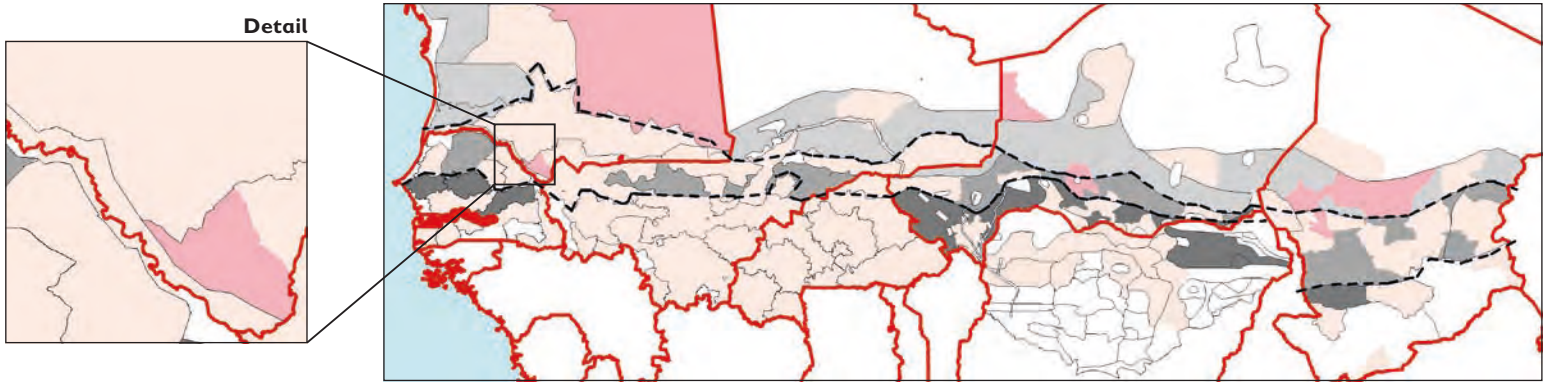
MAP 13: CATTLE OWNERSHIP (INCLUDING OXEN)

(Cattle and oxen owned per household)

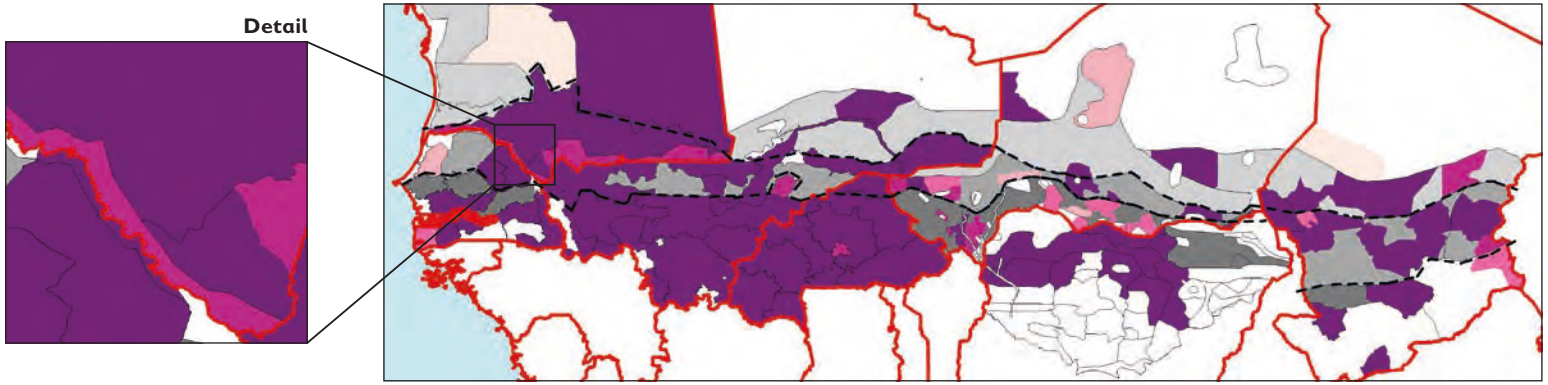
Average households



Very Poor households



Better Off households



LEGEND

Cattle and oxen owned per household

- 0
- 1–5
- 6–10
- 11–15
- >15

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.

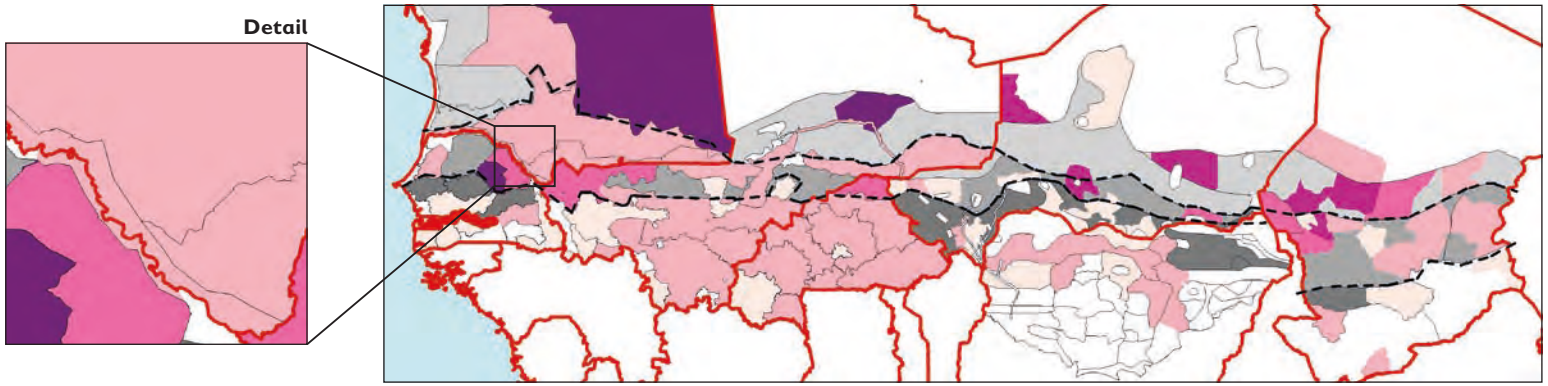
Otherwise, more generally, two things should draw our attention. One is the fact that the Better Off in the majority of *farming* areas – agropastoral as well as agricultural – own herds of more than 15 head of cattle: this is substantial wealth, and underlines the importance of livestock in farming 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.

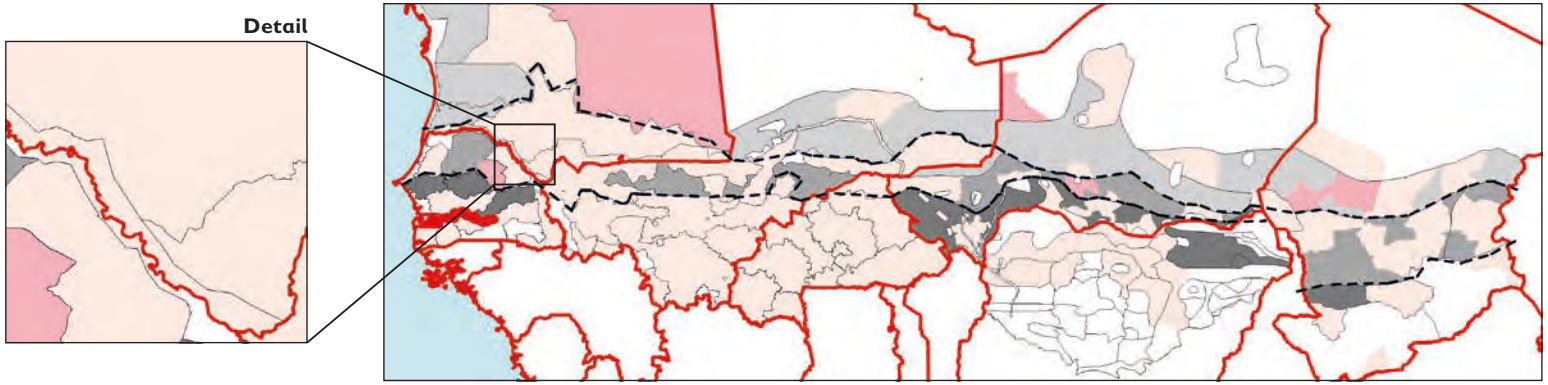
MAP 14: SHEEP AND GOAT OWNERSHIP

(Sheep and goats owned per household)

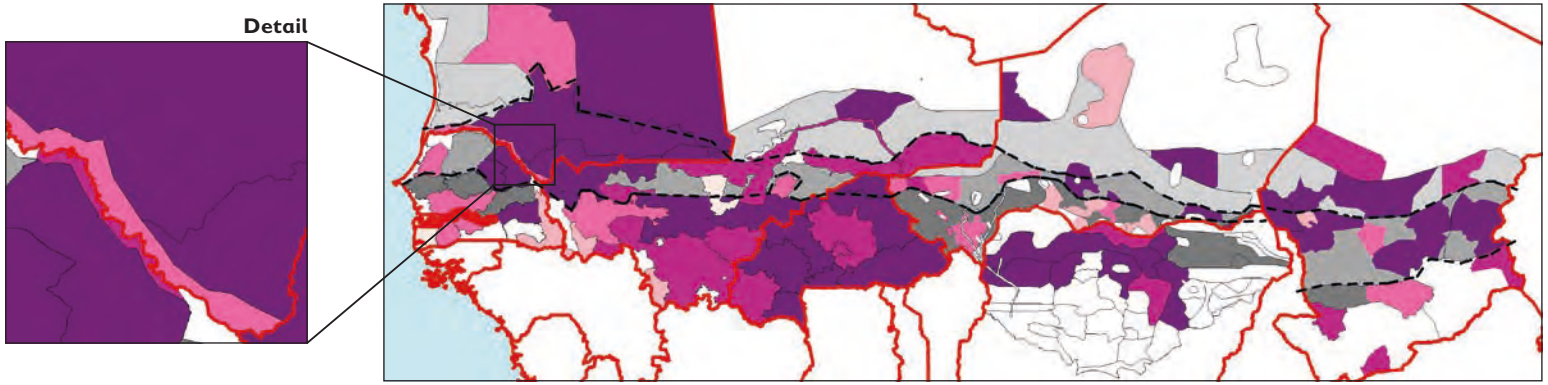
Average households



Very Poor households



Better Off households



LEGEND

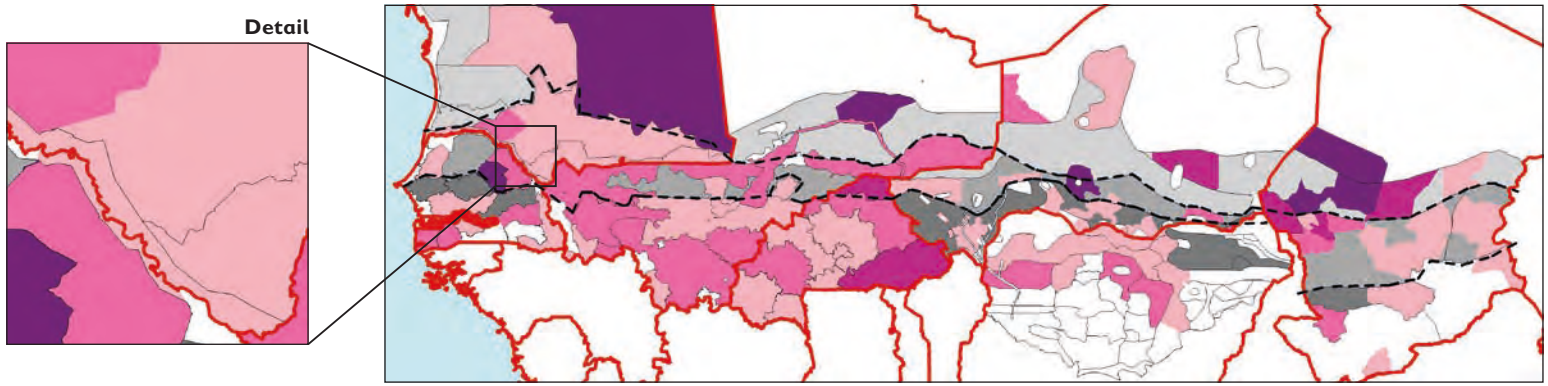
Sheep and goats owned per household

- 0–10
- 11–20
- 21–30
- 31–40
- >40

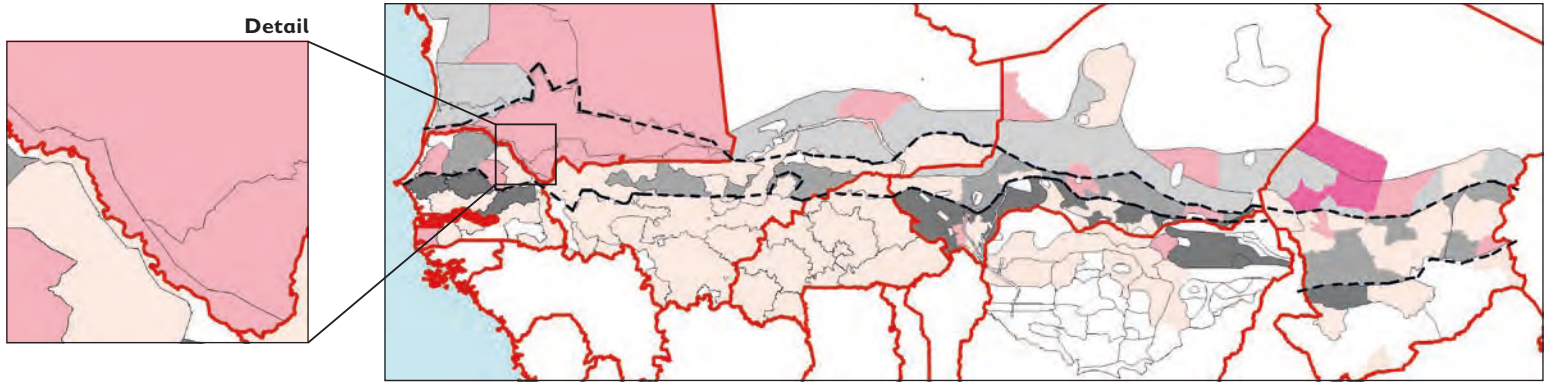
MAP 15: TOTAL LIVESTOCK OWNERSHIP

(Tropical livestock units owned per household)

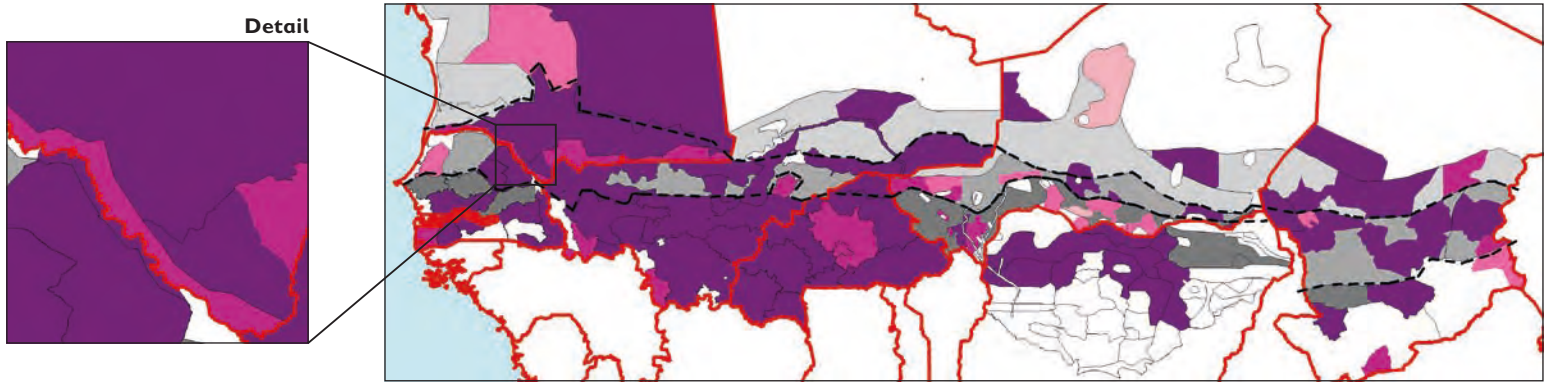
Average households



Very Poor households



Better Off households



LEGEND

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

- 0
- 1–5
- 6–10
- 11–15
- >15

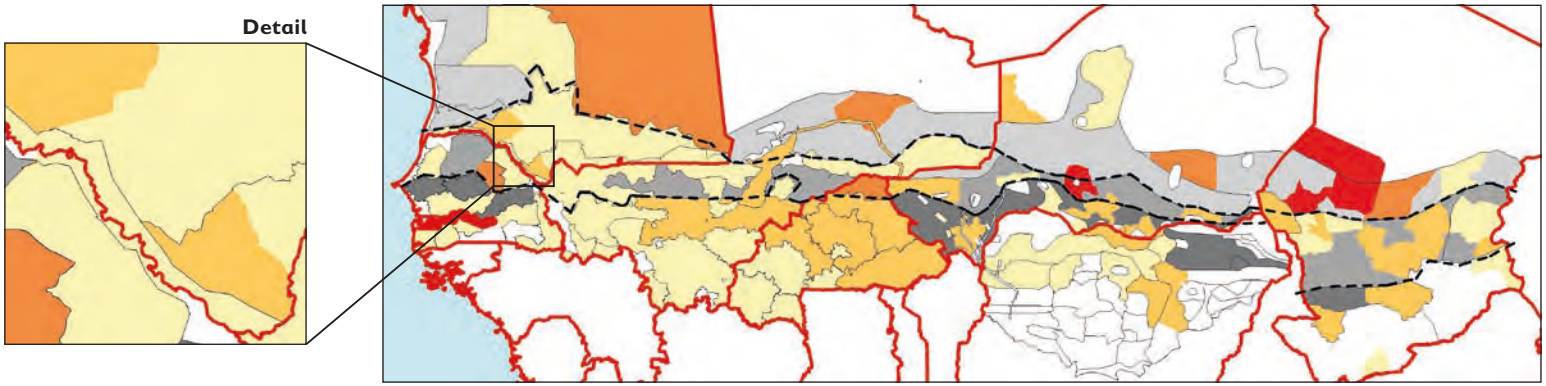
COMMENTARY MAP 14: SHEEP AND GOAT OWNERSHIP; MAP 15: TOTAL LIVESTOCK OWNERSHIP

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.

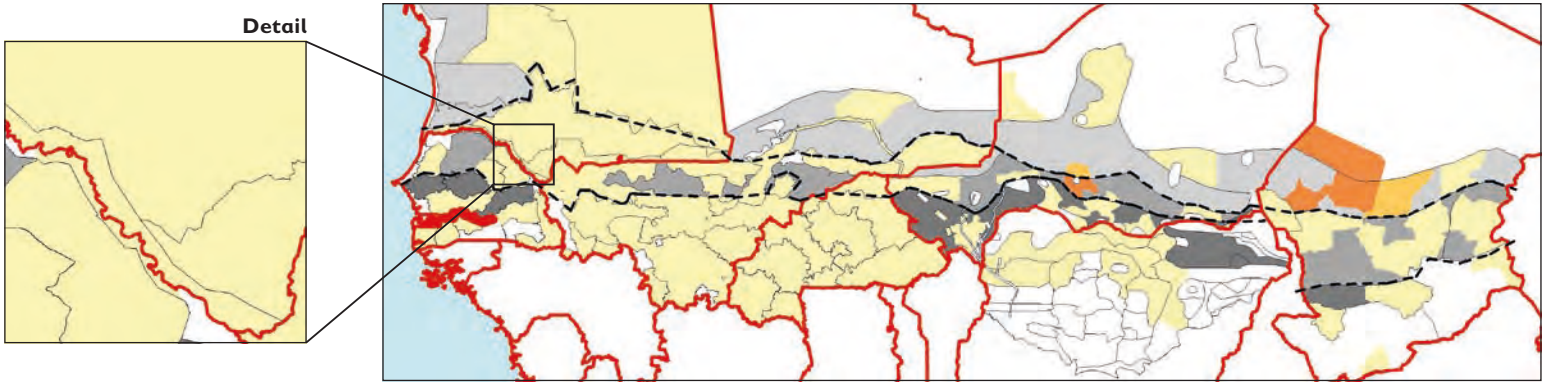
PHOTO: OSCAR NARANJO/SAVE THE CHILDREN

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

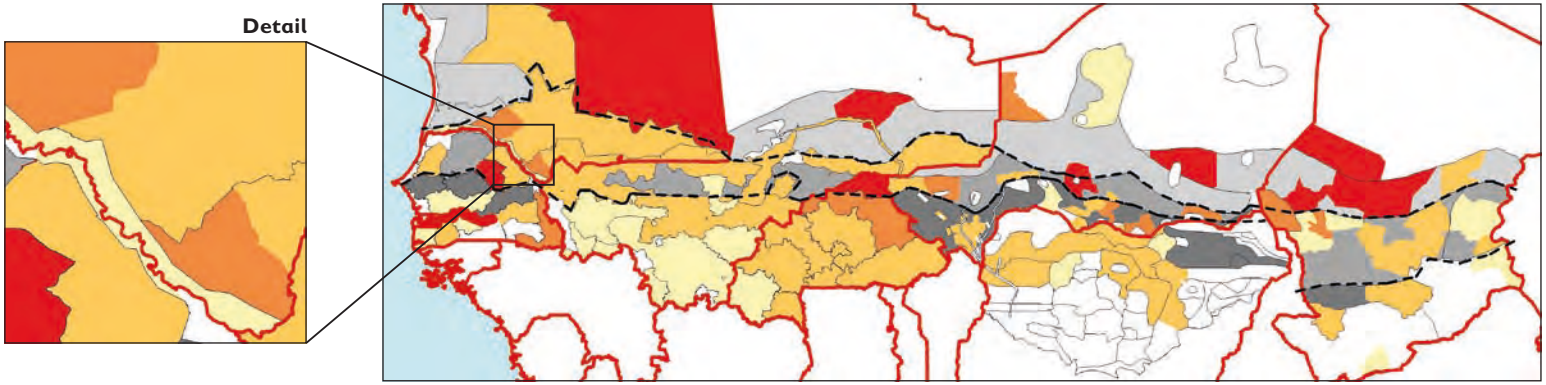
Average households



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.

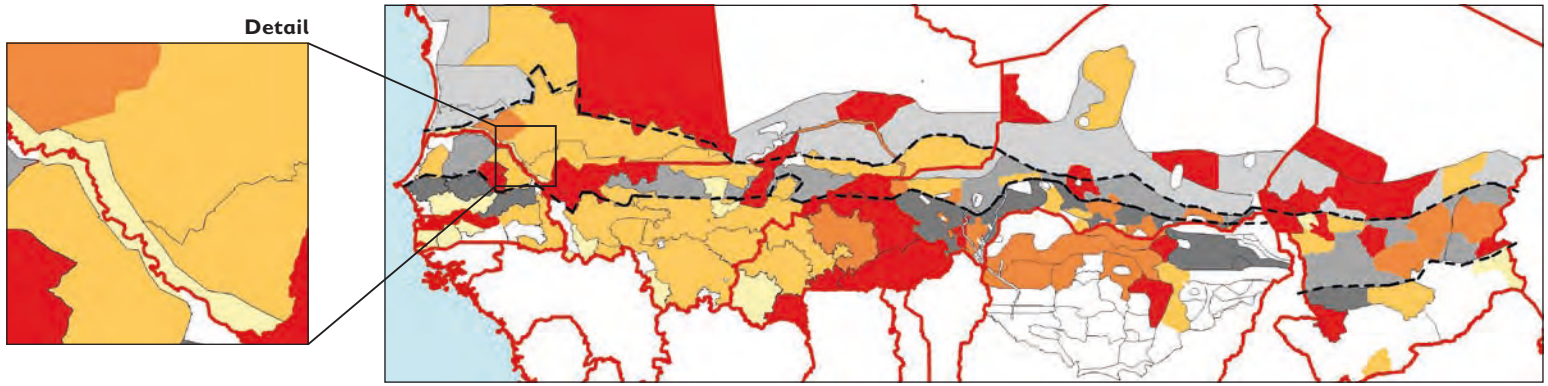
But then we see areas of the overall agricultural zone (ie, south of the agropastoral line) in the Average map, and more so in the Better Off map (especially in Burkina Faso), where ordinary farmers obtain one-quarter to one-half of their total annual cash income from livestock. There are two matching 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.

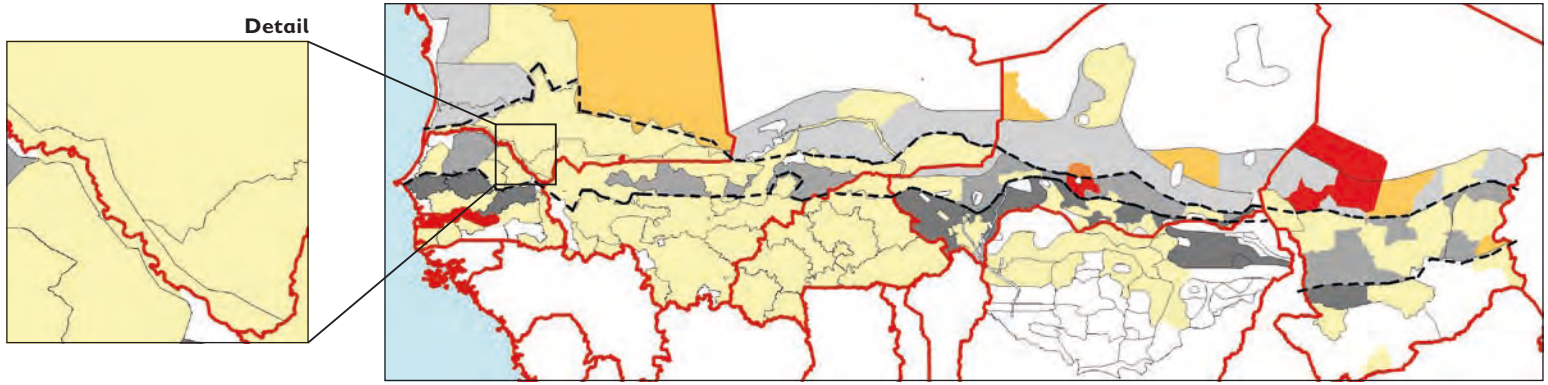
MAP 17: TOTAL INCOME FROM LIVESTOCK (FOOD + CASH)

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

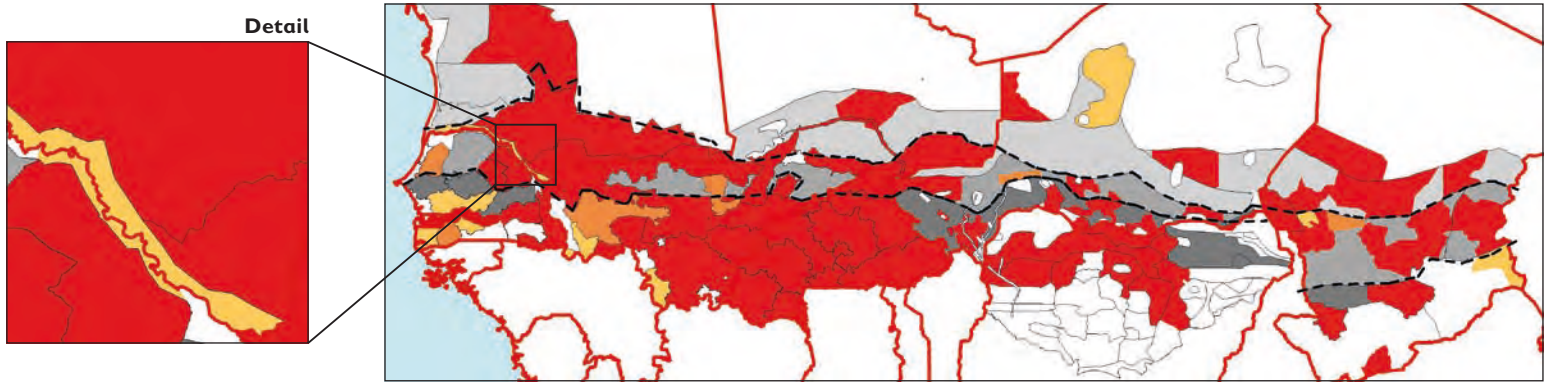
Average households



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 hiring 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.

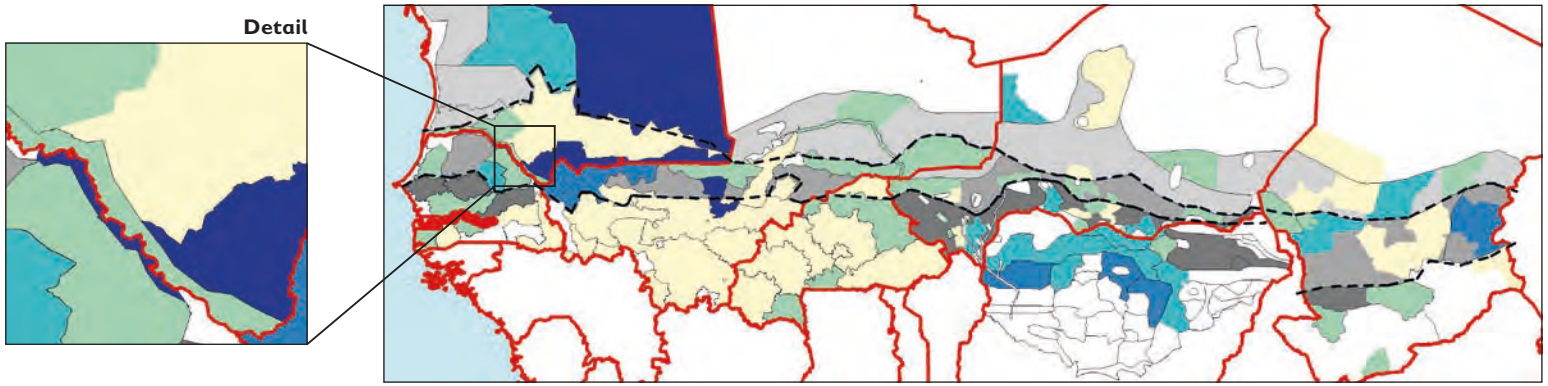
'Self-employment' is overall a lesser but still usually very important source of cash income. For poorer people this mainly means cutting and selling the firewood that nature offers, but also collecting and selling wild foods and other natural items; and it means brick-making, or selling handcrafts such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

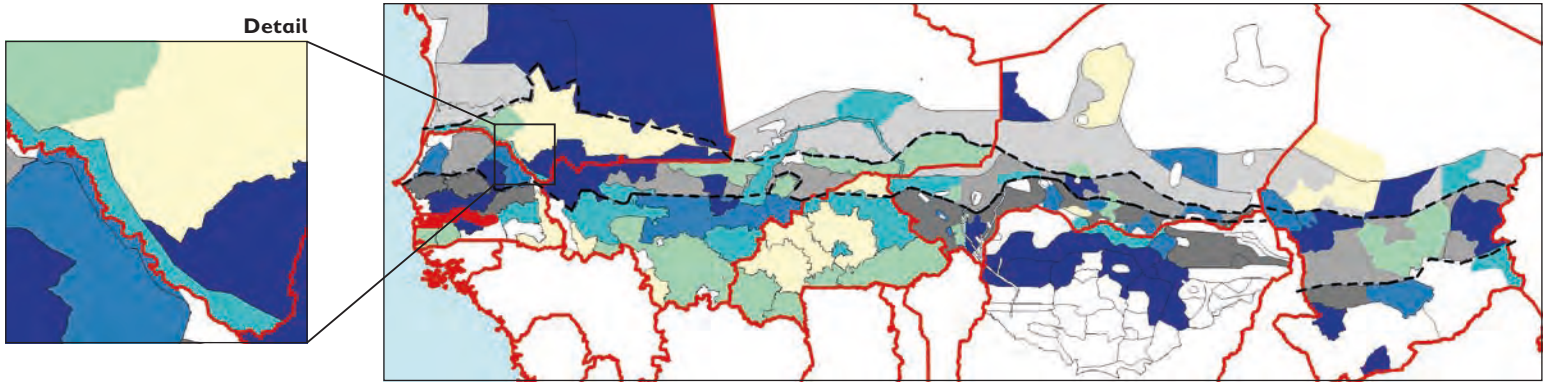
MAP 18: CASH INCOME FROM LOCAL LABOUR

(US$ per person per year)

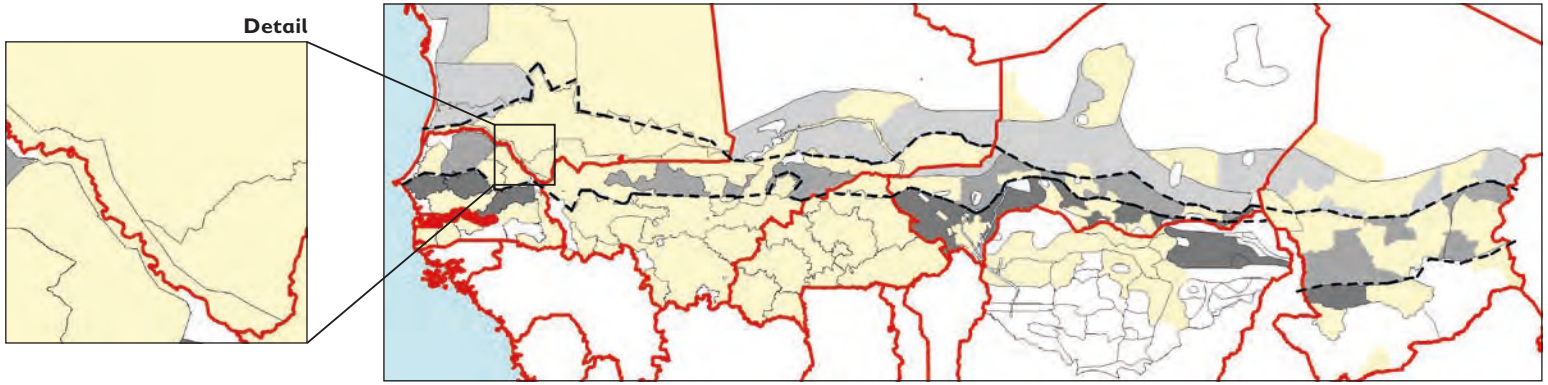
Average households



Very Poor households



Better Off households



LEGEND

US$ per person per year

- 1–10
- 11–20
- 21–30
- 31–40
- >40

COMMENTARY MAP 18: CASH INCOME FROM LOCAL LABOUR

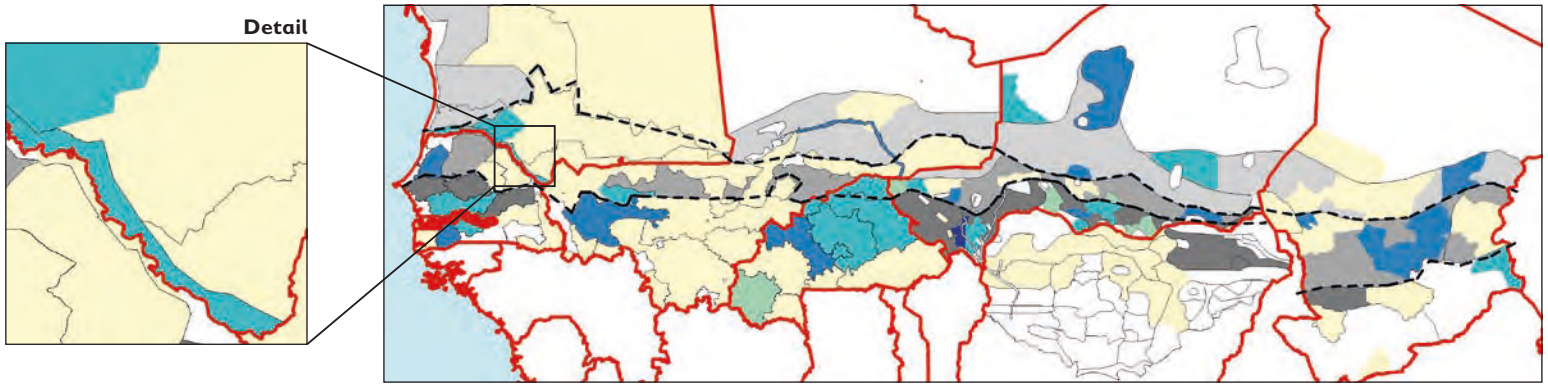
'Local labour' mostly means daily paid employment on the smallholdings of wealthier local farmers, or employment as contracted herdsmen in a pastoral group. Essentially, it is members of Very Poor and Poor households who engage in that type of work, which is generally one of their most important sources of cash. Better Off fellow farmers or herders 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 herders 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 herders' earnings from local labour may be counted as substantial. On the other hand, dependence on the patronage of a single employer makes herders 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.

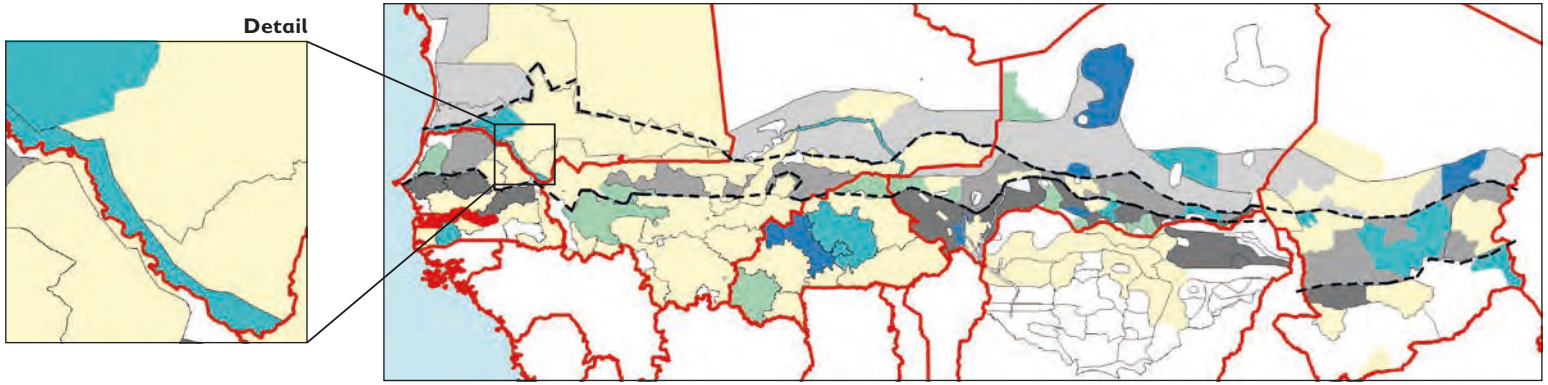
Moving to a contrasting scene, in the irrigated rice zone of the Office du Niger at Niono (ML07), to all intents and purposes a cash-crop area, the work is seasonal but the wages are far higher than in Tarkhint. This reflects not only the labour-intense production system and therefore the high demand 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

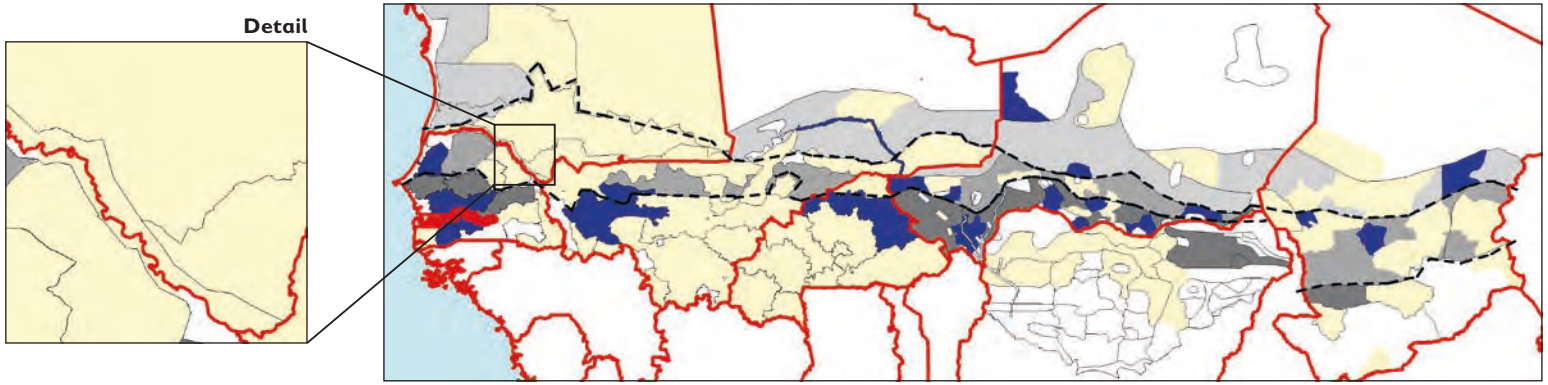
Average households



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 porterage, 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.

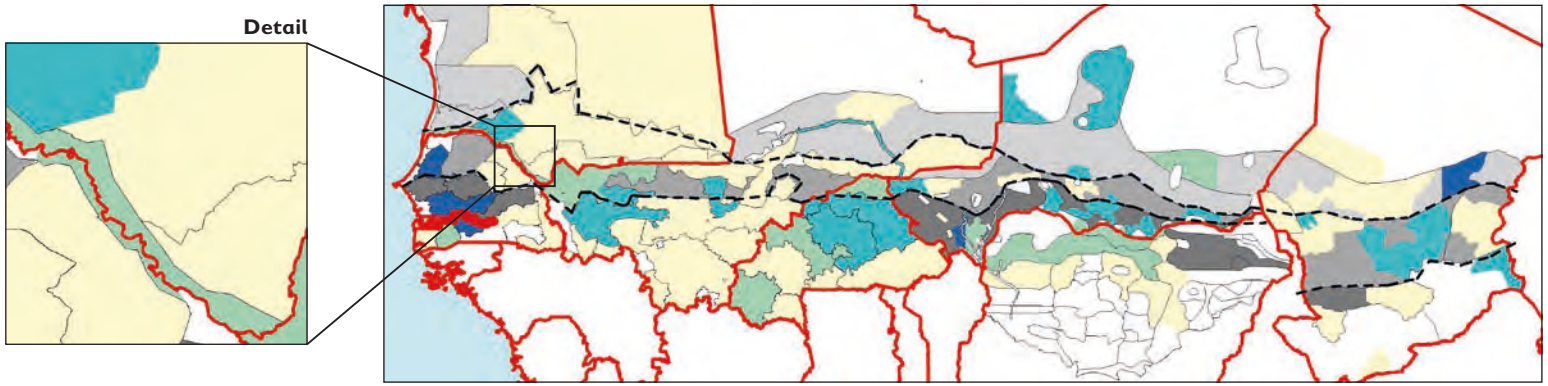
Two nearly proximate areas in western Niger (Tahoua – TLP, Tondiwiki – TON) are known for the villagers' greater tendency to migrate for work. Although it is said to be part of their history and culture, it is surely no coincidence that these are areas also known for poor production conditions and food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

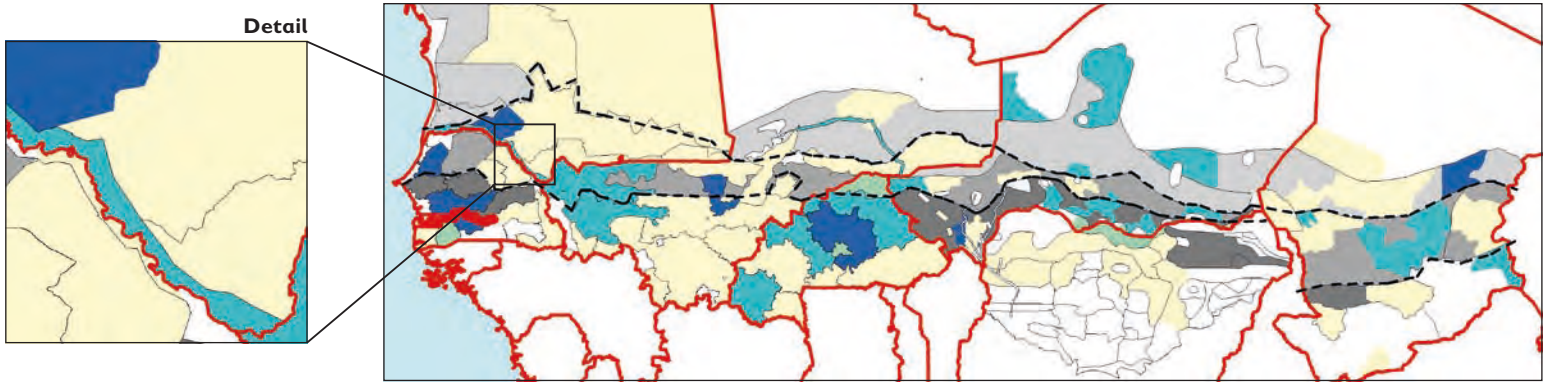
MAP 20: DURATION OF LABOUR MIGRATION

(Number of months per year)

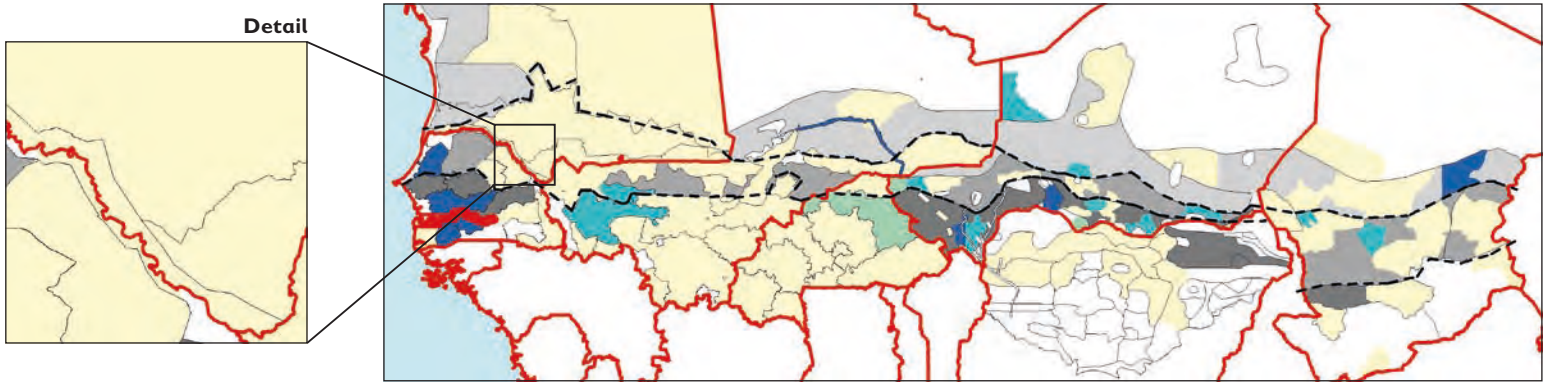
Average households



Very Poor households



Better Off households



LEGEND

Number of months of migrant labour per year

0
1–2
3–4
5–6

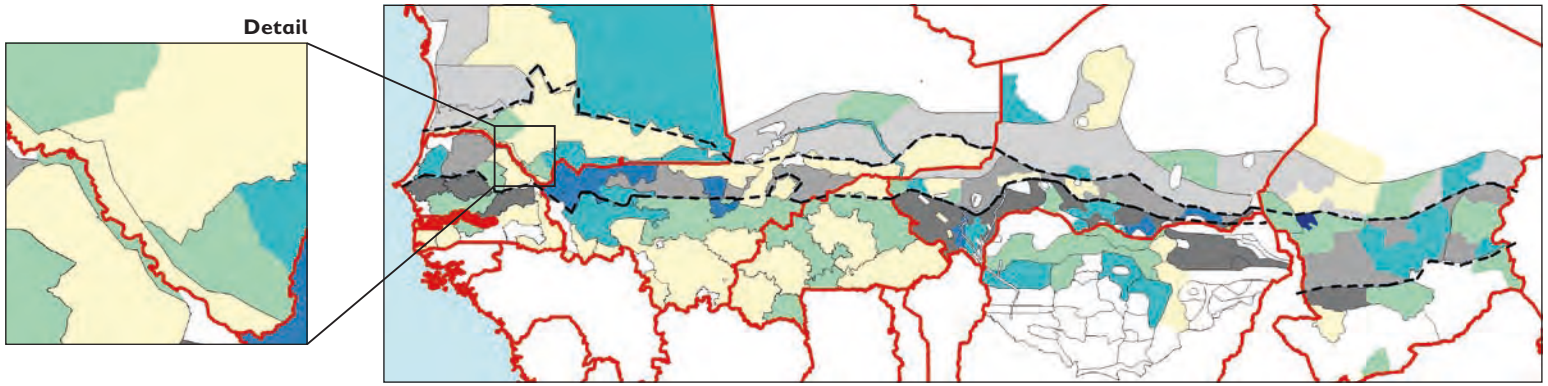
COMMENTARY MAP 20: DURATION OF LABOUR MIGRATION

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 Aïr 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.

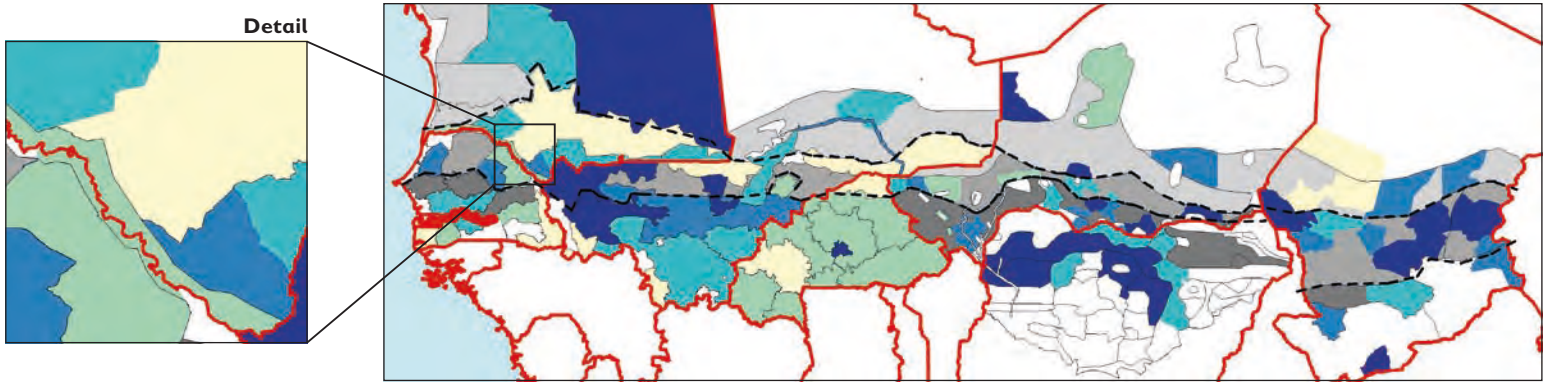
MAP 21: TOTAL INCOME FROM LABOUR (FOOD + CASH)

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

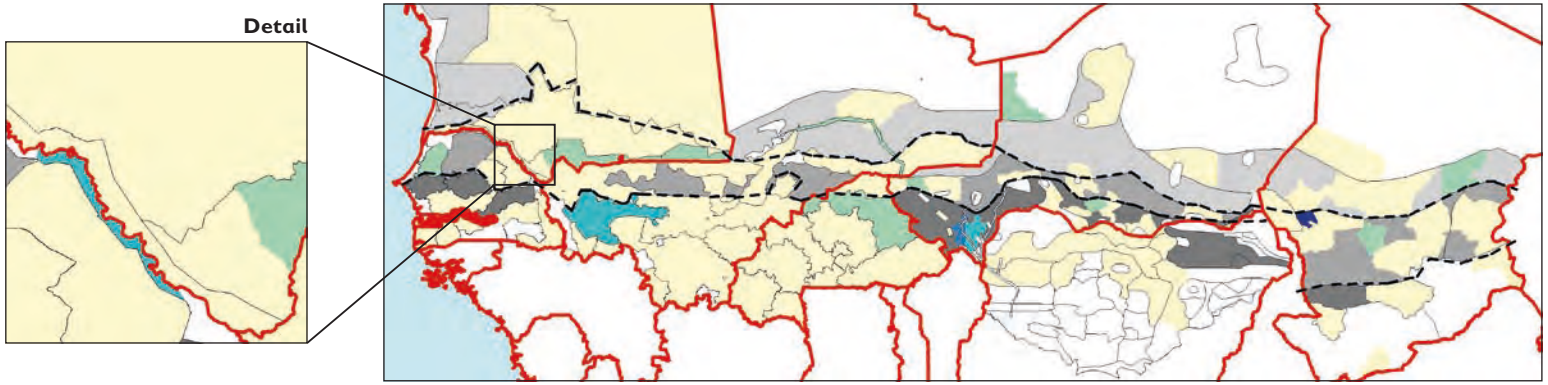
Average households



Very Poor households



Better Off households



LEGEND

% kcals

- 0–20
- 21–40
- 41–60
- 61–80
- >81

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.

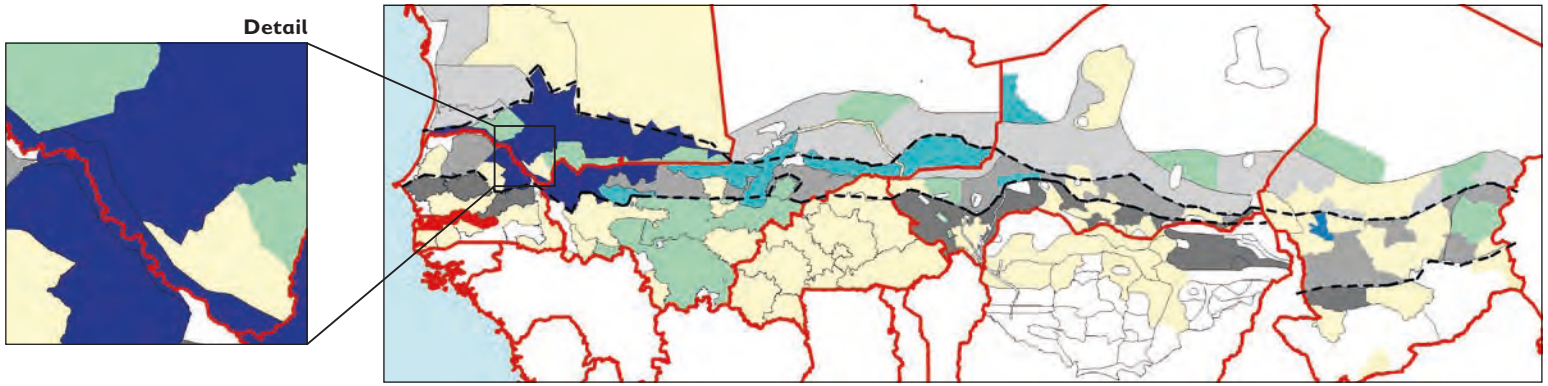
PHOTO: JUSTIN DOUGLASS/WORLD VISION

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

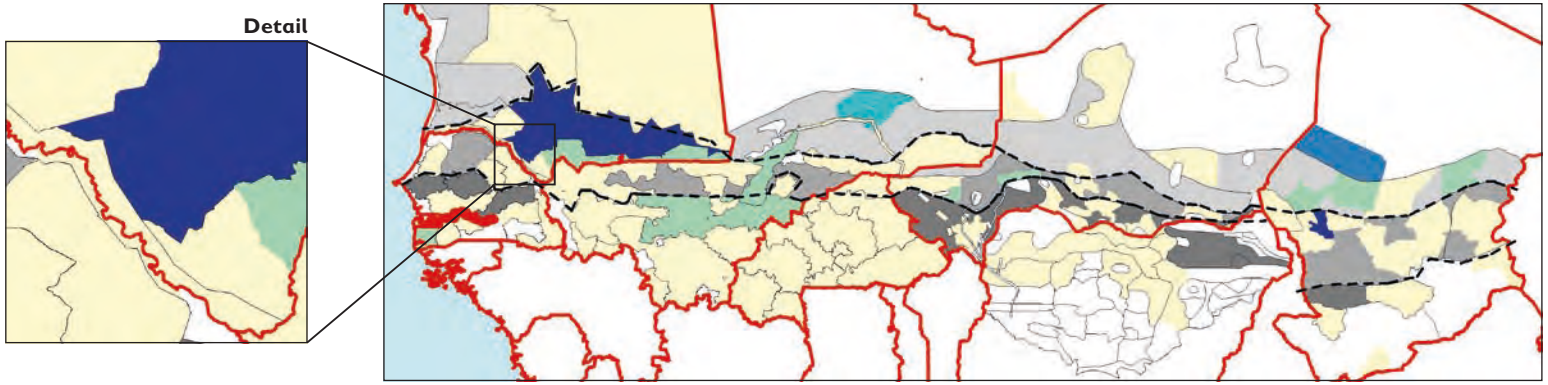
MAP 22: REMITTANCES

(US$ per person per year)

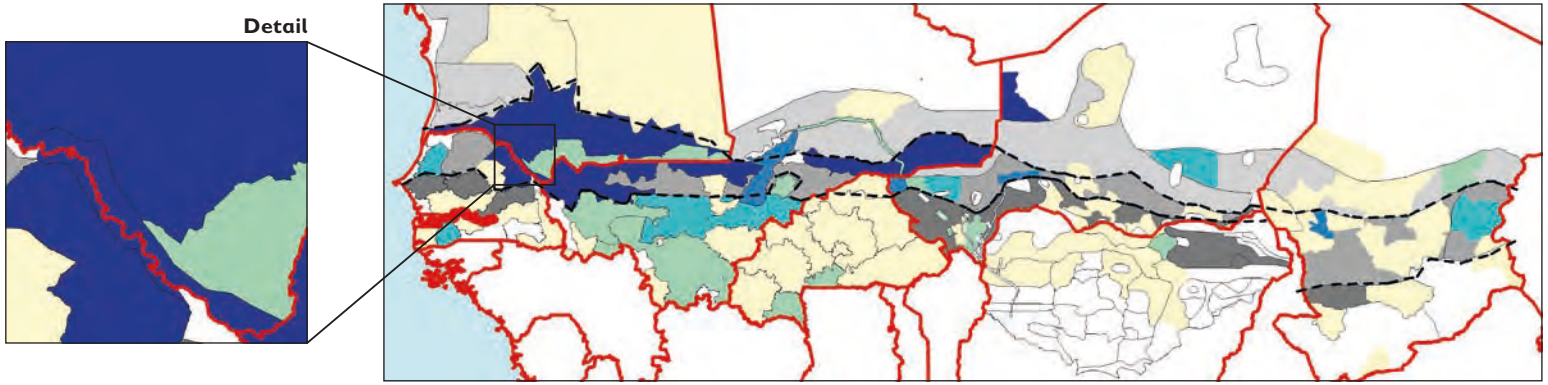
Average households



Very Poor households



Better Off households



LEGEND

US$ per person per year

- 0–15
- 16–30
- 31–45
- 46–60
- >60

COMMENTARY MAP 22: REMITTANCES

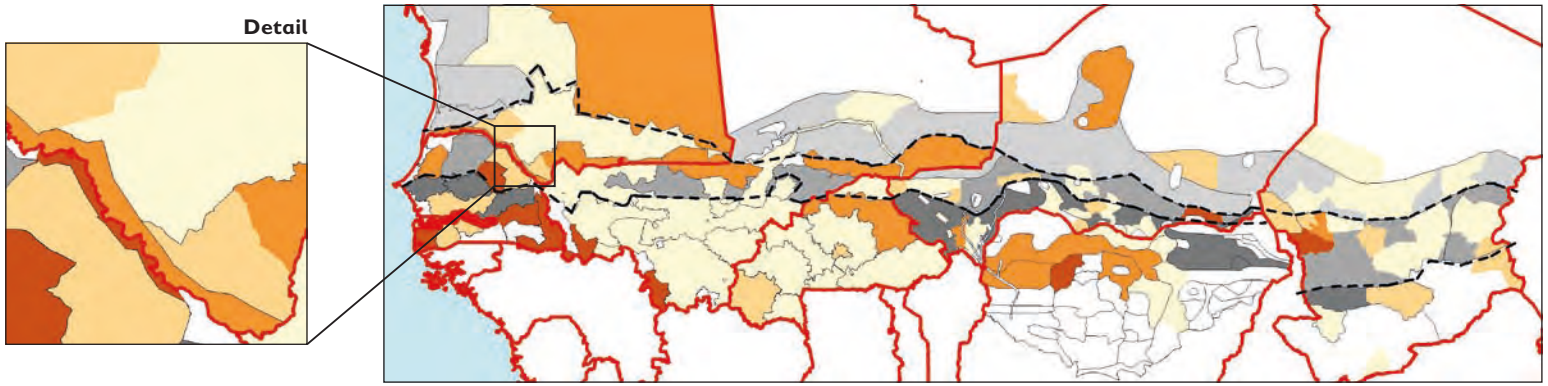
We have seen in Map 19 on migrant labour that Sahelians tend to operate in a much wider economic geography than their own zones, and this is also true in a different way for pastoralists, who may cover enormous distances on seasonal grazing migration, often crossing into neighbouring countries. But in 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?

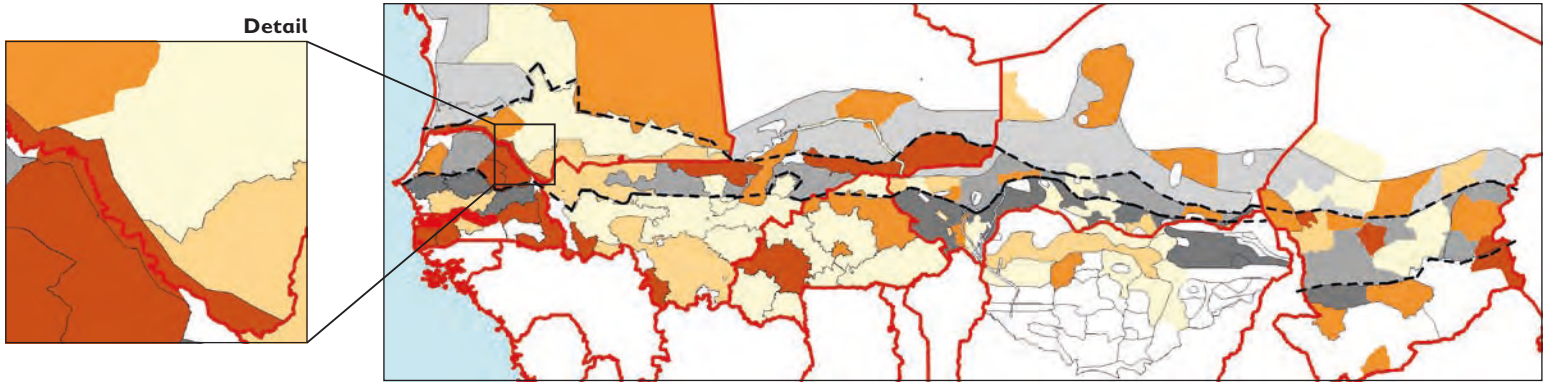
MAP 23: CASH INCOME FROM SELF-EMPLOYMENT

(US$ per person per year)

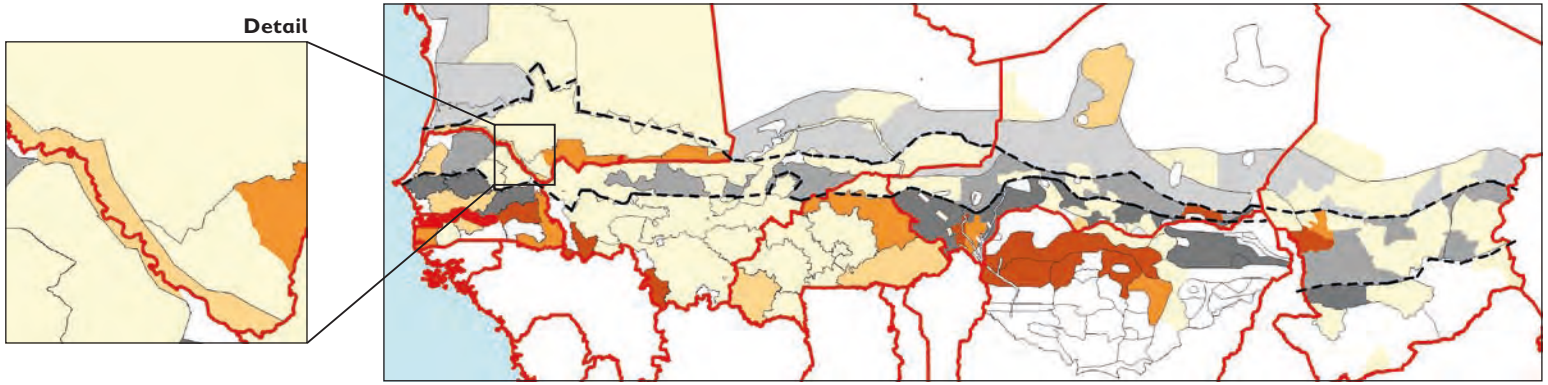
Average households



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.

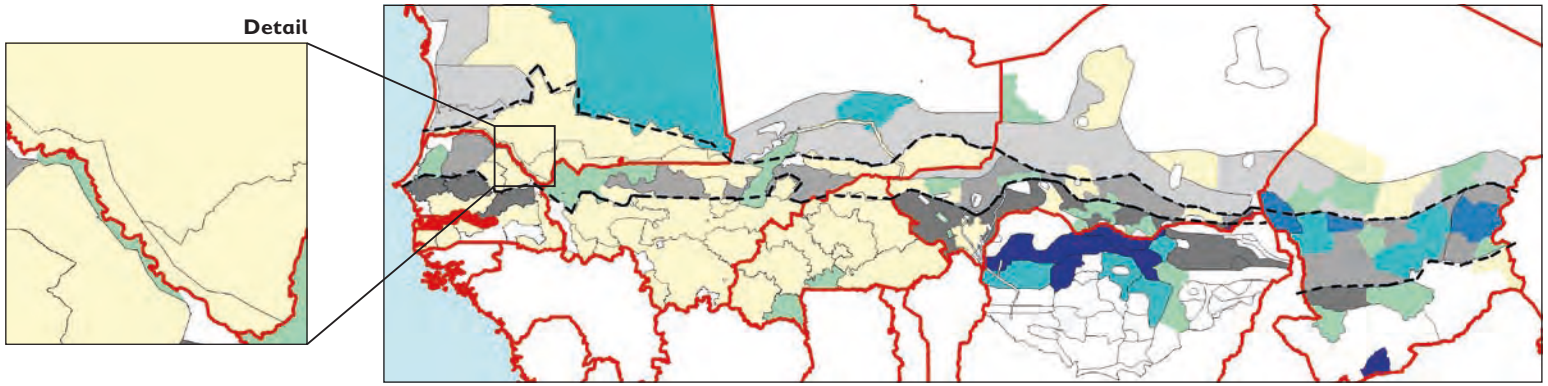
Wood is one 'free' resource offered by nature (although at the price of some labour). Depending on the ecology, other cut or collected items are fodder grasses, basketry reeds and bamboo. Among wild foods and products are baobab leaves and fruit (insofar as they are sold as well as consumed at home), other edible leaves, shea nuts (*karité*), locust bean (*néré*), 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.

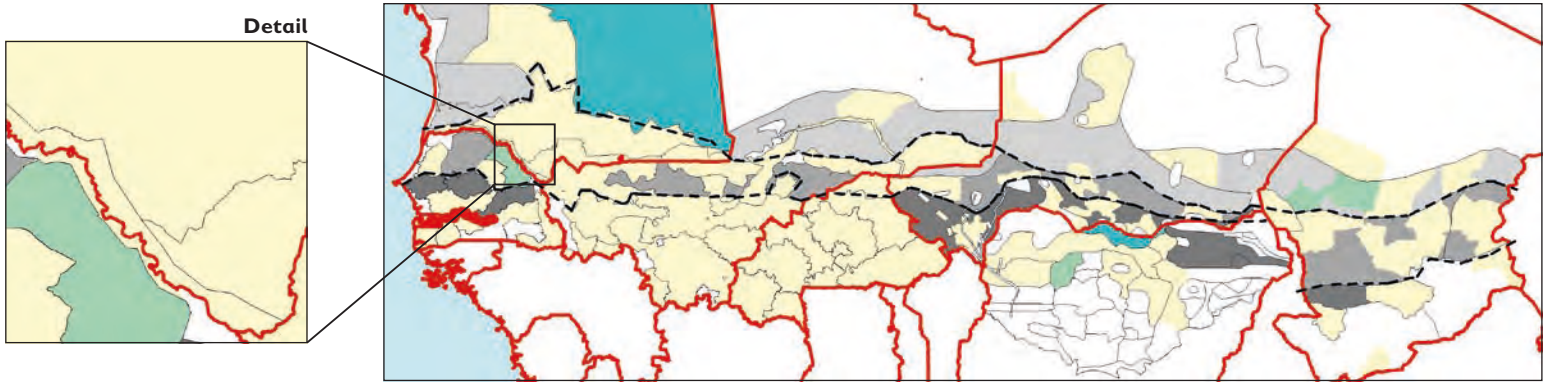
MAP 24: CASH INCOME FROM TRADE

(US$ per person per year)

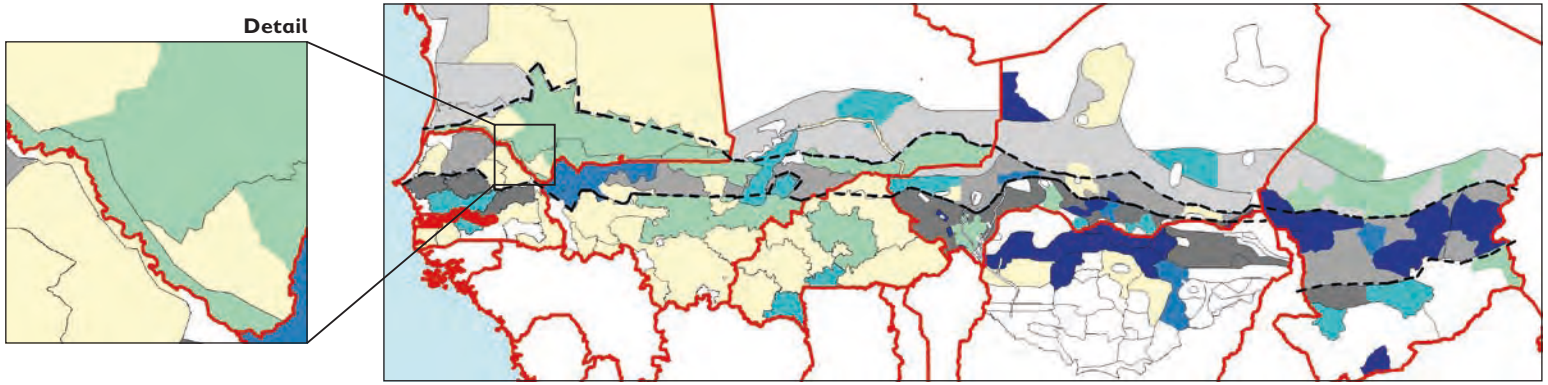
Average households



Very Poor households



Better Off households



LEGEND

US$ per person per year

- 0–15
- 16–30
- 31–45
- 46–60
- >60

COMMENTARY MAP 24: CASH INCOME FROM TRADE

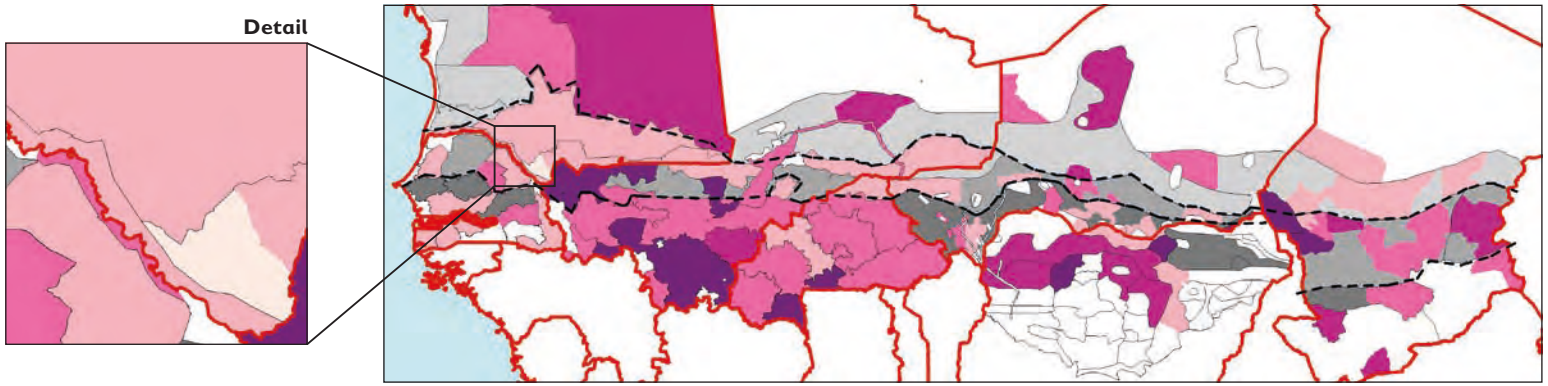
Trade here means the selling of items not produced by the seller. The trade might be on a very small scale, for instance carrying a small retail commodity between local markets to make a minimal profit on the difference in prices. But for someone else in the same village trade could be on a far larger 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'.

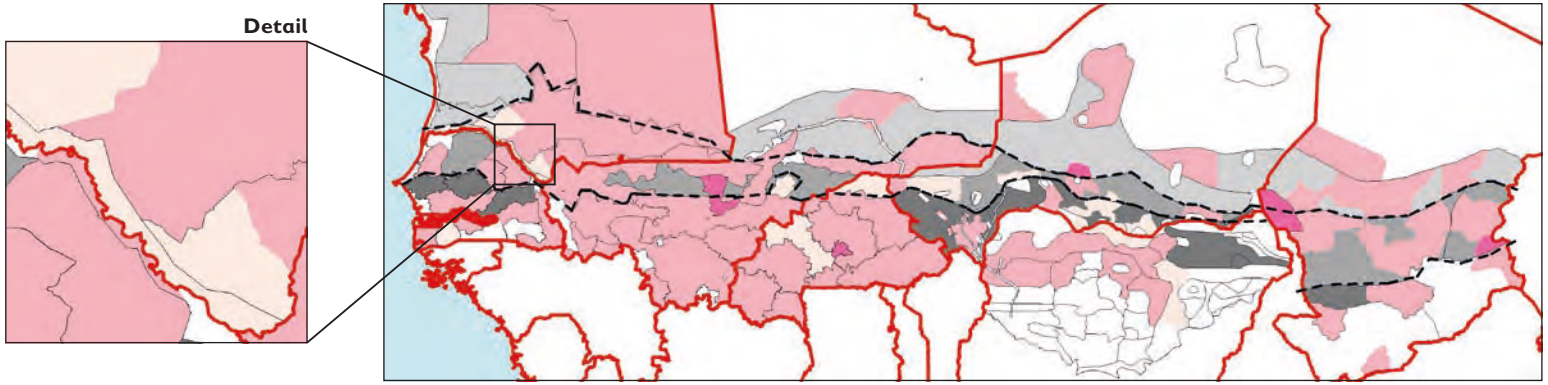
MAP 25: TOTAL INCOME FROM ALL SOURCES (FOOD + CASH)

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

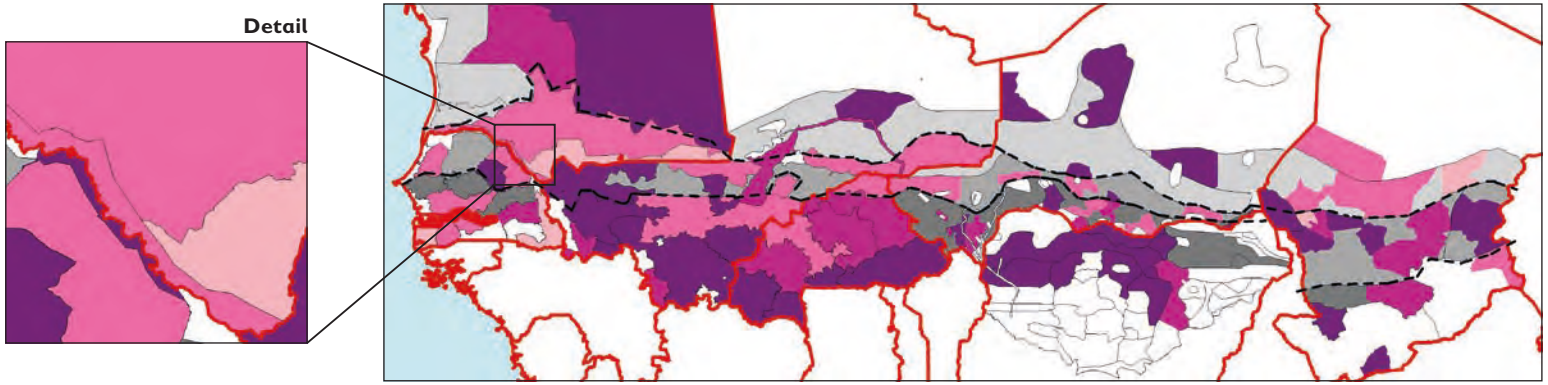
Average households



Very Poor households



Better Off households



LEGEND

% kcals

- <150
- 151–250
- 251–350
- 351–450
- >450

COMMENTARY MAP 25: TOTAL INCOME FROM ALL SOURCES (FOOD+CASH)[5]

What first strikes the eye is the tendency for the higher total incomes to be seen mostly in the far north and the far south, ie, in the more livestock-dominated areas on the one hand and the higher-producing agricultural areas on the other. This is true for the Average map, although clearer for the Better Off. The cash value of livestock and of surplus and cash crops evidently plays a major role here, and on the food side the greater self-sufficiency in the far south also plays its part. Of course the middle areas of the map trade in livestock, and consume and trade in crops; but the combination does not rival the northern and southern specialisms, so to speak, for total income. This is only a general pattern, however, and as always there are local variations to observe. For instance, in the Aïr Mountains zone (ACM) in the far north of Niger it is not livestock but the onion cash crop that dominates the economy, just as it is irrigated rice that dominates the economy of the Office du Niger zone (ML07) in the centre of Mali. And in zones along the Senegal River in Mali, Senegal and Mauritania the high remittances have their effect.

The pattern for Very Poor households is more or less flat. We might point to some tendency for the 'poorest' areas in terms of total income to be in the agropastoral band, but there are several exceptions to this, for instance, two large zones in Burkina Faso – Western Cereals and Remittances (ZME04) and North and East Livestock and Cereals (ZME7) – and the Riverine Rice and Transhumant Pastoralism zone (ML03) in Mali on the northern arc of the River Niger. At the same time, there is a handful of highly contrasted zones where the Very Poor have slightly higher total incomes. For instance, households in the Ouagadougou Peri-Urban in Burkina Faso (ZME6) benefit from their proximity to the city for employment and for high prices for produce they sell directly in town. And in the Lake Chad (TD08) zone in western Chad poorer people have the advantage of a balanced income: they produce significant crops for consumption and sale, and they find substantial employment on the irrigated or flood-retreat 'polders', and even engage in share-cropping.

[5] See the Map 12 commentary for an explanation of 'total income'.

5 How households spend their money

For pastoral households everywhere, even the wealthiest, the position of milk and meat as their source of calories is far outweighed by that of purchased grain. For the poorer ordinary farming and agropastoral households also, we have seen the importance of purchased food for their survival. But that food is not only staple grain. For a minimally balanced and palatable diet, vegetables, oil, dried fish, sugar, etc are also important – but so expensive that expenditure on such items can sometimes outweigh expenditure on staples. Their cost will, at the least, be a limiting factor for purchasing staples above the bare minimum to keep a family going. In other words, as 'cost of diet' studies in some of the zones have shown in more detail, one way or another poorer people often cannot afford a diet that is at the same time sufficient in calories and properly balanced in micro-nutrients.

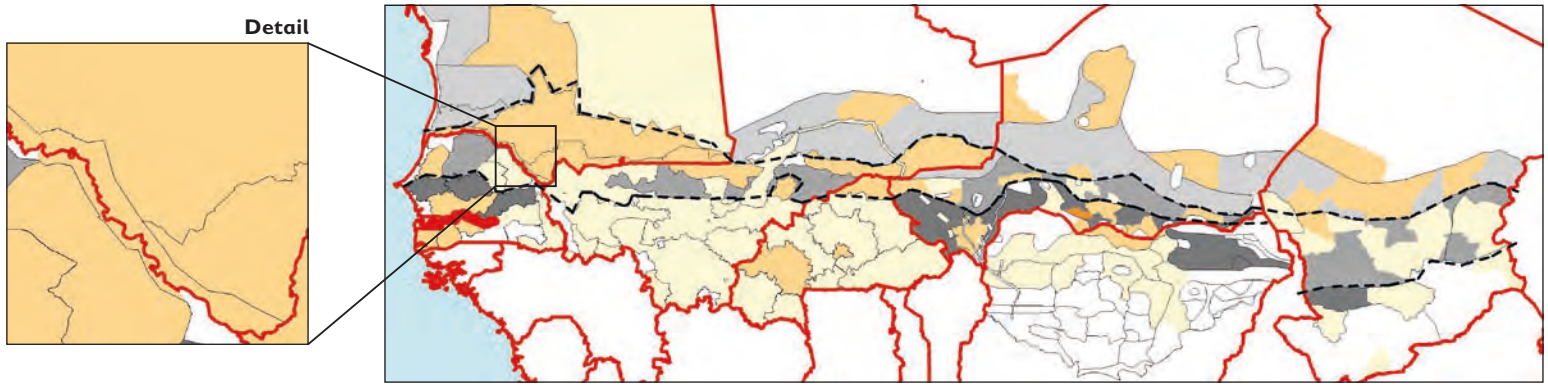
In normal years, then, this is not starvation. But it is hunger – the hunger of sheer poverty. And yet here is a surprising fact: expenditure on staple foods even by the Very Poor is rarely above 50% of their total household expenditure, more often around 30%. And apart from communities in pastoral and some northern agropastoral areas, if we add the non-staple foods, their expenditure on all food is rarely above 60% of total expenditure. But this is not a testament to a high standard of living: on the contrary, it means that all non-food expenditure, also essential to keep up lives and livelihoods, weighs heavily upon household capacity to spend on food.

We do not attempt here to draw a conclusion about policy; rather we suggest that the evidence presented throws a particular light on how livelihoods operate, and on the constraints of household budgets so marginal that there is simply no room for manoeuvre. The factors that make for poverty are so intertwined that it is difficult to separate out individual elements that might be tackled alone in order to make poor people richer – or at least allow them to afford to eat better while maintaining a basic livelihood. For the great majority of rural populations, any likely level of development investment will be very small in relation to the total of transactions that constitute an economy and the great shifts towards mechanisation, if not industrialisation, and urbanisation. But in a shorter-term and more modest perspective there is at least the scope to help protect livelihoods: to help poorer people hold on to what they have now in land and to maintain its quality, to continue to keep at least a handful of livestock, and to market advantageously what they produce. This means that essential expenditure must at least be sustainable, not only in 'bad' years but as a basic condition to enable people to take advantage of economic opportunities that could increase their prosperity. In this respect, the tendency of the Very Poor, often living on what might be termed 'hunger budgets', to sacrifice even 3% of their annual expenditure on education for their children surely constitutes a message to policy-makers about their own judgement of the greatest priorities for development investment.

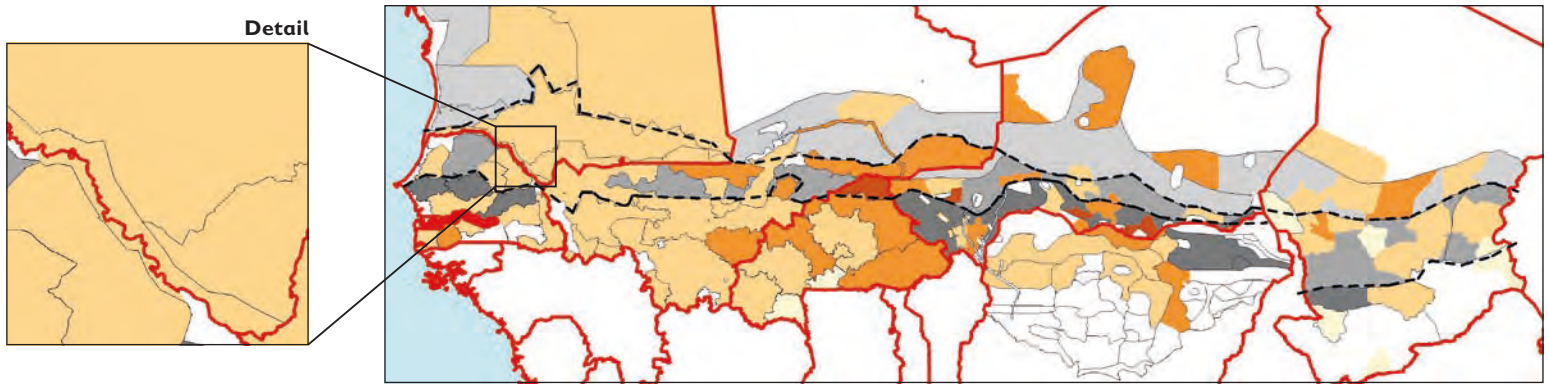
MAP 26: EXPENDITURE ON STAPLE FOODS

(Percentage of total cash expenditure)

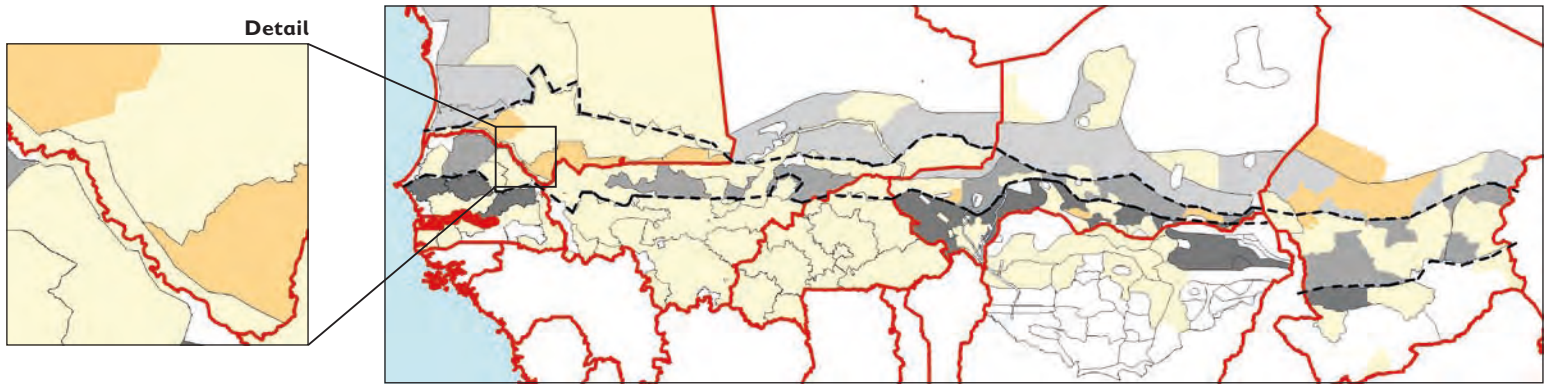
Average households



Very Poor households



Better Off households



LEGEND

% total cash expenditure

- 0–20
- 21–40
- 41–60
- >60

COMMENTARY MAP 26: EXPENDITURE ON STAPLE FOODS

At first glance these maps seem to belie the very first map results presented (Map 5) concerning dependence on the market for food. Why are the Very Poor, at least, not spending a great deal more of their budget on basic food? The short answer is that the prices of common staples (ie, excluding imported rice) allow them to fill the basic food gap from the market without usually spending more than around 50% of their total annual budget, and very generally nearer to 30%. That is just as well, because the rest of their very marginal budget is needed for the other basic essentials of life, starting with non-staple foods for a minimally acceptable diet (see Map 27).

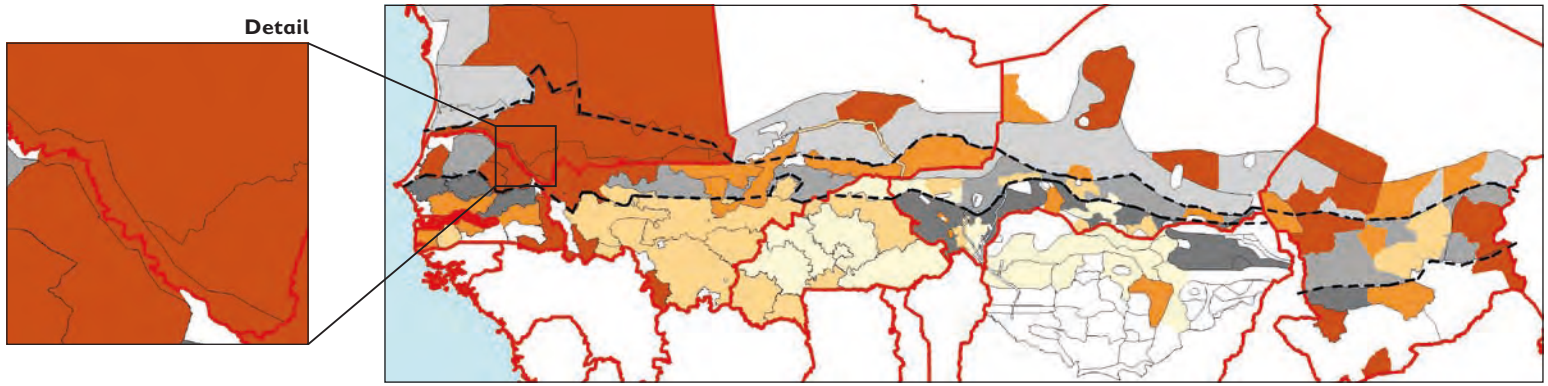
Looking at the zones where the Very Poor spend 40–60% of their budget on staples, it is easy to understand why they are concentrated in the pastoral areas where there is no crop production and in agropastoral areas where the poorer households produce very little grain. It is perhaps more surprising to see how modest by comparison is the expenditure of Better Off pastoralists on the cereals they must buy to survive. To take the case of the Better Off in the Gouré pastoral area in Niger (GPA), we see that they spend around 20% of their budget on grain and 15% on other foods. But they get nearly 30% of their calories from the milk of their cattle and camels. And it is true that they have far larger earnings per capita than the Very Poor, yet only about the same requirement for basic food per capita, so that food expenditure will naturally be less in proportion than for poorer people. But it is interesting to consider what else they need to spend money on. Dominating the list are the costs associated with keeping their large herds: the costs of hiring herdsmen, of purchased fodder, of watering fees, of veterinary drugs, and potentially of purchasing one or two new animals. All this adds up to somewhat more than they spend on basic food. Then they spend almost as much on tea, salt, spices, the stimulant cola nuts, firewood, soap, torch batteries and other household items as they do on non-basic food.

We find no ready explanation for the exceptional staples expenditure of the Very Poor in half the zones of Burkina Faso; and although the agropastoral North Transhumant Pastoralism and Millet zone (ZME8) is markedly more *pastoral* than *agro*, it is not clear why this should be almost the only zone on the map showing the Very Poor spending more than 60% of their budget on staples. But it is true that this is a comparatively low-income area, so that a greater proportion of particularly limited budgets will be spent on essential food. By comparison, the Very Poor of the cattle-rich *ferlo* zone (FER) spend a smaller proportion of their money on staples; but here, poorer people are relatively well paid for contract herding and, equally, they make money from selling wild products. The role of payments in-kind (direct payment in food for casual work) in substituting for market purchase must also provide at least part of the explanation for the handful of zones where the Very Poor spend only 20% or less of their total budget on staple foods. In southern Mali, for instance, in the productive Millet, Sorghum and Cotton zone (ML10) poorer households obtain up to 20% of the calories they consume from payments in-kind on top of consuming nearly 40% of their calories from their own fields, in itself an unusually high proportion for this wealth group. In the Tessaoua agricultural area of central Niger (TSU) the Very Poor obtain nearly 30% of their basic food from payments in-kind, as against only 25% from their own crops. But they still have to spend 55% of their budget to buy cereals.

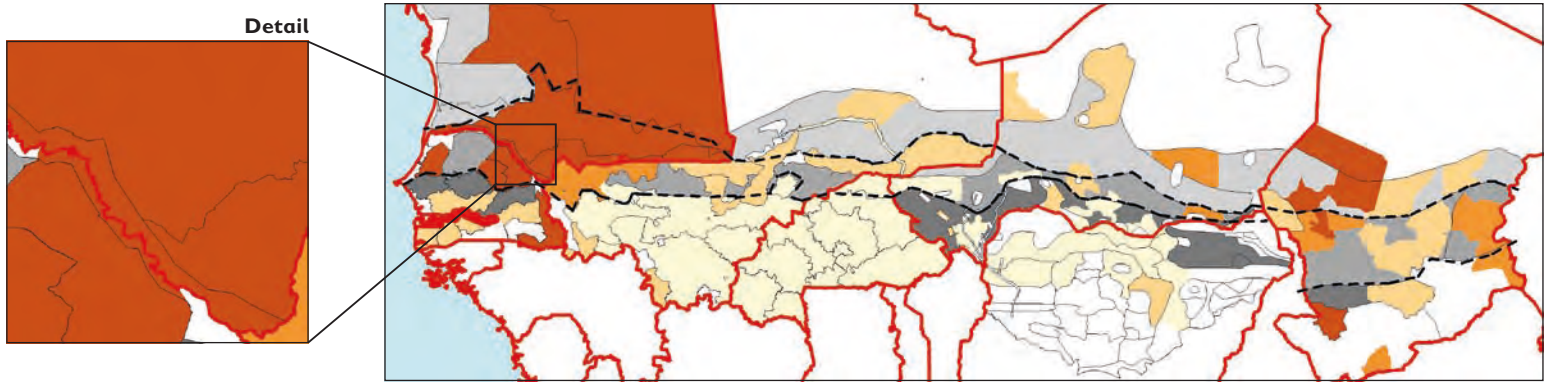
MAP 27: EXPENDITURE ON NON-STAPLE FOODS

(US$ per person per year)

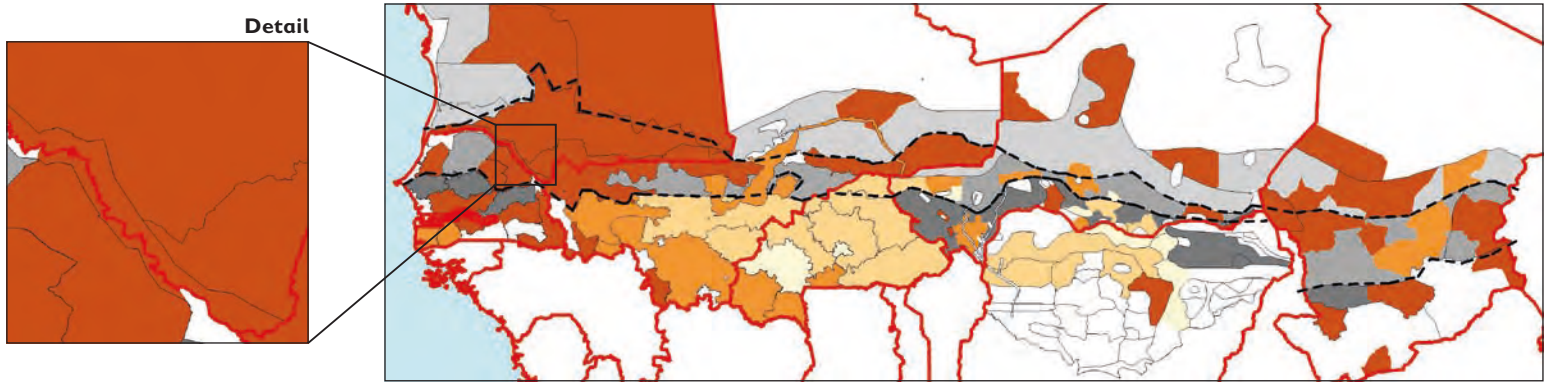
Average households



Very Poor households



Better Off households



LEGEND

US$ per person per year

- 0–15
- 16–30
- 31–45
- >45

COMMENTARY MAP 27: EXPENDITURE ON NON-STAPLE FOODS

People cannot live on staple foods alone, except in an emergency. Non-staple foods are crucial for a healthy diet and for palatability – for living as a human being. The items commonly include pulses, vegetables and fruits, dairy, meat, dried fish, oil and sugar. The lower expenditure by poorer people, though hardly surprising, is an indication of a less-than-adequate dietary balance[6] and of a lower quality of life. In general, the proportion of poorer households' budgets devoted to non-staple foods is lower than among wealthier households, but it is a far from negligible expense for them.

Geographically, we see a north-south divide in the amount people spend on non-staple foods. Prices in the markets of remoter areas tend to be higher than in markets nearer to the centres of commerce, but the pattern is not consistent between commodities and locations, and not all localities of high expenditure in the maps are remote from big markets. The main drivers of the difference in expenditure are the amounts of sugar and oil consumed. Sugar consumption is especially high among some pastoralists: in the study of Aïoun pastoralists in Mauritania (MR01) it was found that all wealth groups consumed around 15% of their calories in sugar. But the record of 19% is held by the Better Off in the Senegal River Valley Outmigration and Remittance Walo livelihood zone (MTW) in Senegal.

In general, high oil consumption follows the high sugar geography, and the same Senegal zone holds the same record at 19% of household calories from oil for the Better Off. But meat expenditure can be very high, too, although this is not consistent across the geography; even poorer households spend significant sums (for them) on meat, although the actual amounts are very small, given their small overall budgets. Rural high-remittance areas have an almost urban feel to them in the way wealthier people spend money on non-staple items. In Yelimane (YEL) in Mali their expenditure on meat (2% of household calories) is 80% of the cost of sugar and oil combined (19% of calories), while expenditure on bread (baguettes purchased from bakers, again 2% of calories) very nearly matches that on oil (9% of calories).

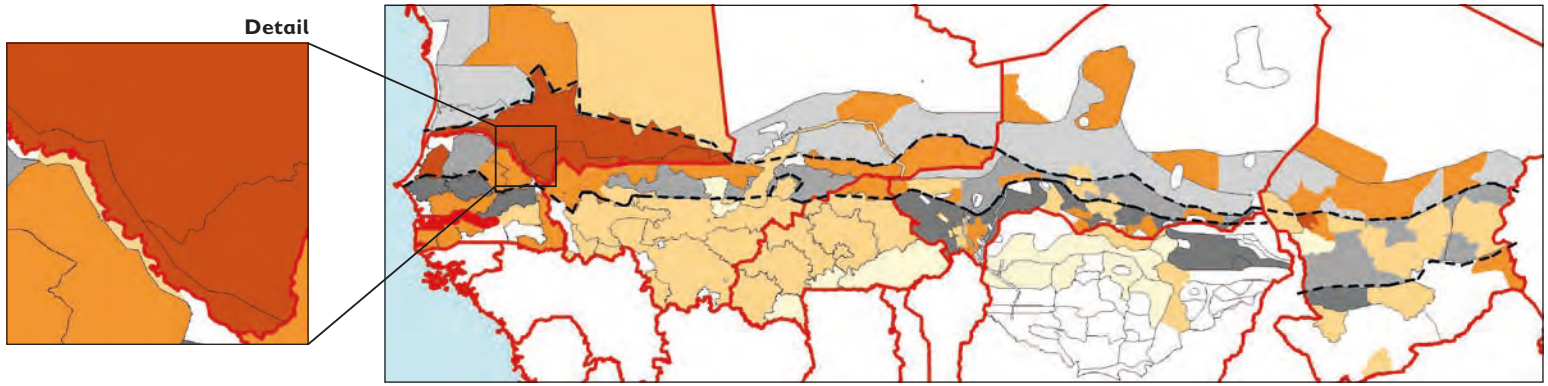
These figures compare with 1–3% of calories from sugar or oil consumption among the Better Off in ordinary agricultural locations further south. It is true that they may have their own oil seeds (groundnuts, soya and sesame). And in terms of overall non-staple food expenditure they tend to have an advantage over northerners in terms of vegetables, at least. Unlike semi-arid areas, in the more humid agricultural areas even poorer people tend to grow some of their own vegetables and condiments, often in a small kitchen garden maintained by women, who may also have a certain amount of land for their own production and potential income. In many localities too there are important areas of depressions (*bas fonds*) or temporary natural ponds that maintain soil moisture into the cooler dry season. These are usually devoted to market gardening, aimed at an urban market where transport will allow, but also offering vegetables locally at cheaper prices to avoid losses of this perishable produce. Dried vegetables, notably tomatoes and okra, as well as dried chillies and peppers, find their way to distant markets, sold by traders at prices reflecting transport costs and popular demand.

[6] This balance is quantified in nutrient terms in Cost of Diet studies available from Save the Children UK, and measured in a different way in various World Food Programme food security surveys.

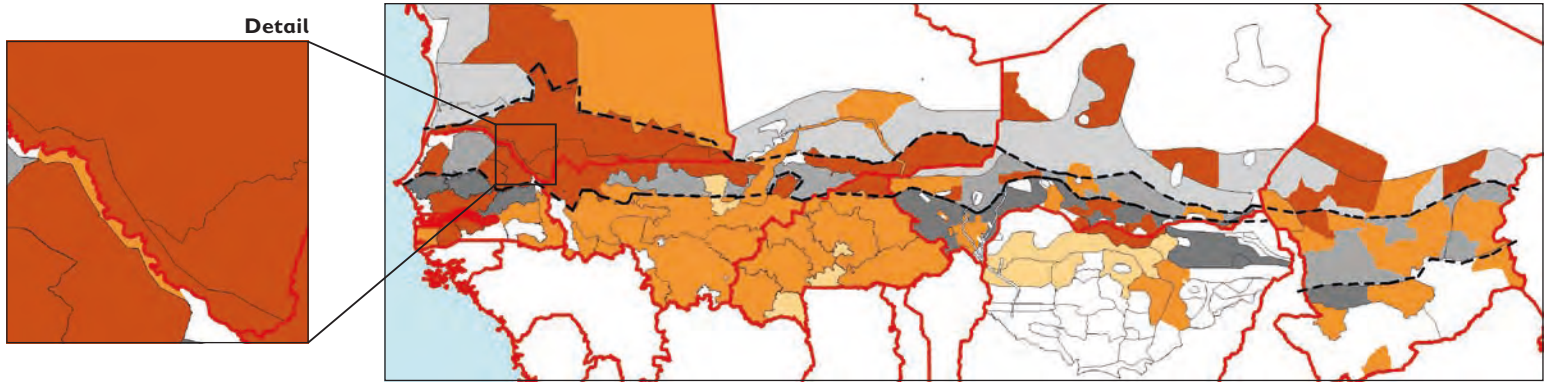
MAP 28: TOTAL EXPENDITURE ON FOOD

(Percentage of total cash expenditure)

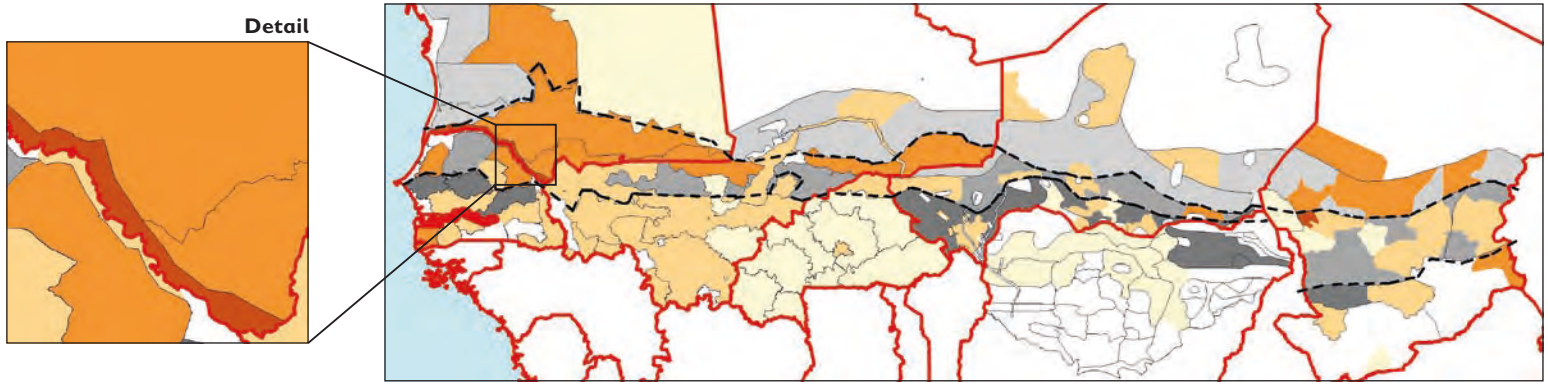
Average households



Very Poor households



Better Off households



LEGEND

% total cash expenditure

- 0–20
- 21–40
- 41–60
- >60

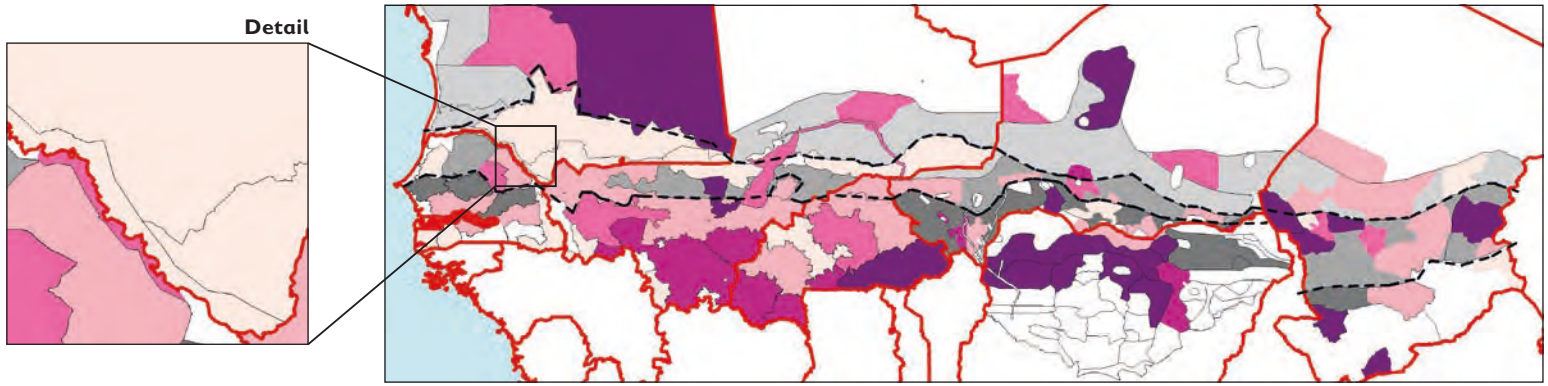
COMMENTARY MAP 28: TOTAL EXPENDITURE ON FOOD

If we take account of the previous two maps on staple and non-staple foods, the present combined picture seems to be substantially influenced by non-staple food expenditure, notably in the northern parts. But the Average map shows a clear and expected northern pattern for higher total expenditure on food, and this is accentuated in the Very Poor map for both pastoral and agropastoral areas. A crop-producing zone where the Very Poor have particularly high total food expenditure is in northern Nigeria, the Millet and Sesame zone (NG04), the northernmost and most sahelian of the studied Nigerian zones. On the other hand, the zones south of NG04 stand out for relatively low total expenditure on food, and part of the explanation for this contrast is certainly that the Very Poor in these zones are able to be twice as dependent on their own cereal production as the Very Poor in NG04. Here, there is a generous mix of food crops by comparison with most zones in the sahelian belt of the region: sorghum, millet, maize, rice, groundnuts and cowpeas. But to the east in Bauchi North-East State, the North-Central Maize, Sorghum and Cotton zone (NG29) and North-East Millet, Cowpeas and Sesame zone (NG19) are again in a dryer, more sahelian ecology, especially the latter, and it cannot be a coincidence that, with NG04, they are also higher in total expenditure on food than generally among the Nigerian zones surveyed. In fact, here the Very Poor cultivate very little land by local standards, and although it does give them 40% of their calories, they have minimal income from crop sales and virtually none from livestock, and little else to do but work for others. Even by the standards of the Sahel countries proper there is here an extreme skewing of overall income between the poorer and wealthier households.

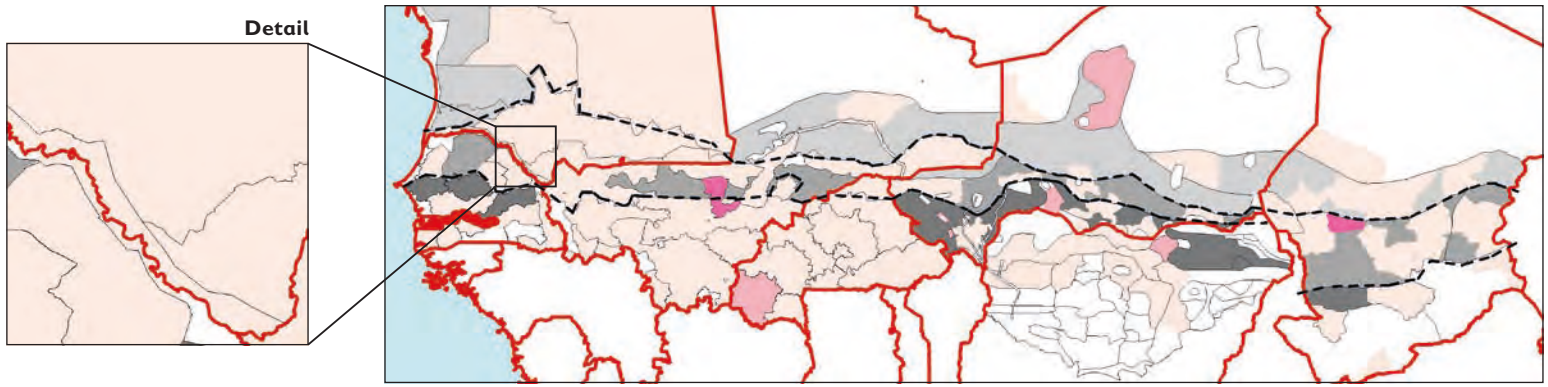
MAP 29: EXPENDITURE ON INPUTS

(US$ per person per year)

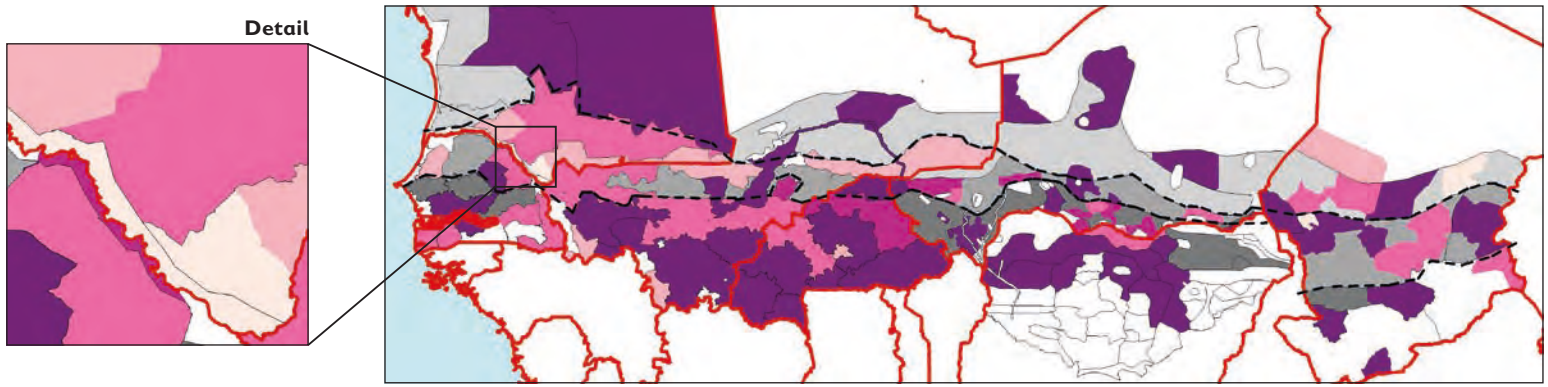
Average households



Very Poor households



Better Off households



LEGEND

US$ per person per year

- 0–15
- 16–30
- 31–45
- 46–60
- >60

COMMENTARY MAP 29: EXPENDITURE ON INPUTS

Of all the maps in this Atlas, it is here that we see perhaps the most stark difference between poorer and wealthier people across the whole geography. This is undoubtedly because poorer farmers have less land and far fewer livestock to spend money on than wealthier farmers, and poorer pastoralists similarly have far fewer animals than the wealthier. Very generally, the *proportion* as well as the absolute amount of expenditure by poorer people is distinctly smaller than among the wealthier; and this is an indication that their own opportunity cost calculations make them unwilling to invest more than the essential minimum in such land and livestock as they have. This seems to be the case from the far south-east of the region in the Southern Staples and Cash-crop zone (MDL) of Chad to the far north-east in the Mixed Pastoral, Oasis and Wadi zone (ML03) of Mauritania (where the Better Off irrigate their precious date-palms using motor-pumps).

Going for a moment beyond the maps, we may look for more detail in the HEA database. We take the case of Dosso (ADC) in south-west Niger, part of the general rainfed agriculture belt where production conditions are reasonably favourable by Sahel standards and where in the reference year rainfall was satisfactory. We find that comparing the Poor (not even the Very Poor) with the Better Off, there is a clear picture of extreme differences in expenditure on inputs. The typical household size of the Better Off is 20 people, that of the Poor is nine, and so the differences below need to be roughly halved if a 'per capita' view is taken. But it hardly matters given the disparities. In the reference year the Better Off cultivated five times more land than the Poor. They spent 17 times more money on agricultural inputs, of which by far the greater part went on hiring workers, who certainly included some of their Poor and Very Poor village neighbours, who in turn spent nothing on hiring workers. The Better Off spent over seven times more cash on livestock upkeep than the Poor, or 18% of their total annual expenditure compared with 4% for the Poor. But there is one further element: the typical Poor household in the reference year did not increase its number of livestock, which amounted to a handful of goats. But the Better Off typically upgraded their cattle, for instance by selling two of their herd and spending extra money on buying a couple of more valuable ones. With births and deaths and slaughter included, they ended the year with 16 instead of 14 cattle. In fact, their sales income from livestock was considerably greater than that from crops.

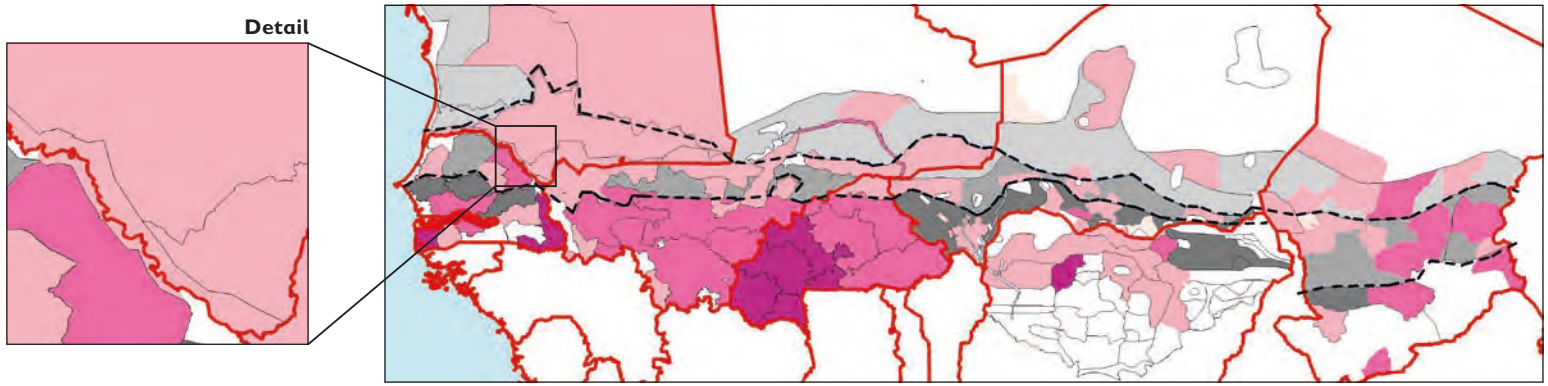
The story is, therefore, of the Better Off apparently operating in a benign cycle where input investment in cultivation promotes profits from the harvest (savings through high self-sufficiency in food, and cash from surplus sales), and these profits are put inter alia into cattle as a productive repository of wealth. Of course the cycle may be interrupted in a year where rainfall is poor, and there is always the possibility of losing cattle through illness or theft. The Poor have no net profit, it seems, either from cultivation or livestock. They are not necessarily in a vicious cycle, but rather stuck in a cycle that is only temporarily altered by better or worse production years. Any improvement in their income is far more likely to come from off-farm activities that bring in the overwhelming bulk of their annual earnings: ie, local and migrant work and self-employment.

Looking elsewhere, it is not clear why expenditure on livestock inputs is so weak in Chad among the big herders. The statement in the Profile Report for Salale (SAL) is that it is a sign of the 'very traditional character of livestock raising', but this does not perhaps quite explain why Aïoun pastoralists (MR01) in Mauritania spend some ten times more on inputs although they have only around twice the number of large stock. There may be a difference between pastoralists who have cattle and those who have only camels, but with the evidence to hand that is only a guess.

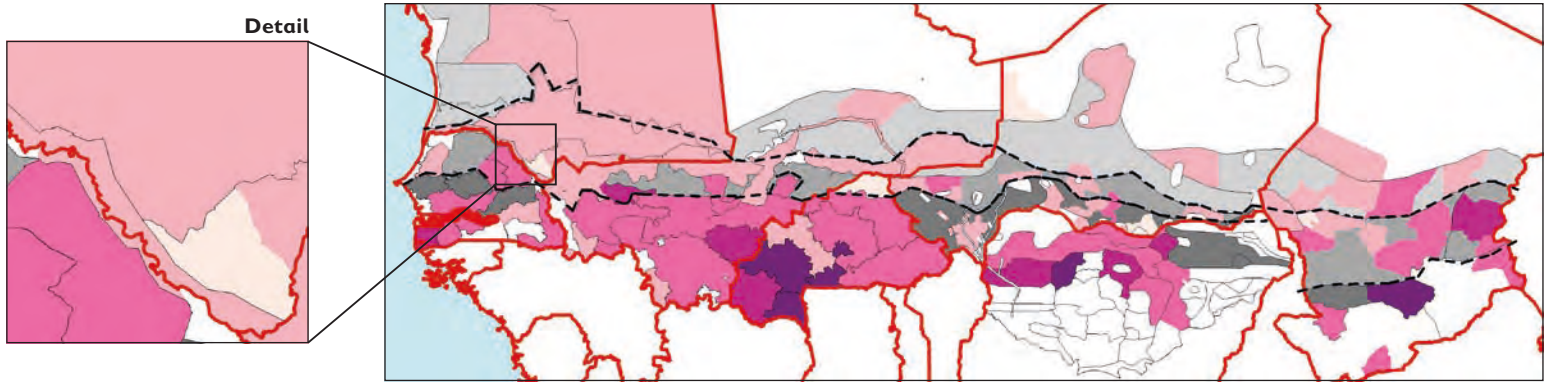
MAP 30: EXPENDITURE ON HEALTH AND EDUCATION

(Percentage of total household expenditure)

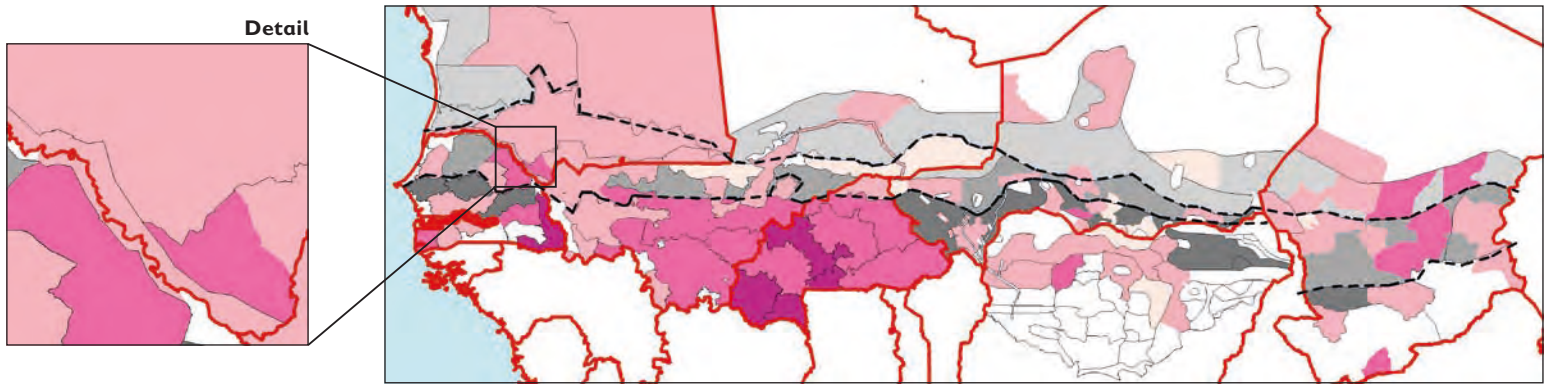
Average households



Very Poor households



Better Off households



LEGEND

% total cash expenditure

- <3
- 3–5
- 6–8
- 9–11
- >11

COMMENTARY MAP 30: EXPENDITURE ON HEALTH AND EDUCATION (% TOTAL HOUSEHOLD EXPENDITURE)

It is not easy to discern a strong geographical pattern here, although there is a general indication that pastoralists and agropastoralists tend to spend a lesser proportion of their total budget on health and education than ordinary farmers do. Why this might be so is not clear, unless it is a matter of access in that they might be farther from schools or clinics than agriculturalists and so use them less. There is certainly no reason to think they are less in need of medical treatment or less interested in educating their children, nor to think that service costs are less for them than for agriculturalists.

Within the agricultural areas it is notable, but again not easily explicable, that some Burkina Faso zones stand out for higher proportions of expenditure by richer and poorer alike. Again, it is not the case that the Very Poor in zones where they spend a high proportion on these services are simply poorer than their fellows in other zones (ie, that the same costs would make a bigger dent in their budget). There is a considerable variation, also without evident geographical pattern, in relative spending on education versus health, although the general tendency is to spend more on health than on education.

Taking the total expenditure on services across the region, it is possible to say that in absolute cash terms the poorer households generally spend less – often far less – than the wealthier on services. But the poorer tend to spend a greater *proportion* of their budgets on services than the wealthier, although again with several local exceptions. This would not be surprising assuming that the basic costs of services were similar for all, except that in that case one would expect there to be a more marked difference in proportional expenditures, given the substantial difference in household incomes even per capita. To take a couple of examples: in the West-Central Millet and Sorghum zone (ML09) of Mali, the Very Poor spend 6.4% of their total budget on health and education (3.8% and 2.5% respectively), and the Better Off spend a very similar proportion of their budget on these services: 6.9% (2.6% and 4.3% respectively). But the Better Off spend twice as much per capita as the Very Poor. In the Sorghum, Cowpeas and Groundnuts zone (NG06) in northwest Nigeria, the Very Poor spend 11% of their total budget on health and education, the Better Off 2.7%, but the total per capita cash spent by the Better Off is nearly four times that of the Very Poor. One conclusion must be that the provision of free or low-cost government and charitable services in northern Nigeria is remarkably thin on the ground, forcing very poor people to make such sacrifices.

It ought to be recognised that if poorer people, with their extremely marginal budgets, spend even 5% of their total budget on these services, that already represents a considerable sacrifice, sometimes even competing with the purchase of enough basic food to get them up to the threshold of their minimum calorie requirement. In the extremely constrained circumstances of the Very Poor, the decision to spend even 3% of their total budget on school costs is a major affirmation of faith in education as an avenue out of poverty for their children. Despite improvements in educational provision across the region, it often remains the case that poorer households cannot afford to send children to secondary school where the nearest such school is too far from the village to walk to every day, so that transport and/or accommodation and boarding costs would be necessary. Yet for the children of the poorer households no less than of the wealthier, it is the threshold of secondary education that needs to be crossed to gain far greater life chances.

6 A new way of looking at what crops 'yield' for household economy

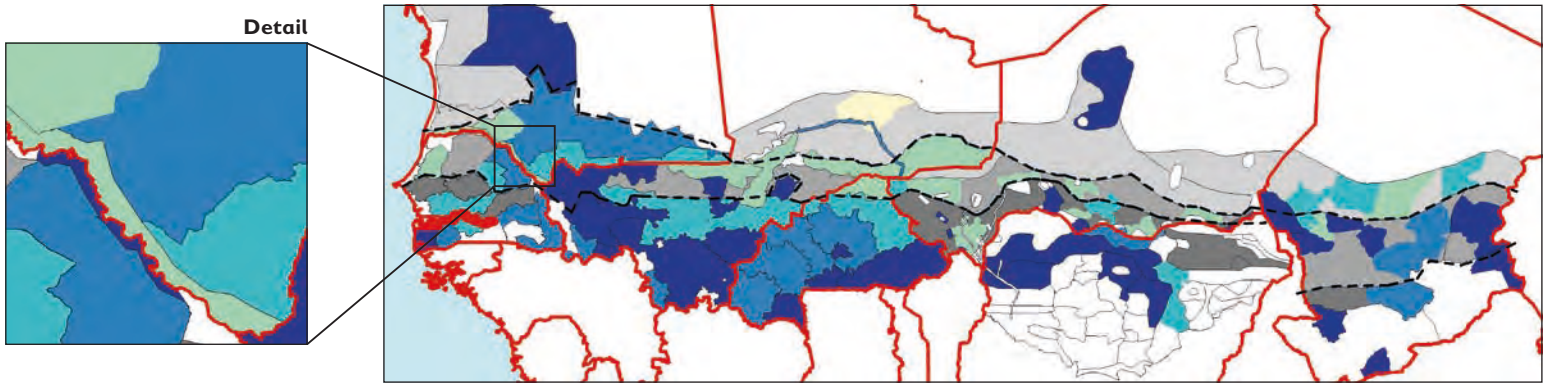
In this chapter we present a way that HEA information offers of looking in the round at what people get from their land – in effect the crop 'yield' in terms of a household's total income. What is at play is the consumption of own-produced crops and the sale of both food crops and cash crops, and differential 'yields' per hectare for poorer and wealthier farmers, given their level of inputs.

It is hoped that this viewpoint will hold intrinsic interest for readers, but we do not attempt to put forward any firm conclusions. We do make an inference at the end of the chapter that seems to redress the position of food crops as against cash crops.

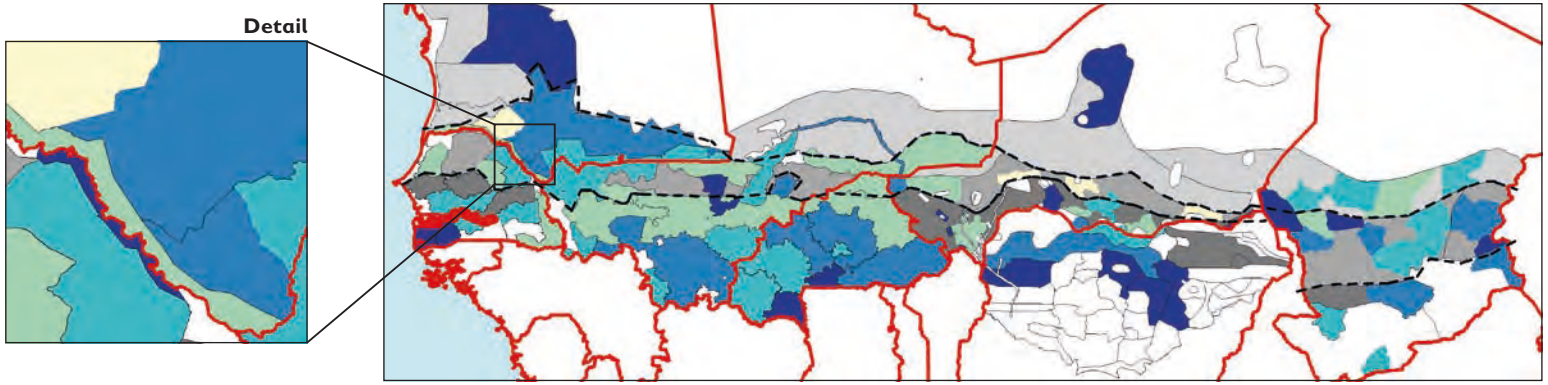
PHOTO: KATIE SEABORNE/SAVE THE CHILDREN

MAP 31: CROP YIELDS AS A PERCENTAGE OF MINIMUM HOUSEHOLD FOOD NEEDS GENERATED PER HECTARE CULTIVATED – FOOD + CASH

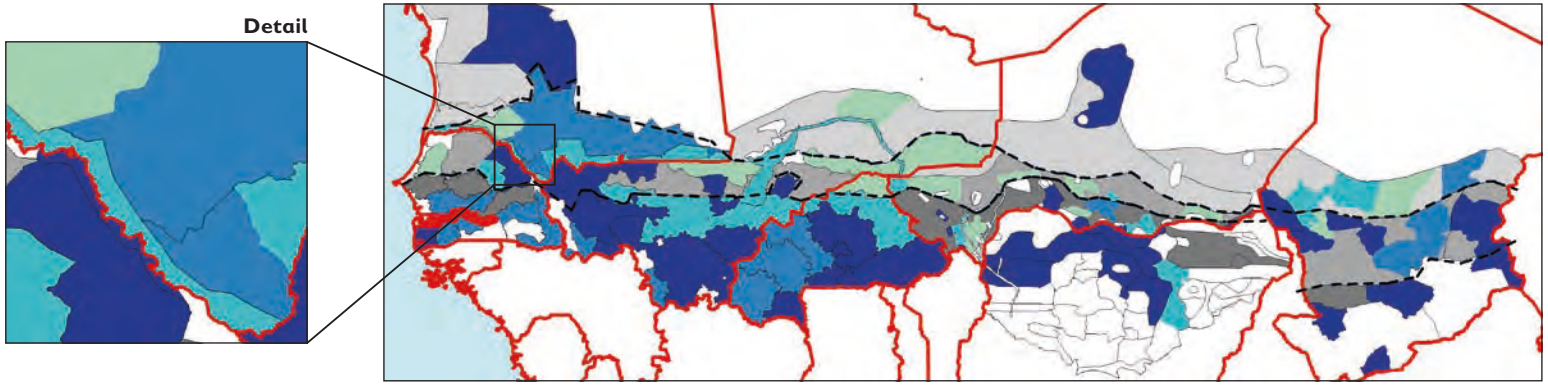
Average households



Very Poor households



Better Off households



LEGEND

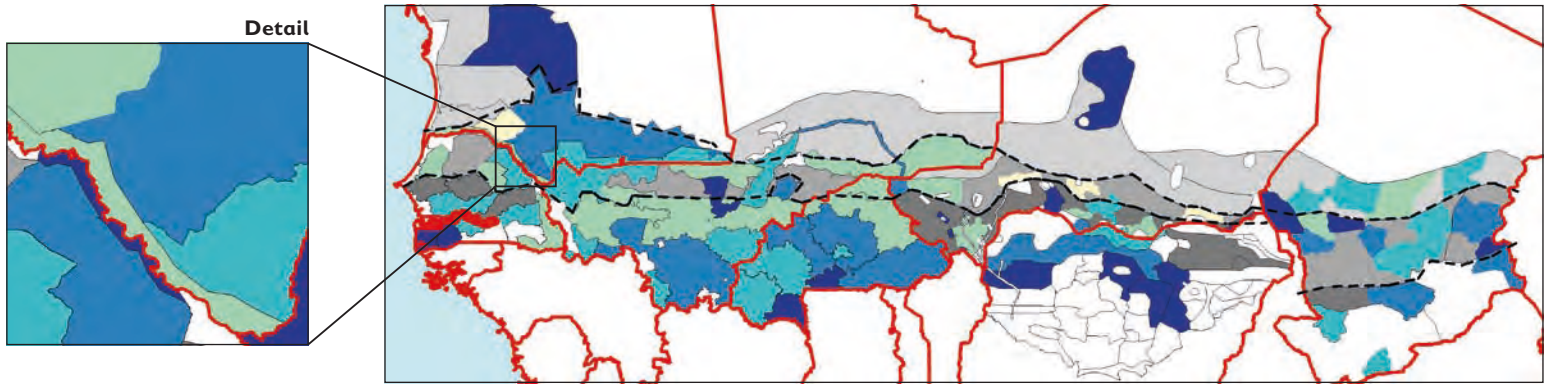
% minimum food needs (HH* size 6) generated per Ha* cultivated

- 0–15
- 16–30
- 31–45
- 46–60
- >60

* HH: household; Ha: hectare

MAP 32: CROP YIELDS – DIFFERENCES BETWEEN WEALTH GROUPS

Yield for average households

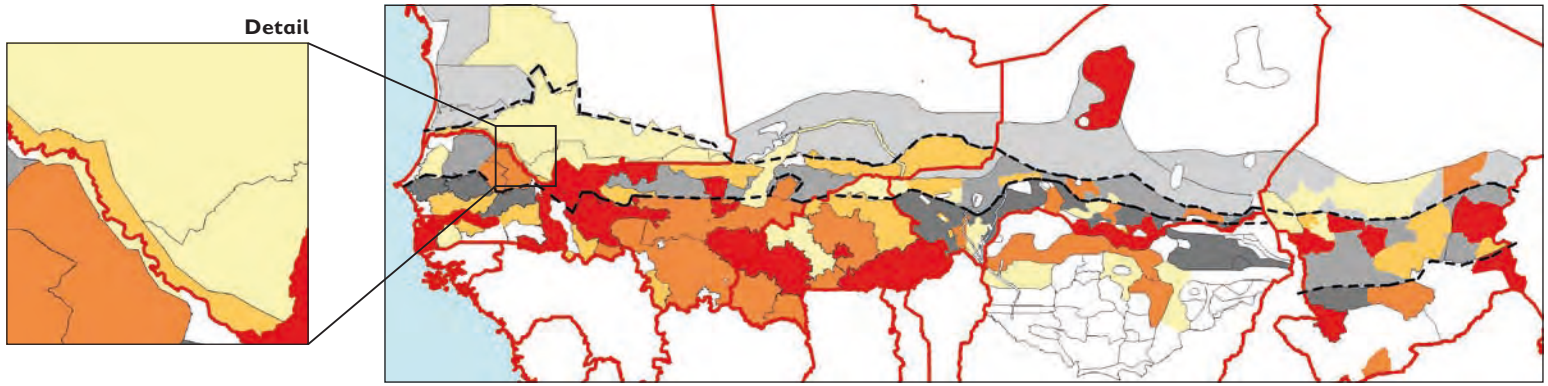


LEGEND

% minimum food needs (HH size 6) generated per Ha cultivated

- 0–15
- 16–30
- 31–45
- 46–60
- >60

Better Off yield as a percentage of Very Poor yield



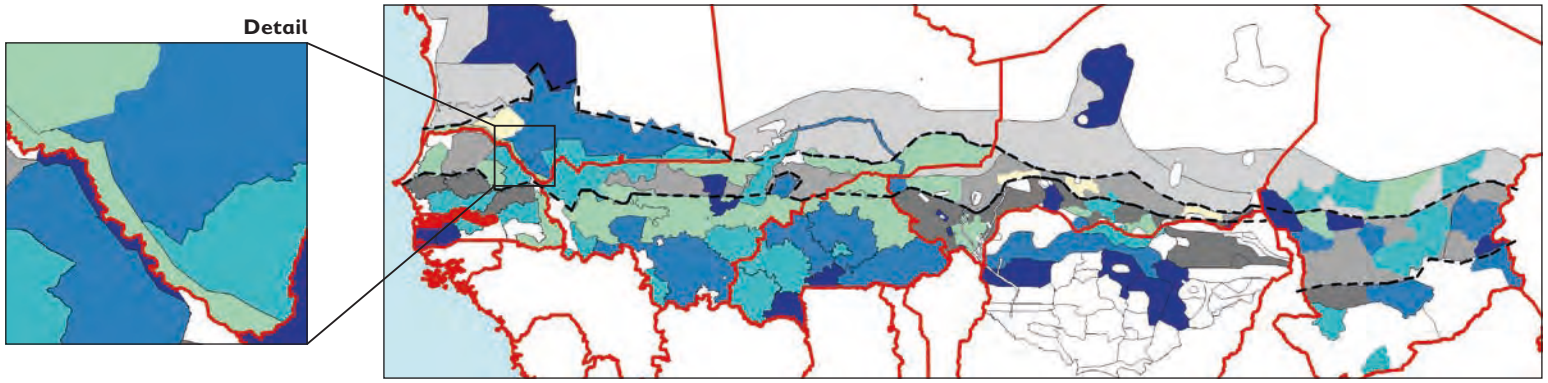
LEGEND

Better Off yield as a % of Very Poor yield

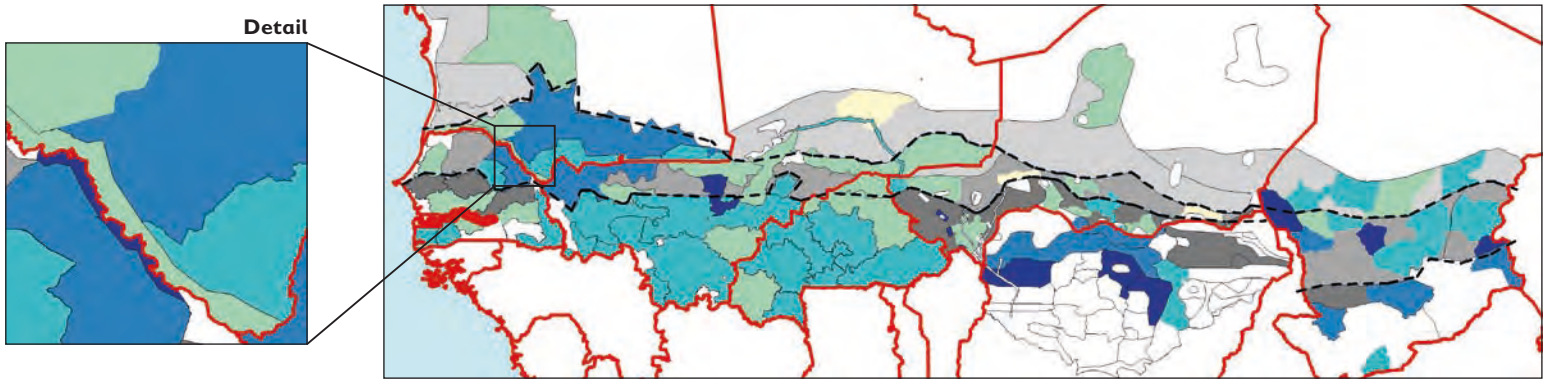
- <125
- 125–150
- 151–175
- >175

MAP 33: CROP YIELDS – CONTRIBUTION OF FOOD AND CASH CROPS

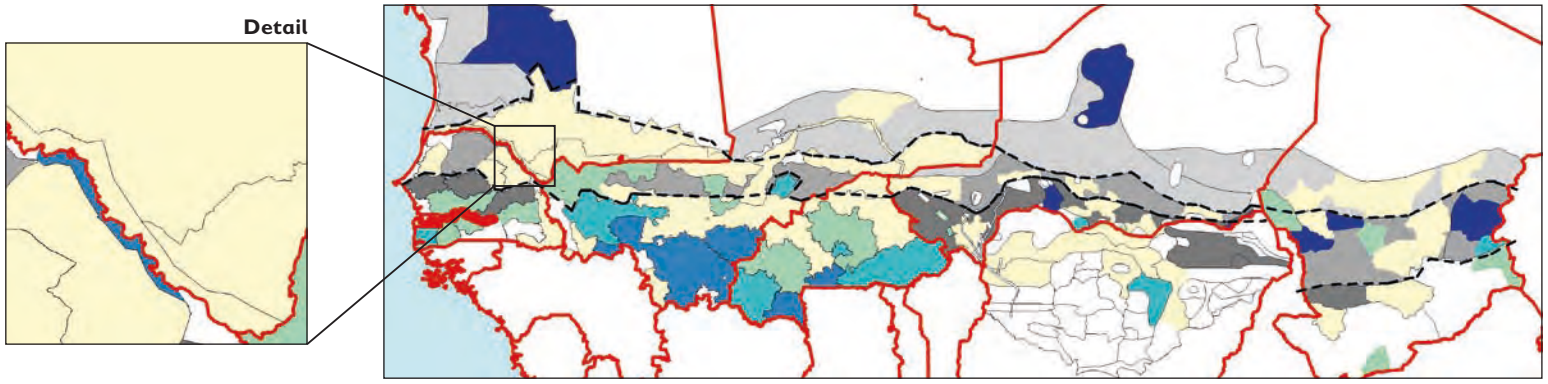
Yield – all crops (average households)



Yield – food crops



Yield – cash crops



LEGEND

% minimum food needs (HH size 6) generated per Ha cultivated

- 0–15
- 16–30
- 31–45
- 46–60
- >60

Note: Food and cash crop yields are based upon the total income (food plus cash) from these crops divided by the *total* area cultivated (not the area given to each type of crop).

COMMENTARY MAP 31: CROP YIELDS AS A PERCENTAGE OF MINIMUM HOUSEHOLD FOOD NEEDS GENERATED PER HECTARE CULTIVATED – FOOD + CASH; MAP 32: CROP YIELDS – DIFFERENCES BETWEEN WEALTH GROUPS; MAP 33: CROP YIELDS – CONTRIBUTION OF FOOD AND CASH CROPS

The acute differences between the poorer and wealthier in terms of their expenditure on inputs was discussed in relation to Map 29. This leads to the question of the effect of input expenditure on crop yields. HEA data is not the first place to look if one is seeking a detailed agronomic account of crop production in the Sahel with evidence for levels of increased production resulting from farmers' use of different inputs (including hired labour). But the HEA databases do include information on landholdings, crop production, consumption and sales, as well as on household sizes. It is of interest, therefore, to treat the 'yield' question to the particular HEA form of analysis used several times for other themes, namely 'total income': that is, the value of production in terms of direct food consumption and cash income combined (see the explanation given for Map 12). This approach allows us to consider whether expenditure on inputs seems worthwhile in the sense of the value of production per hectare to *households* in terms of direct consumption and of cash earnings expressed as potential consumption. We use the term 'yield' in that more complex sense in what follows, ie, not simply in the usual meaning of the weight of crop produced per hectare.

In this set of maps, the calculations are made on the basis of a household of six members, so that Very Poor and Better Off can be compared (still taking account of actual differences in household sizes between the wealth groups), and similarly an Average yield calculation can be made.

In Map 31 there is a clear and expected overall pattern of higher yields for the Better Off compared with the Very Poor (and, in a general way, of higher yields in higher-producing areas, mostly to the south). As so frequently, the Aïr Mountains zone of northern Niger (ACM) is the exception, with its unusually high yields for the Very Poor. But there is no mystery here: in this special situation, with unusually limited income options other than from cultivation, poorer farmers could not survive without achieving high yields from their small irrigated plots, including modestly more expenditure on inputs than is generally found among their counterparts elsewhere. Similar cases concern the date-palm and market garden production in the oases zone of western Mauritania (MR03) and the irrigated rice of the Malian Office du Niger (ML07). The riverine Matam Walo zone (MTW) in Senegal also stands out for high yields for the Very Poor, and here we can look both to their

production of the valuable rice and to the high local demand for all products from remittance-based wealthier households (rather surprisingly, the Better Off do not sell rice but specialise in sweet potatoes as their big cash crop, perhaps because it requires less organisation of labour).

The lower section in Map 32 breaks the pattern of all the previous maps, although what is presented sharpens our view of the difference in yields between the Better Off and Very Poor. For instance, despite the unusually high yield noted for the Very Poor in Map 31, it is interesting to see that in the Aïr Mountains in Niger (ACM), the Better Off, with their more numerous or deeper wells and animal draught power for irrigation, far outstrip the Very Poor in yield. And there is the same sort of result, though less acute, for the eastern Chad areas (HDS, RDS). Meanwhile, the Mauritanian oases zone (MR03) is a case apart. Aside from vegetables and cowpeas grown using residual moisture from seasonal watercourses (wadis) between the dunes, dates grown in the oasis areas are the main crop. Although dates are primarily a cash crop, they are also a food crop which gives the Better Off about 17% of their total calorie intake. Per hectare, the direct food consumed and cash generated together give a high 'yield' whether for wealthier or poorer people.

We have highlighted inputs as the factor most likely to affect production per hectare. But in the present 'yield' terms, there are also questions about the value of the *types* of crops produced. We are not in a position to delve into this in detail, but we can compare the contribution of food crops versus cash crops (Map 33). Yield is calculated in relation to the total area cultivated rather than the area planted with each type of crop. Cash crops play their part, notably in the cotton, fruit and market gardening zones of southern Mali and similarly next door in Burkina Faso; and where the yield of cash crops is high, the average yield, overall, is also high. But elsewhere in Burkina Faso it is food crops rather than cash crops that have more influence on the All Crops average. In the zones studied in northern Nigeria, as a general picture the particular combination of direct consumption and sales of food crops also makes for high 'yields' across wealth groups.

Overall, the dominating factor seems to be food crops. This is interesting in relation to the relative position of food and cash crops in total *cash* income as presented in Maps 9 and 10, where cash crops tend to win. But in relation to yields, when we combine direct consumption and sales, it seems that farmers tend to rely more on food crops. This reflects the comment in Map 7 that farmers throughout the Sahel are serious about food crop production, even in most of the prominent cash crop areas. The date economy in Mauritania is a case apart: no other product, including livestock, begins to rival date sales as the engine of the economy, and the consumption of dates as food is rather a bonus than a reason for their production.

7 Production hazards and how people cope with them

The information in this chapter comes from what is, in effect, an opinion poll of household representatives participating in interviews in the HEA baseline fieldwork. As will be expected, rain failure is the enemy most feared by farmer and herder alike, whether as outright drought or more often as irregularities during the rainy season that seriously damage crops and affect pastures. There is little that governments and agencies can do directly against these rainfall phenomena in the Sahel, whether or not they are deemed to be increasing in frequency or severity, or both. But we also hear the anxiety of villagers about matters that might invite a greater official response. For farmers, the most important of these seems to be the level of crop losses, principally cereals, to bird and insect pests. Multiplied at national scale, such losses must constitute a significant economic loss; at village level they are certainly a contribution to food insecurity. This is known to governments and donors, but perhaps there is a call here for investment in prevention to be moved up the list of investment priorities.

A quite different problem, but one that appears to be growing, is the damage caused by livestock to standing crops, especially by the cattle of herders from elsewhere who take them on seasonal far-grazing migration, and who are meant to use customary 'corridors' through cultivated areas.

As regards hazards to livestock, we find that drought is the first concern not only of herders but of northern farmers too, followed by livestock disease. However, in the south, where rain failure is less frequent or severe, it is livestock disease that is felt as the main hazard. Again, there is surely a call here for more official investment in preventive services: we have seen how very important livestock are not just for professional herders but for farmers, who form by far the majority of the region's population.

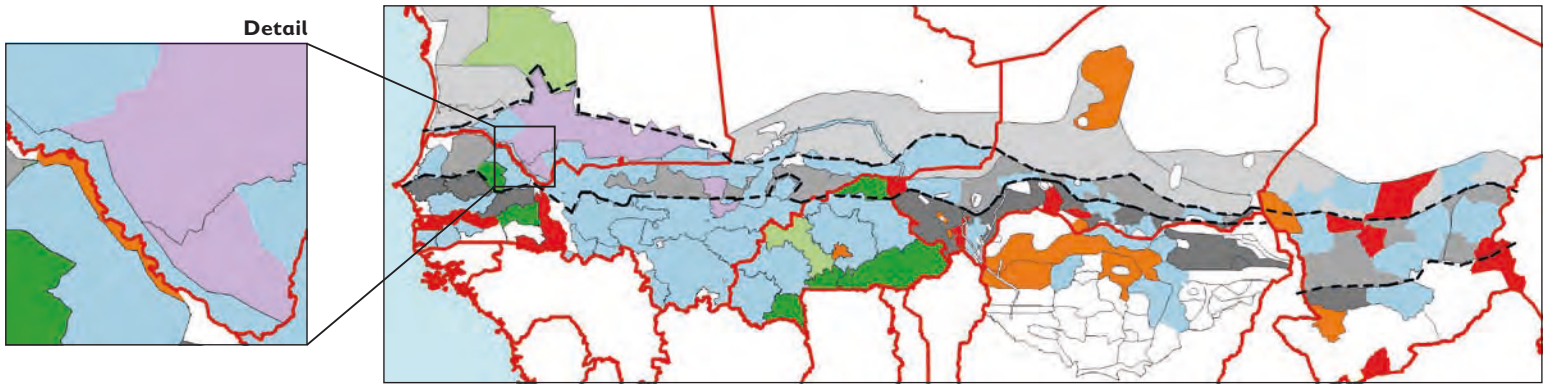
MAP 34: MOST IMPORTANT HAZARDS AFFECTING AGRICULTURE AND LIVESTOCK

Hazards affecting agriculture

LEGEND

Most important hazard (as perceived by rural households)

- Drought/erratic rainfall
- Flooding
- Pest outbreaks
- Disease outbreaks
- Conflict with herders
- No data

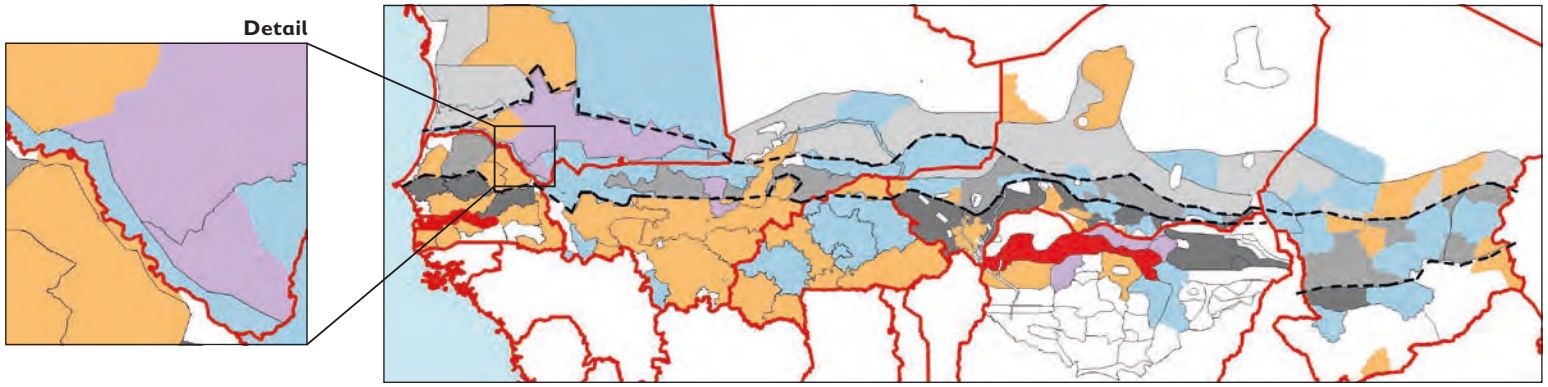


Hazards affecting livestock

LEGEND

Most important hazard (as perceived by rural households)

- Drought/erratic rainfall
- Disease outbreaks
- Theft
- No data



COMMENTARY MAP 34: MOST IMPORTANT HAZARDS AFFECTING AGRICULTURE AND LIVESTOCK

This information, and that in the subsequent hazard-related maps, represents the judgements of village respondents to the HEA baseline surveys. Villagers were asked to state the main hazards for crop and livestock production that they face, and to rank them in importance. Two levels of hazards to production are usually distinguished: those that occur virtually every year on a general scale, such as low-level pest damage to crops; and those that occur only periodically, such as an epidemic crop-pest outbreak. Both types of hazard were referred to in the responses, but for these maps it is the periodic hazards that we have selected as best we can: that is, the events that make a substantial difference between one year and another.

We should admit that there may well be some 'noise' in the data. It was not clear in each and every instance whether a response was about a permanent or a periodic hazard. In terms of ranking, it is likely that people found it easier to identify the most important hazard than to precisely rank the others. In the subsequent maps, we offer an account of 'most important' and 'secondary' ranking, where 'secondary' carries no implication that the hazard in question is not also important. It is possible that on occasion answers about the most important hazard were influenced by a recent event rather than representing the most important periodic hazard over a period of years, but on the whole we trust that a genuine pattern is offered over the spread of HEA studies.

This kind of information, combined with that on coping shown in later maps, is essential for the practical application of the HEA methodology for early warning purposes. It is put together with current field information on shocks to enumerate scenarios of the likely outcome – Outcome Analysis – within a period of up to one year. In other words, it helps to predict the effects on food security and livelihoods of a given event or events. Here we map the baseline data as a matter of record, and for the most part they speak for themselves: we offer only a light commentary.

Rain failure is a common hazard for production across the Sahel. It is no surprise that the light blue colour representing this hazard is almost the default shading in the agricultural map and in the northern part of the livestock map, where rain failure acutely affects the most vital resources: grazing and watering points. It is perhaps all the more interesting, therefore, to look at those zones where something different is reported as most important. In the agricultural hazards map we note the frequent identification of crop pest/disease outbreak as the greatest hazard, even in such areas as the *ferlo* zone in Senegal (FER) where rain failure is certainly a common phenomenon. This seems to contain a message that rain failure is not the single overwhelming hazard of the Sahel. It reflects anxieties expressed in any village about crop losses due especially to pest infestations, usually with a plea for more official help in combating this scourge, which is indeed known to significantly reduce national food production.

It is perhaps surprising that flooding could be the most serious hazard anywhere in this region, where rain failure is the dominant threat. But each is a particular local case. Rice agriculture along the Senegal River in north-east Senegal is especially vulnerable to water surges over the river bank. And the spot in the centre of Burkina Faso is in fact peri-urban Ouagadougou, where the deluge of 1st September 2009 that caused serious flooding inside the city also hit farmers on the peripheries. In the northern Niger Aïr Mountains (ACM), where annual rainfall is modest and the all-important but delicate onion cash crop depends on irrigation from wells, a single excessive downpour that causes water-logging in plots for any length of time can wreak great damage.

'Conflict with herders', the red patch, relates to damage to crops caused by herders' cattle, often migrating through an agricultural area on seasonal grazing migration. In fact, one important reason for migration from some

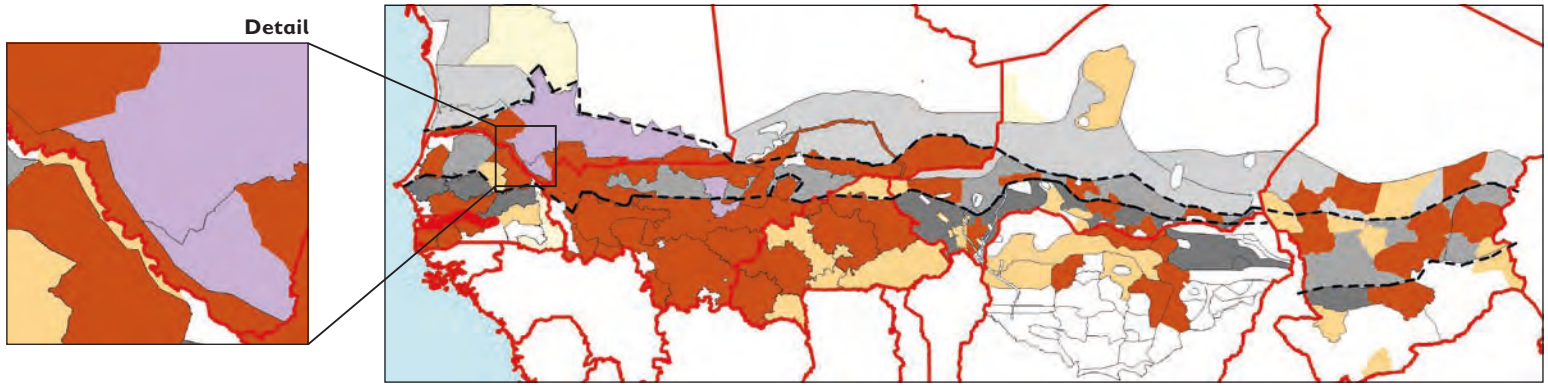
areas is precisely to keep animals off local fields in the growing season, and cattle-owning farmers commonly send their own stock with professional herders for this purpose as well as to benefit from better open grazing elsewhere. Along the main migration routes there are traditional corridors (*parcours*) maintained formally for safe passage through cultivated areas, and particularly intense conflict usually arises when animals are allowed to stray from these. It is not always accidental or intended negligence of the herders: sometimes part of the corridor has been tilled and planted by farmers. Elsewhere, on the fringes between the northernmost millet cultivation and the grazing grounds of pastoralists, encroachment of cultivation into traditional pastures has become an increasing source of conflict in recent years, presumably due to increasing population pressure on even marginally cultivable areas. The particular value of the onion crop that characterises the Southern Irrigated Cash-crops area (CMS) in south-central Niger probably explains the particular sensitivity of farmers to the trampling of plots by animals. In Chad the conflict in the centre and east is no doubt also caused by herds passing through, but in the south it is more likely to be about herds that stay there for a good amount of time, because the migration is aimed at precisely such lush areas.

As we have observed, the threat of rain failure reducing seasonal pastures has a northern bias, and of course it is the greatest preoccupation of pastoralists. But rain failure that threatens livestock includes areas with settled farmers who depend partly on grazing on local common land. But again, it is significant that in large areas, admittedly mainly in the south, livestock disease outbreaks are seen as the main hazard. In fact, as for crop pests, the message from livestock keepers everywhere is that they are desperate for greater official help against the scourge through expanded veterinary intervention. This is not just a problem for wealthier cattle keepers: the poor household with just a handful of goats – or even of poultry – can lose the best part of this capital, modest but very precious to them, in the space of a week.

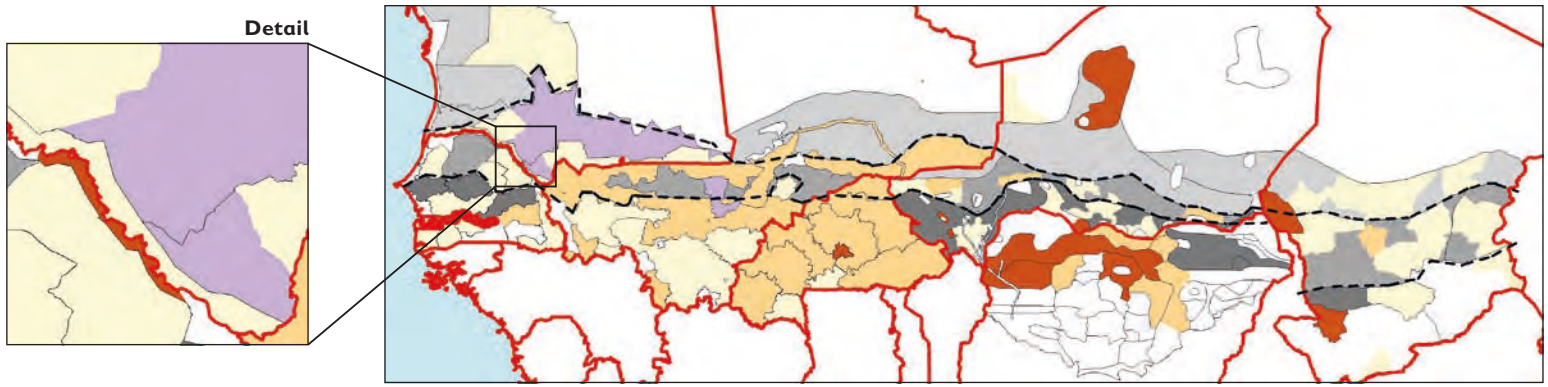
Livestock theft was frequently reported as a problem, albeit ranking third or fourth behind others. But in northern Nigeria we see it reported as the main hazard in the extensive Millet, Cowpea and Groundnut zone (NG03); this arises from an unusually severe bout of wholesale banditry in the reference year of the field study (2012) when owners lost many animals, even whole herds.

MAP 35: HAZARDS AFFECTING AGRICULTURE

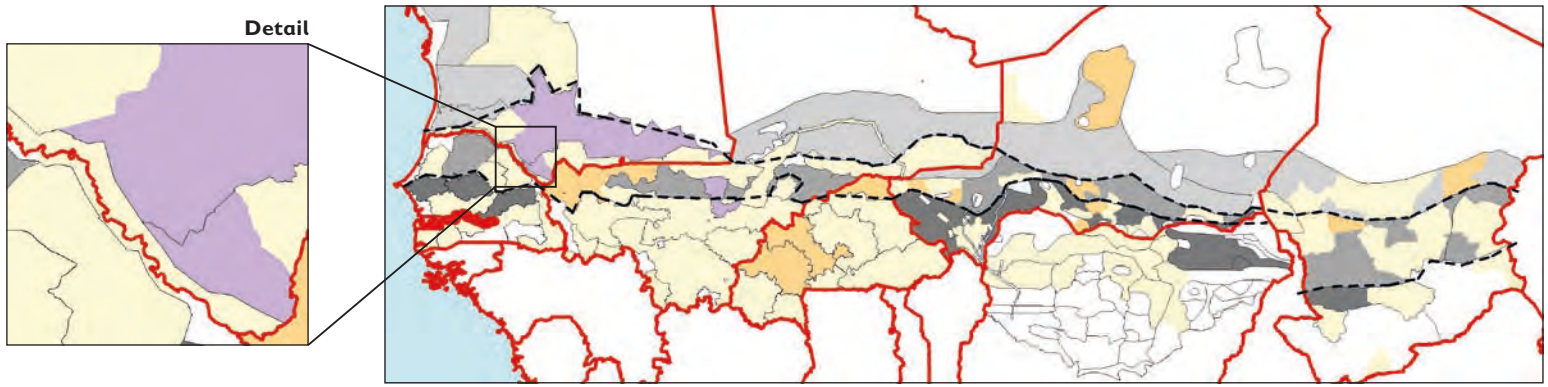
Drought/erratic rain



Flooding



Wind/sandstorm

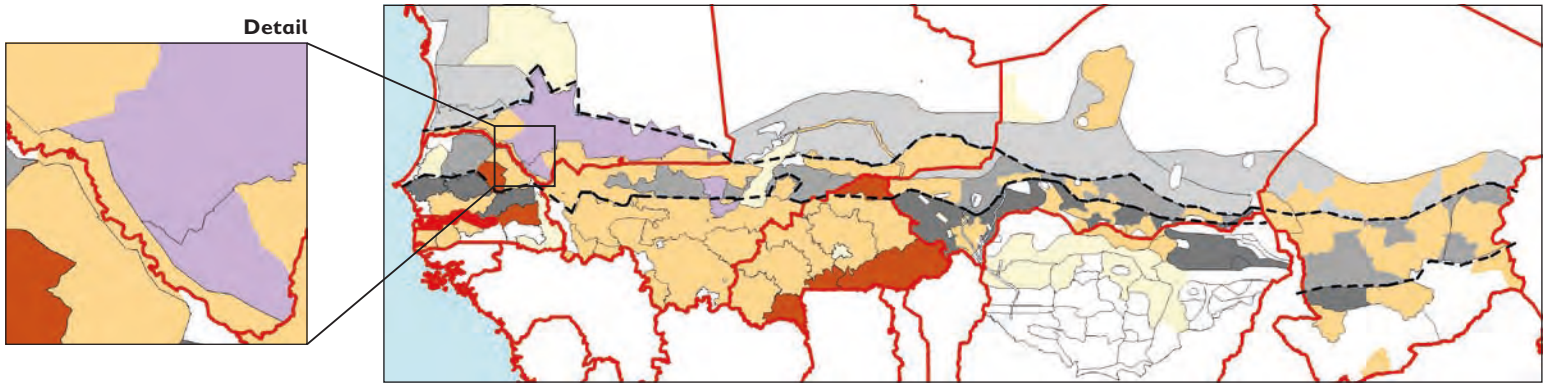


LEGEND

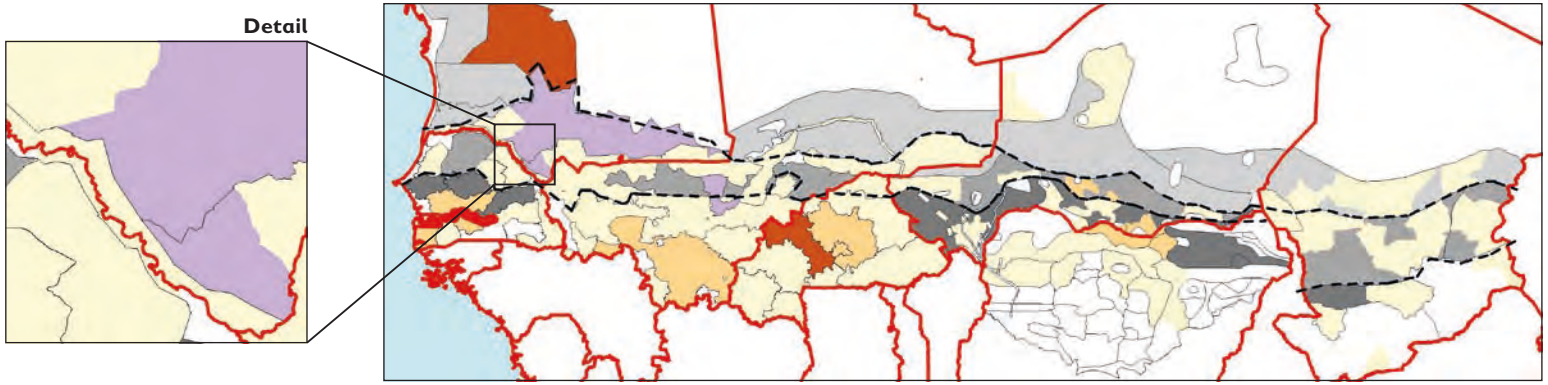
- Most important
- Secondary importance
- Not reported
- No data

MAP 36: HAZARDS AFFECTING AGRICULTURE

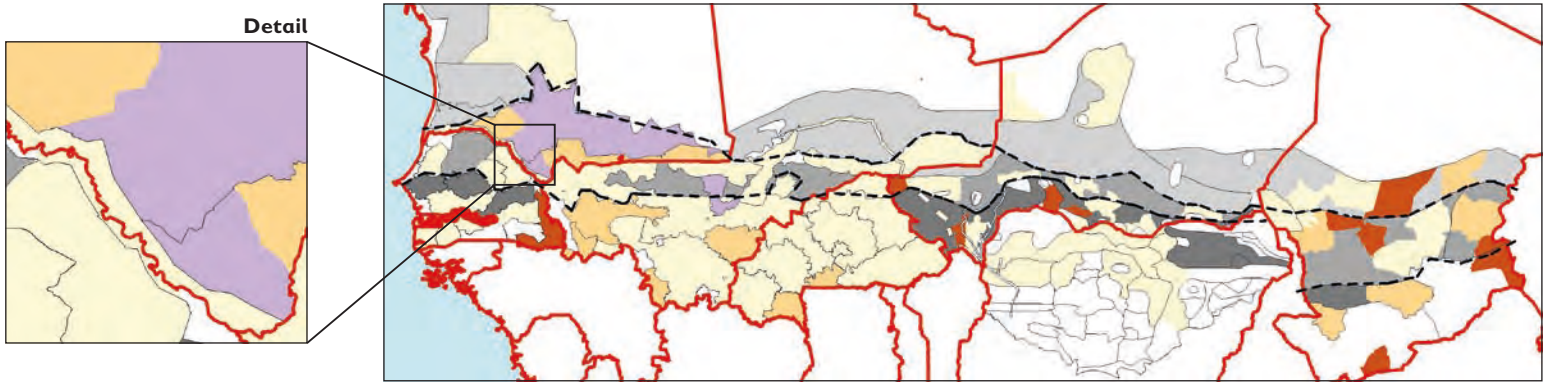
Pest outbreaks



Disease outbreaks



Conflict with herders



LEGEND

- Most important
- Secondary importance
- Not reported
- No data

COMMENTARY MAPS 35 AND 36: HAZARDS AFFECTING AGRICULTURE

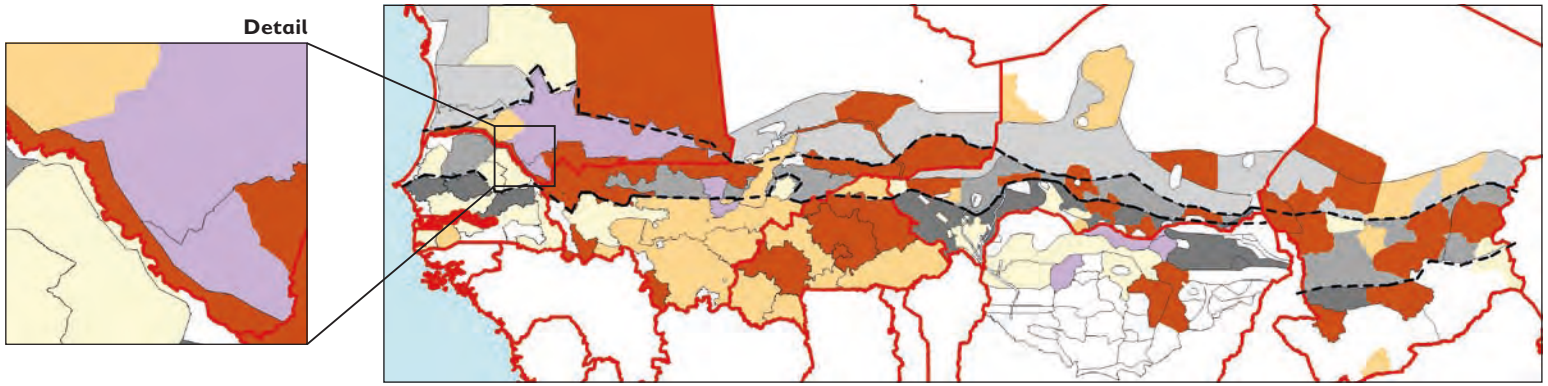
Here single hazards are mapped by whether they are reported as main or secondary hazard, or are not listed among main hazards. Rain failure is always listed, and is generally the most serious hazard. And reinforcing the points made for the previous map, where it is not rain failure that comes first, it is crop pests (Map 36). But flooding is surprisingly widespread as a secondary threat, even if as a first hazard it is localised. Windstorms carrying sand are a general phenomenon in the Sahel (and can carry sand in the air down to the coast); here it seems they show up as a threat mainly to grain-crop based areas, especially those growing mostly millet, ie, the northernmost cultivation and the nearest to incoming winds from the desert. In the oases zone of Mauritania (ML03) any attack of fungal or parasitic date-palm disease strikes at the heart of the economy of households. For Burkina Faso we do not have the information to tell us why crop disease should be the main hazard uniquely in the Western Cereals zone ZME4); perhaps a recent, severe outbreak may have influenced responses in field interviews.

COMMENTARY MAP 37: HAZARDS AFFECTING LIVESTOCK

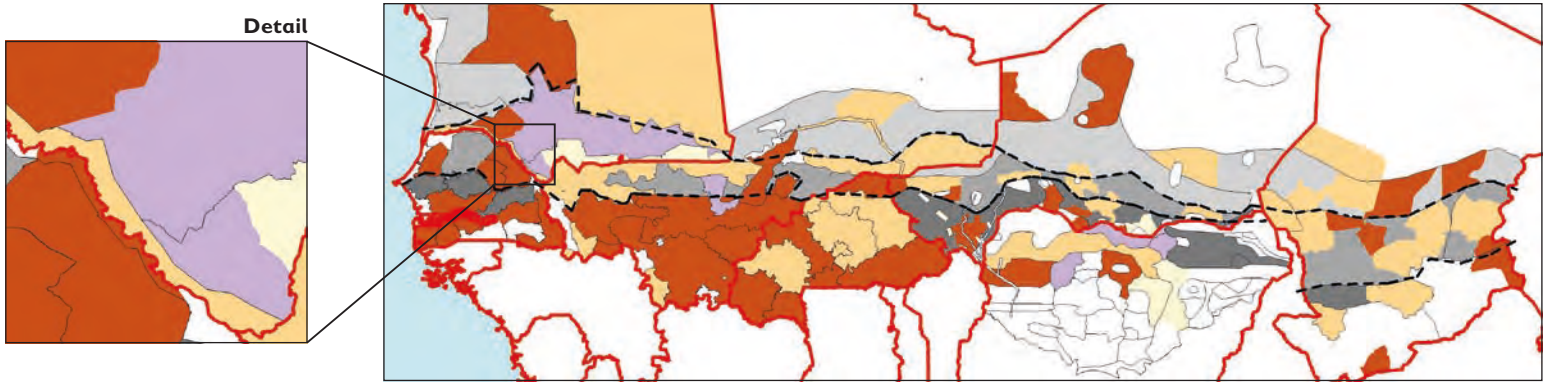
We have commented above on the primacy of rain failure and disease outbreaks. Bushfires as a reported phenomenon do not show a particular geographical pattern, but evidently in some years in some areas they are widespread enough to seriously damage pastures – bush browse as well as grasses.

MAP 37: HAZARDS AFFECTING LIVESTOCK

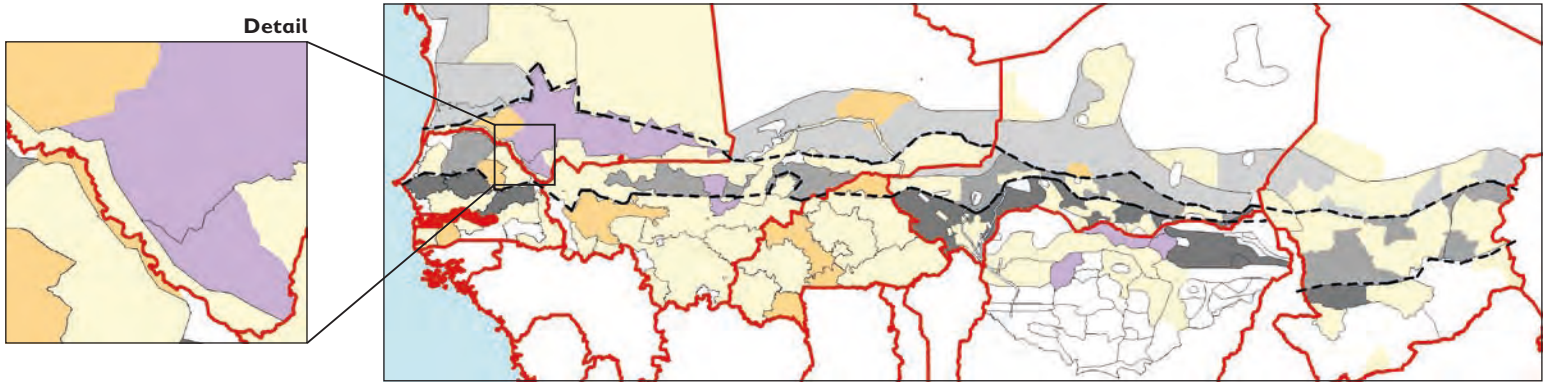
Drought/erratic rain



Disease outbreaks



Bush fires

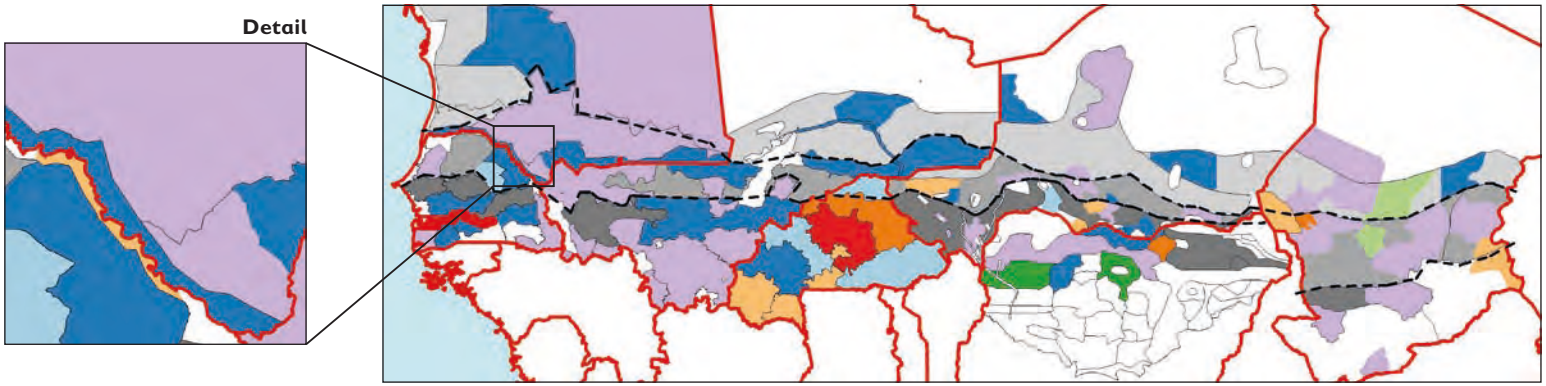


LEGEND

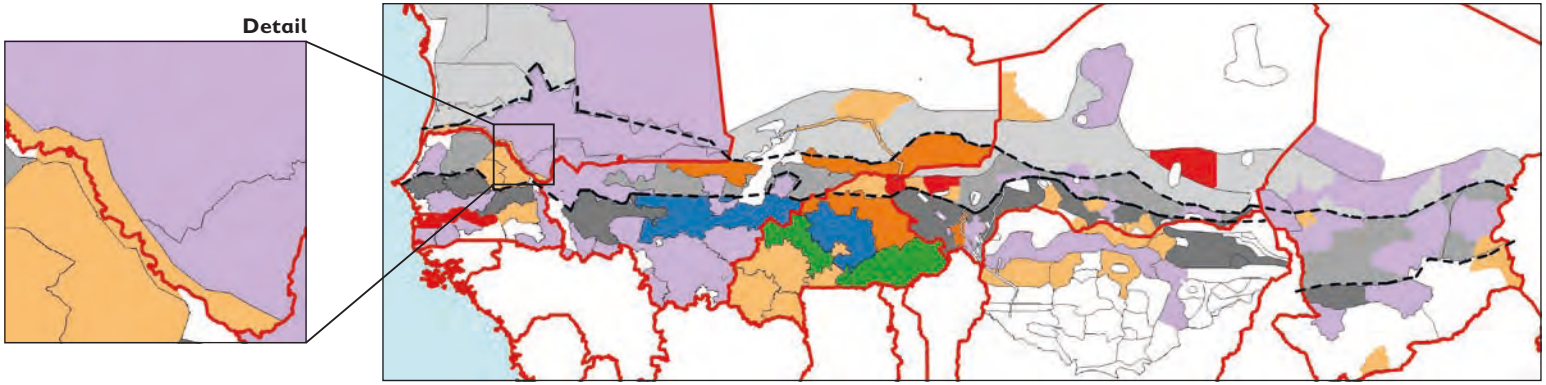
- Most important
- Secondary importance
- Not reported
- No data

MAP 38: MOST IMPORTANT COPING STRATEGIES IN A BAD YEAR

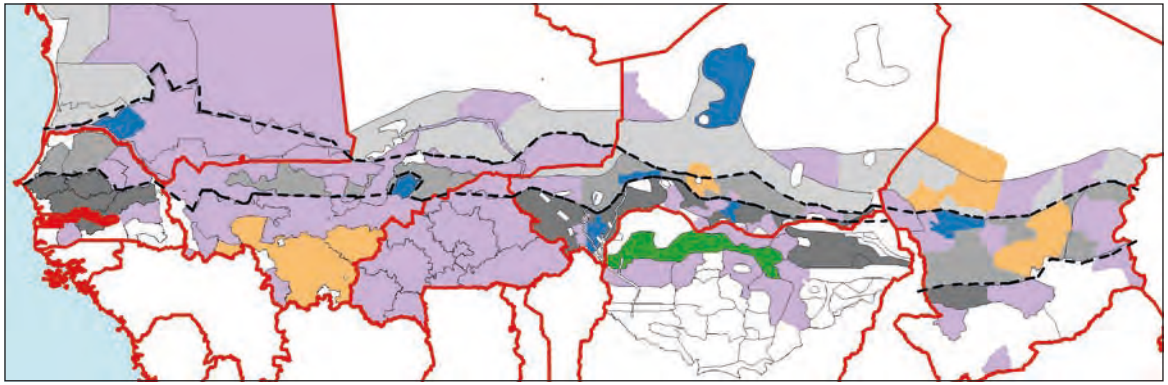
Strategies for Very Poor



Strategies for Better Off



General strategies



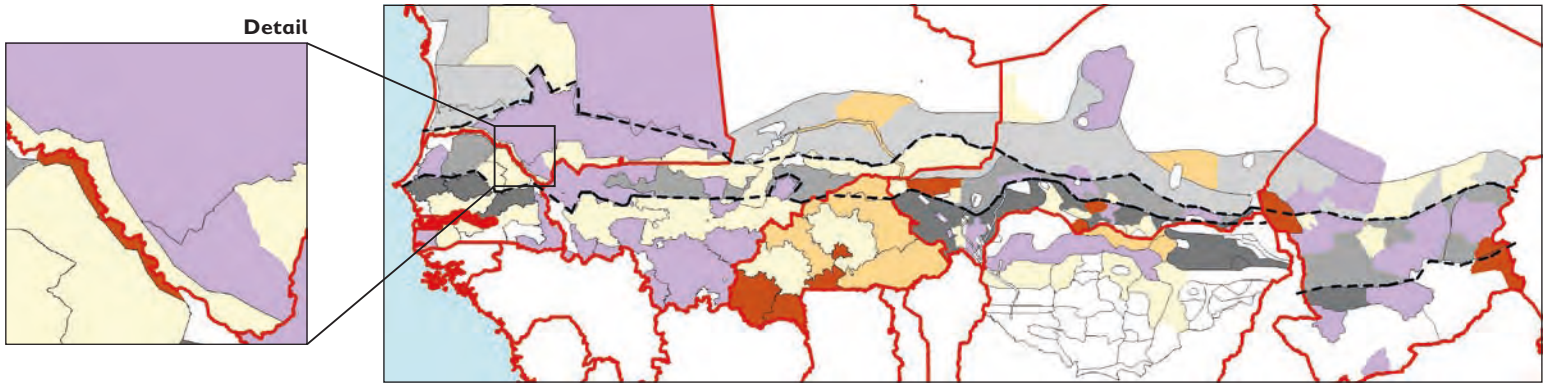
Note: In most livelihood zones, informants were asked about strategies for the Very Poor and for the Better Off (see above maps). In other cases, data on strategies was not differentiated by wealth group (the map to the right).

LEGEND

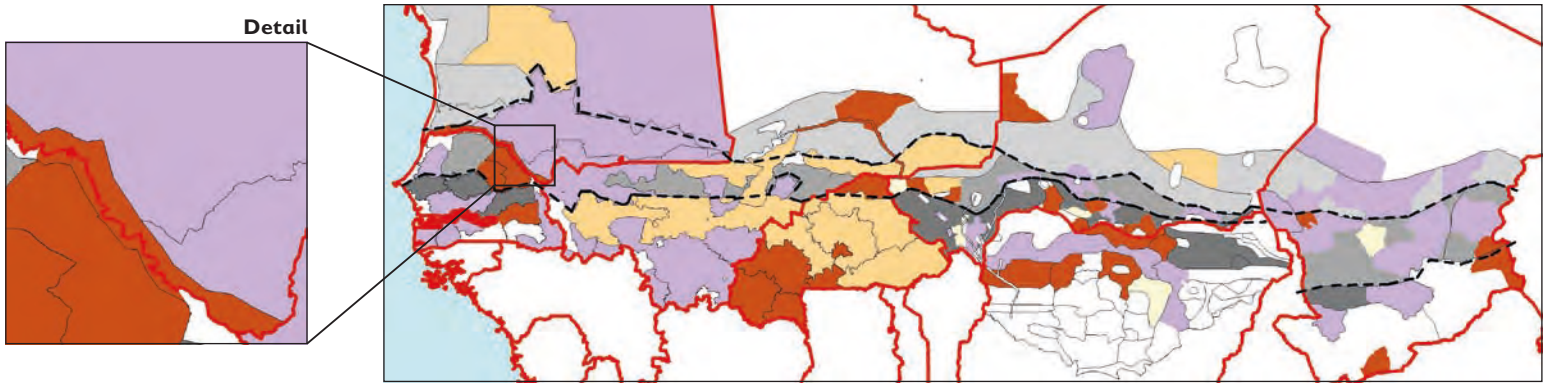
- Livestock sales
- Labour (local)
- Labour (migrant)
- Self-employment
- Trade/petty trade
- Crop diversification
- Credit
- No data

MAP 39: COPING STRATEGIES IN A BAD YEAR – LIVESTOCK SALES

Very Poor households



Better Off households

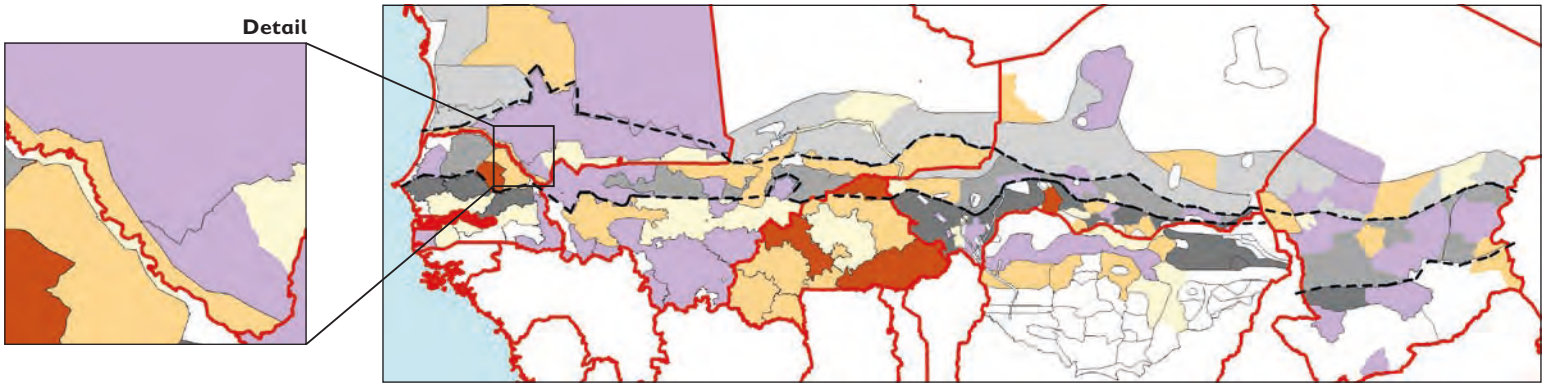


LEGEND

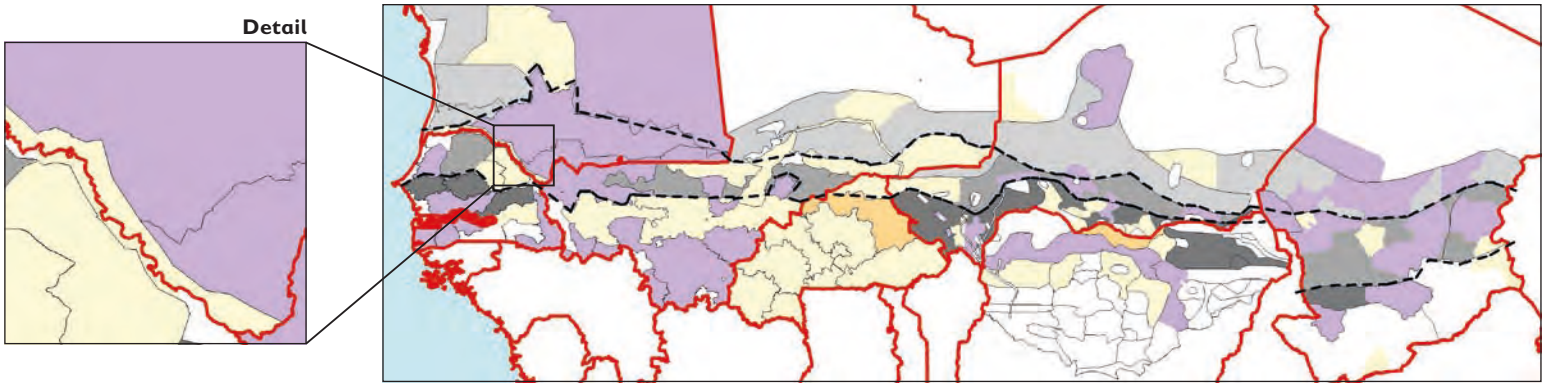
- Most important
- Secondary importance
- Not reported
- No data

MAP 40: COPING STRATEGIES IN A BAD YEAR – LOCAL LABOUR

Very Poor households



Better Off households

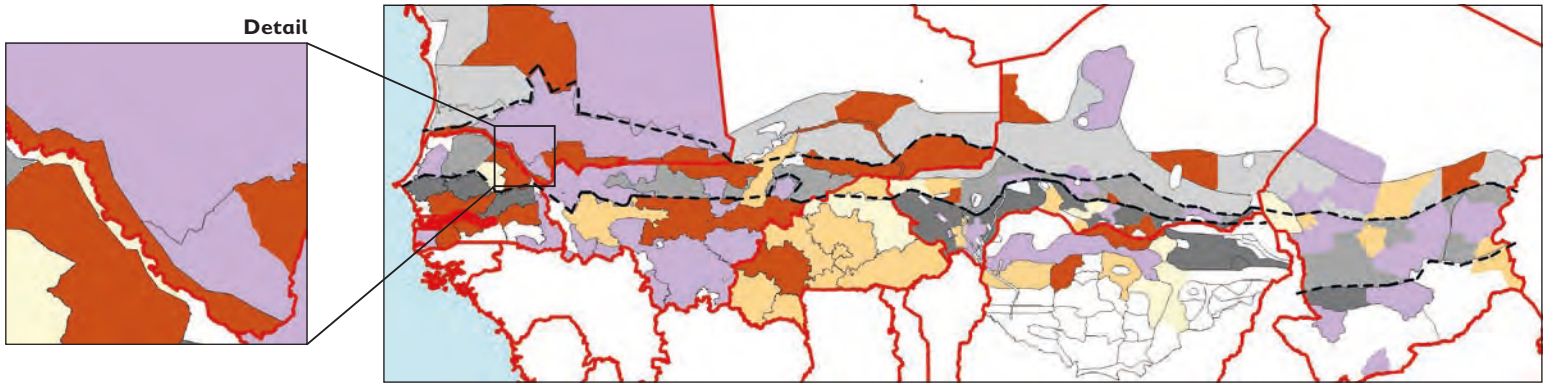


LEGEND

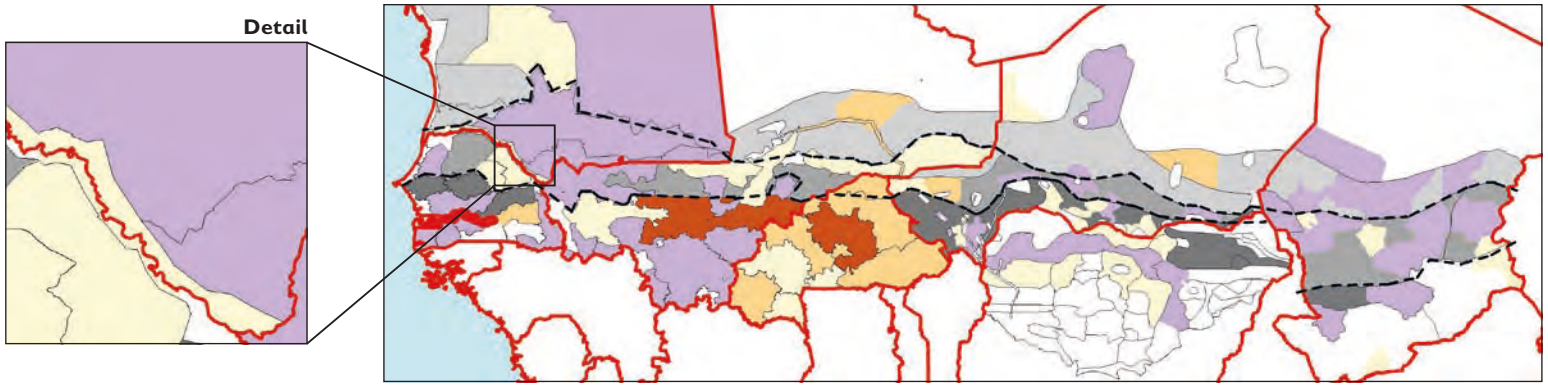
- Most important
- Secondary importance
- Not reported
- No data

MAP 41: COPING STRATEGIES IN A BAD YEAR – MIGRANT LABOUR

Very Poor households



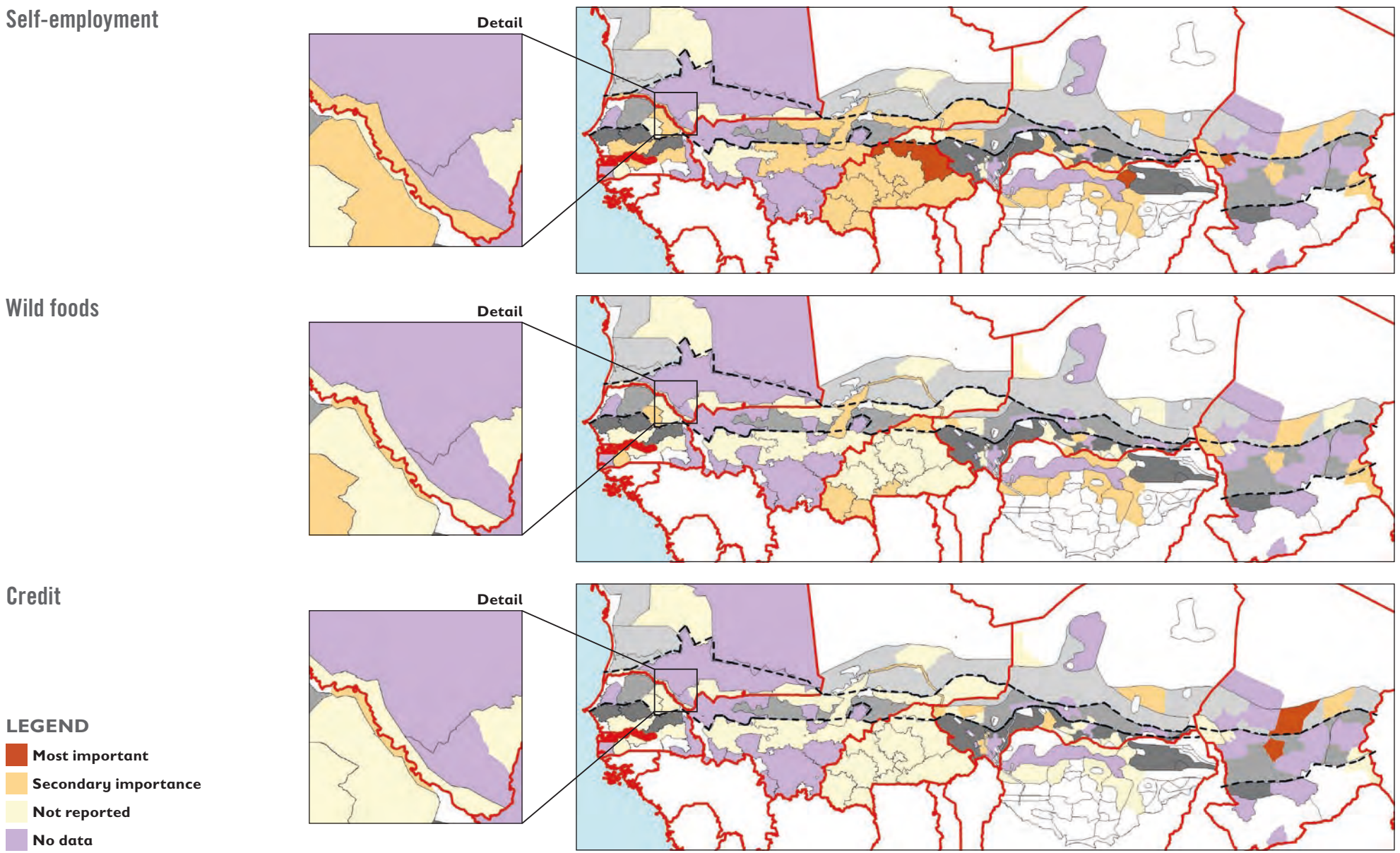
Better Off households



LEGEND

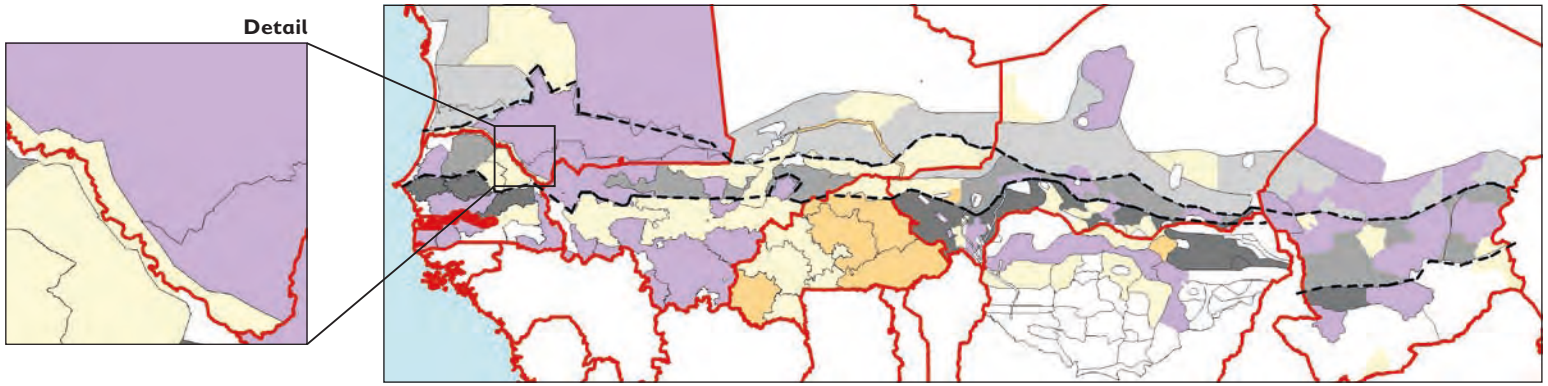
- Most important
- Secondary importance
- Not reported
- No data

MAP 42: OTHER COPING STRATEGIES IN A BAD YEAR – VERY POOR

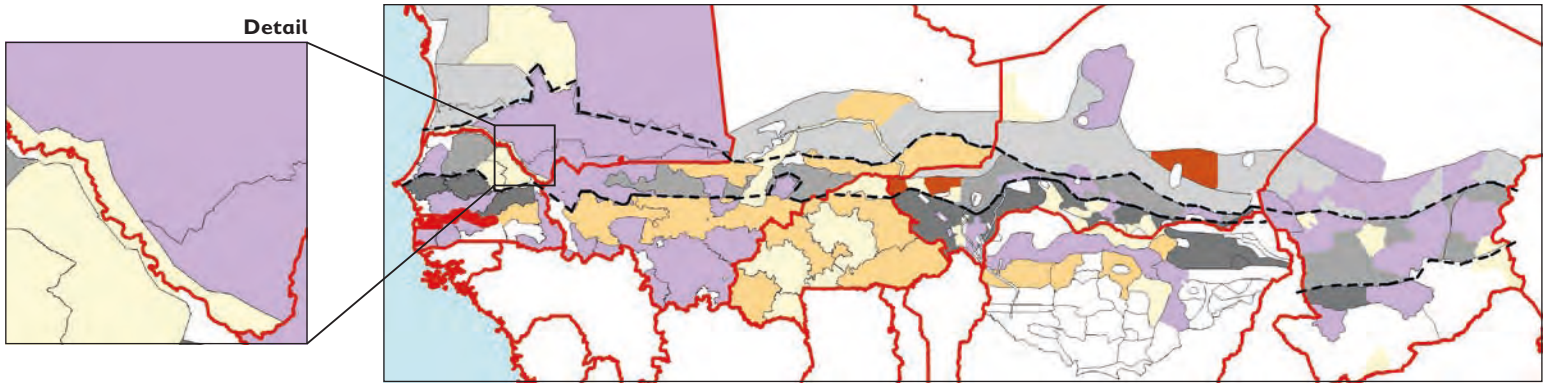


MAP 43: OTHER COPING STRATEGIES IN A BAD YEAR – BETTER OFF

Sale of milk



Trade/petty trade



LEGEND

- Most important
- Secondary importance
- Not reported
- No data

COMMENTARY MAPS 38–43: COPING STRATEGIES IN A BAD YEAR

There are several coping strategies that we have not attempted to map because they are ubiquitous geographically and common to all wealth groups, if at different intensities. Such strategies include: reducing 'luxury' expenditure (sugar, meat, cola nuts, condiments); reducing other 'non-essential' household expenditure (even the purchase of soap); reducing social expenditure (eg, on baptisms, memorials, weddings); reducing education costs; reducing basic food consumption, first in terms of food quality, finally in the number of meals per day.

We have concentrated on strategies related to the search for extra income, summarised in Map 38. For poorer households, the most widespread primary recourse is to look for extra paid employment; and because local possibilities are least available in a bad year, a good part of the search involves seasonal migration to where work is available (Map 41). Our information is limited, and dominated by Burkina Faso, where local employment (Map 40) is also important. In the far northern agropastoral zone ZME8, local employment for the Very Poor includes a substantial number of jobs in local gold mining, to which people also come from far and wide. Returning to Map 38, the red 'self-employment' patch in the Very Poor map, covering the Central Plateau (ZME5), is also highly influenced by gold mining, which therefore might have been taken as a special part of the work migration story. In this regard, the population density in this part of the country is high, and that seems to push even Better Off people to engage in 'migrant work', whether commercial activity in neighbouring coastal countries or in gold mining, where they would hire workers rather than labour themselves. In the oasis zone (MR03) in Mauritania, labour migration stands out as the main coping strategy for the Very Poor, and this is essentially to the capital, Nouakchott. In normal years, poorer households do not typically have anyone going on work migration.

Crop diversification usually means that when the main crop shows signs of substantial failure, perhaps because of inadequate rain in the first part of the season, a late shorter-cycle crop is planted. This might be a cereal or a pulse, or field melons for seeds and cattle feed; or the household will concentrate on market gardening if local conditions allow.

Livestock sales (Map 39) are a common first recourse for wealthier people, perhaps starting with small stock but rising reluctantly to cattle or camels when the need for cash reaches a higher level. Unfortunately, pastoralists and agropastoralists are poorly represented in this particular set of data, although we would assume that increased sales of livestock must be a prime recourse, for the wealthier at least. With the overall information we do have it is interesting to note that poorer people also quite generally attach some importance to livestock sales, although they usually have very few livestock and virtually no cattle or camels. If the terms of trade for animals against grain have not collapsed in a panic-selling market, even the sale of a couple of goats can stave off the worst hunger for a household for some weeks.

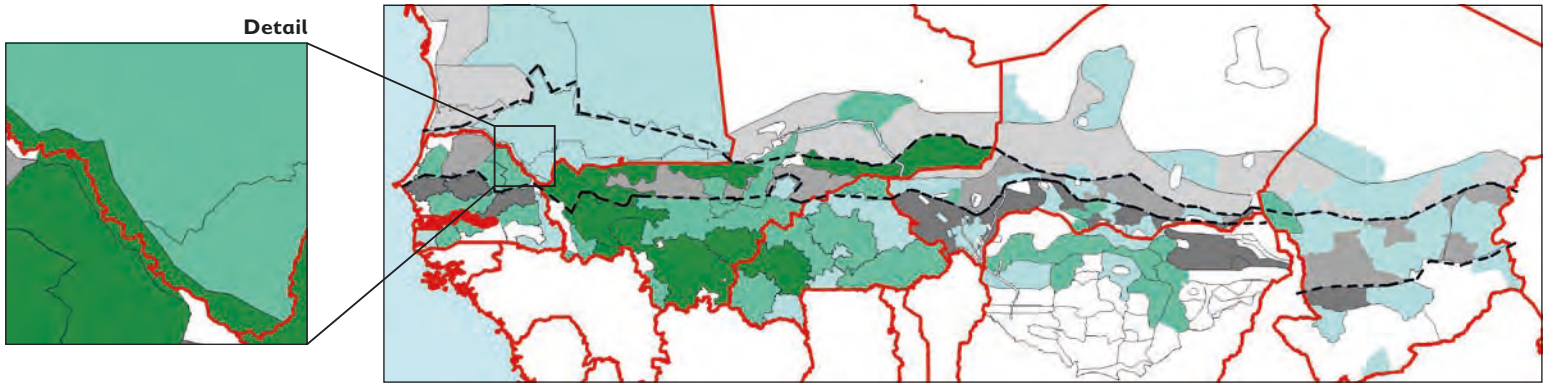
The pastoralists of Gouré (GPA) in north-east Niger seem to present an anomaly among the Better Off in Map 38: how can extra livestock sales not be their main coping strategy in a bad year? In this particular case, it is trade rather than livestock sales that comes top (see also Map 43). But the 'trade' relates particularly to pastoralists acting as brokers in cattle and camel sales for a commission, an activity that becomes particularly remunerative when transactions multiply in a bad year as people try to de-stock before animals die or become too emaciated to sell. But it may also be that in this particular instance some confusion arose in interviews between profits from brokering and profits from sales of own animals.

Otherwise, poorer people tend to rely on expanding their self-employment (Map 42), including selling firewood, cut fodder grass, and artisan products such as mats and basketry. Better Off people tend to try to expand earnings that do not require work with their hands, notably trading (Map 43).

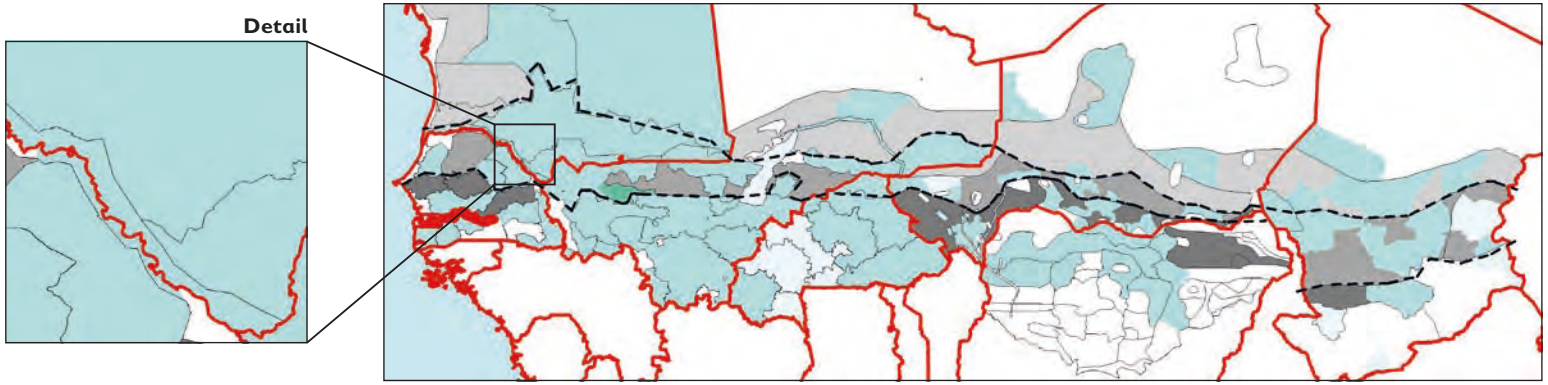
MAP 44: AVERAGE HOUSEHOLD SIZE

(Number of people in household)

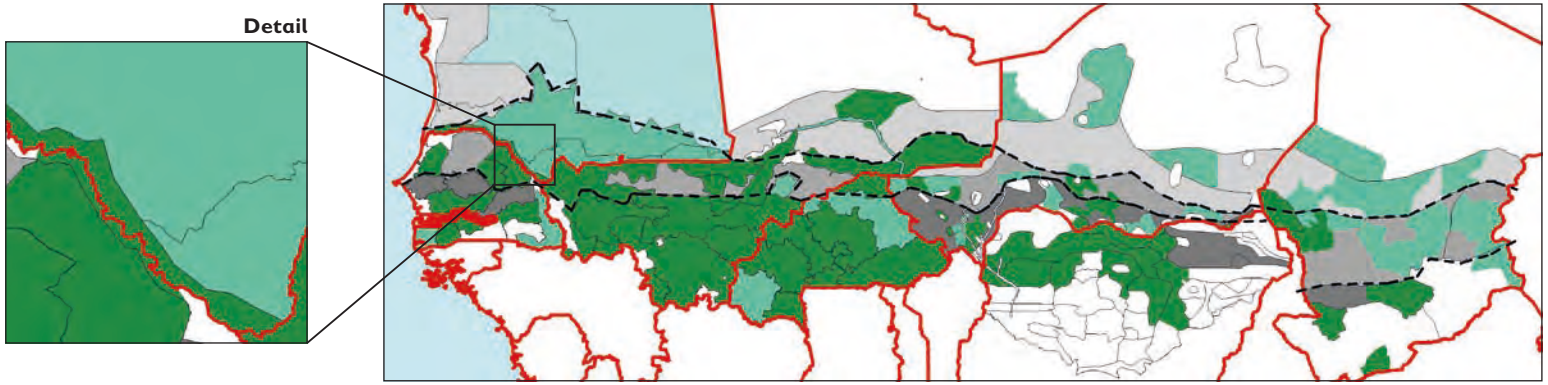
Average households



Very Poor households



Better Off households



LEGEND

Number of people per household

- 1–5
- 6–10
- 11–15
- >15

COMMENTARY MAP 44: AVERAGE HOUSEHOLD SIZE

The HEA methodology takes the household as its unit of reference because in rural economies in developing countries that is the universal unit of asset-holding, production, pooled income, and cash expenditure and consumption. Households in this sense may consist of one person (rare in rural Africa) or more than 20 people. In the Sahel where polygamy is common, if there is more than one wife, what is defined as the household depends on whether the quasi-nuclear family of each wife and her children operates separately, or whether there is sharing between them. Very frequently it is the latter – they 'eat from the same pot' – so that such households may be very large, even upwards of 25 members, living in separate dwellings within a compound but sharing the same assets and granary and even meals prepared on a rota basis. Unmarried or elderly kin (especially the widowed) often live with one or other nuclear family. The identification of household size in the fieldwork in a given area is not by a sampled mean, but refers to the 'typical' household within a wealth group, as estimated by focus groups, to which then the economic information refers.

The Average map shows a definite tendency for larger households to be found towards the southern half where the majority farming population live, and the Better Off map accentuates this pattern, although there are exceptions in both the agropastoral and pastoral bands. But what looks more like a rule than a tendency is that Very Poor households are smaller, mostly markedly smaller, than the Better Off. We are not in a position to make an analysis of this phenomenon, except to say that of course higher landholdings feed more people, and that it seems that wealth attracts more members to households and maybe thrives on the solidarity of the many. Livestock must also play a part, and in fact the differences between wealth groups in land per capita are by no means as great as the differences in livestock per capita. As regards the Very Poor it is common to be told in villages that 'they have many children': but given the small absolute sizes of their households, it looks as though this should be translated as having a higher proportion of children, ie, a higher dependency ratio, rather than larger households.

A note on the evidence from urban HEA baseline surveys

Although almost all the HEA baselines in the Sahel are for rural populations, a handful of urban or peri-urban baseline studies have been carried out over the years – for Bamako and Sikasso in Mali, for Niamey in Niger, for Ouagadougou in Burkina Faso and for Nouakchott in Mauritania. The motive has been to understand the situation of poorer households in cities, and secondarily to describe rural household economy in the immediate proximity of cities, where the households may be expected to be highly influenced in one way or another by the urban economy. In Niamey a separate study was made of areas subject to flooding. The Nouakchott study was called 'peri-urban' in that it dealt with peripheral shantytown areas; but it must be considered as a city study because there is no hint here of rural life. In the semi-desert setting of Nouakchott, surrounded by the Pastoral and Trade rural livelihood zone MR05, you either have a city-based occupation, or you are a pastoralist who moves around to find grazing for the livestock and who might also engage in trading to a greater or lesser extent. The situation is quite different around Ouagadougou and Sikasso, the truly peri-urban areas studied. In what follows we concentrate on the city HEA, although we briefly visit the peri-urban scene at the end.

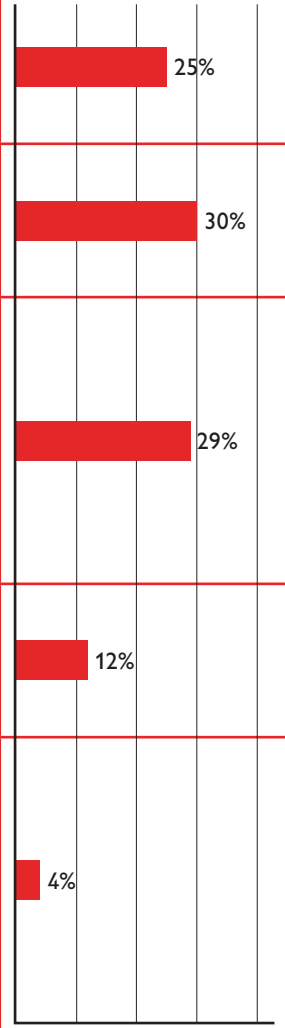
The basic HEA framework of analysis – sources of food, sources of cash, expenditure – is well adaptable to the urban circumstance, but clearly one big element of the rural scene is lacking completely or nearly so: crop and livestock production. A few people might make some income by market gardening in the few (and usually fast dwindling) patches of open land within cities. And a small minority of households may keep a cow or two, at considerable expense in fodder, for both home consumption or sale of milk; another minority might keep a very few goats in the courtyard for fattening and slaughter for home consumption or, less likely, for sale to a butcher. Some wealthier people (notably in Nouakchott) may own herds of livestock that they employ herders to look after, even far from the city. Some others may own land near or even far from the city which they cultivate with hired labour or by arrangement with rural kin. But otherwise the household economy in cities is based entirely on cash income from wages, self-employment, business profits or pensions, or remittances from kin working in other countries, and any food that is not a gift (possibly from a rural relative) must be purchased.

Therefore the identification of 'wealth groups' must be principally based on levels of cash income. In terms of 'livelihoods zoning' the big cities tend to be roughly divisible into localities or *quartiers* that exhibit a wealthier or a middling or a poorer income profile. HEA studies have sought to represent the poorer households of city populations via the poorer localities. But it is rare to find localities exclusively populated by poor people: unless they are pure slum or shantytown areas, as in the Nouakchott study, poor *quartiers* usually contain numbers of households with middle-level incomes as well as a few wealthy households.

In the poor localities studied in Bamako the wealth breakdown was as shown in the table on the next page (in Niamey it was similar).

Wealth group characteristics in poorer *quartiers* of Bamako, Mali in 2015

Wealth group	% of households	House-hold size	% of the sample area's population	Number of children at school	Number of people working in the household	Typical occupations	Household income in CFA francs**	Income per capita in CFA francs**	Type of house	Assets
Very Poor	25%	8–10	15%	2–3	2–3	Unskilled workers (construction, transport, emptying latrines, guards, running errands, domestic service), hawker/ petty trade	3,500–4,000/ day	415/day	Traditional earth-built, mainly rented at 7,500–10,000 fcfa/ month	Cellphone
Poor	30%	12–15	26%	4–5	4–5		5,500–6,500/ day	450/day	Traditional earth-built, mainly rented at 10,000–20,000 fcfa/ month	Cellphone
Middle-	29%	15–20	33%	6–7	4–5	Petty trade, lower-level civil servants, skilled and unskilled workers, specialised occupations (electrician, metal soldering, garage mechanic, etc)	400,000–450,000/ month	24,860/ month	Both traditional earth-built and modern-type houses – usually owned by the family	Bicycle, motorcycle, refrigerator
Middle+	12%	20–30*	20%	8–9	3–4	Higher-level civil servants, middle level traders, higher-qualified workers	600,000–1,000,000/ month	32,000/ month	Modern house – owned by the family	Bicycle, motorcycle/car, refrigerator, other urban land/house rented out
Better Off	4%	20–30*	6%	8–9	3–4	Large-scale traders (wholesale, export, bigger shops), higher-level civil servants, entrepreneurs	>1,000,000/ month	>40,000/ month	Modern house – owned by the family	Motorcycle, car/truck(s) refrigerator, own other urban land/house(s) rented out, own productive agricultural land and some livestock



* Sometimes more, depending on the ethnic group

** 500 CFA francs = US$1

It is a phenomenon of our time that the cities of the Sahel, like those in other developing countries, attract greatly increasing numbers of rural people to migrate and try to earn a living. They typically reside at first, or even long term, with kin already established. Therefore the size of the city households among the poorer may be larger than in the countryside, with more adolescents or young adults and possibly a somewhat lower 'dependency' ratio, that is, a smaller proportion of non-earning members. In poorer households especially, income is earned through diverse occupations: of three working members, one man might do casual labour, his wife might take in laundry, and an adolescent male might be a street hawker. Women contribute substantially to the cash earnings and are very often the chief, regular breadwinners even when a male partner is present: they tend to be more versatile as market retailers, runners of street-side food stalls, providers of domestic service, etc, whereas men tend to have only unskilled labour to offer. For wealthier households it is very common to host sons and daughters of rural kin while they go through secondary school or further education: these households may well show a higher dependency ratio than either their poorer neighbours or among their fellows in the countryside.

In US dollar terms in 2015, the income per capita for a Very Poor household in Bamako living by intermittent casual labour and other non-regular earnings, the income was around $17 per month (if we assume 20 days of income at the rate quoted). For the Poor with a more regular daily income at, say, 25 days worked per month the per capita income was not more than $25. But for the Better Off it was around $80 per month. In the Nouakchott shantytown the occupation profile was much narrower than in the Bamako or Niamey examples: there were no middle-level office workers, let alone bigger business people, and the relatively Better Off here earned only three times more per capita than the Very Poor.

As we have said, virtually all food has to be purchased. In Bamako the Very Poor managed in 2015 to just meet their minimum calorie requirement – 80% coming from cereals and 20% from all other kinds of food: pulses, oil, sugar, vegetables (but extremely little meat or fish). Such is the preference for (mostly imported) rice in the cities that here even the Very Poor, teetering on the edge of hunger, bought half of their cereals as rice, even though in most months it was substantially more expensive than the sorghum or millet otherwise available. We may note that urban economic life is not dominated by the seasons as is rural life. Yet it was reported in both Niamey and Nouakchott that there is some reflection in the city of the rural 'lean season' (*soudure*). Before the country's new harvest, which the city mainly depends upon, poorer households suffer from high food prices in the market (for they never have the capital to buy substantial stocks of cereals cheaper in the earlier months after the previous harvest). But they cannot be described as food insecure in the same way as so many of their rural counterparts, even in a poor harvest year, except to say that at least for the Very Poor, their *livelihood* insecurity – the fluctuation in their daily earnings – may often leave them unsure where the next meal or two will come from. Meanwhile, the Better Off and Middle households were said to be affected by increased lean-season requests from rural kin to send them cash.

As regards expenditure, if we were surprised to find early in this Atlas that the rural Very Poor rarely spend more than 50% of their income on staple food, we may be all the more surprised to discover the urban Very Poor in Bamako spending only a little above 30% of their income on staples, and another 25% or so on other foods. In Niamey the figures were higher by 10% on each count, but still perhaps not as high as one might expect. The Better Off and Middle households, with their far higher income, spent less per capita on staples in absolute terms and far less in proportional terms; but they spent far more on other foods, getting from them more calories and a greatly more varied and palatable diet than the poorer households.

The reason for the seemingly low proportion of food expenditure by poorer city dwellers compared to their rural counterparts lies in the cost of food as against the other competing costs of the most basic living. In the city these are more varied than in the countryside, if not always a greater proportion of the total budget: the list includes rent, electricity for lighting and possibly cooking or refrigeration, other fuel for cooking, domestic water charges and transport. This last may be quite substantial, because poorer people living on the outskirts of cities, whether construction workers, service providers or just street hawkers, often have to travel a distance to work every day that cannot be covered on foot. They cannot afford the time or expense of returning

home for lunch so they either take a pack of food with them or buy a plate of rice and sauce or a baguette sandwich at a roadside food stall – a burgeoning industry in many cities.

What can be said of the two peri-urban studies proper, without going into detail, is that they are surprisingly similar to most other agricultural zone baselines in matters of land holding, food and livestock production, and the structure of income and expenditure, with little evidence even of relatively high casual employment in town. The influence of the city may be seen in higher prices for produce, including livestock, because farmers are selling to the city market, where prices tend to be higher than elsewhere in the country, and even if they sell to a trader the discount for transport will be comparatively small. Market gardening assumes a greater role because of the big, nearby market for perishable produce, and profits per unit area are high on land with nearby water for irrigation after the rainy season. No doubt self-employment is better remunerated too, except that around Ouagadougou there is little opportunity to make money from selling firewood as nearby natural wood resources are now so exhausted that firewood and charcoal come in from as far as 50 kilometres or more away.

This very rural profile is more surprising around a city the size of Ouagadougou than around the smaller provincial centre of Sikasso, with its lush hinterland, although that town is growing fast. Perhaps it takes a very big city indeed to create the kind of peri-urban economy that might have been expected. It is certain that such a study around Dakar-Thiès in Senegal or Kano in northern Nigeria, for example, would show a greater proportion of income from urban casual or contract work, with many young people staying in the city during the week and returning home with money at the weekend.

PHOTO: GINA KANE

Annex 1: Livelihood zones identification

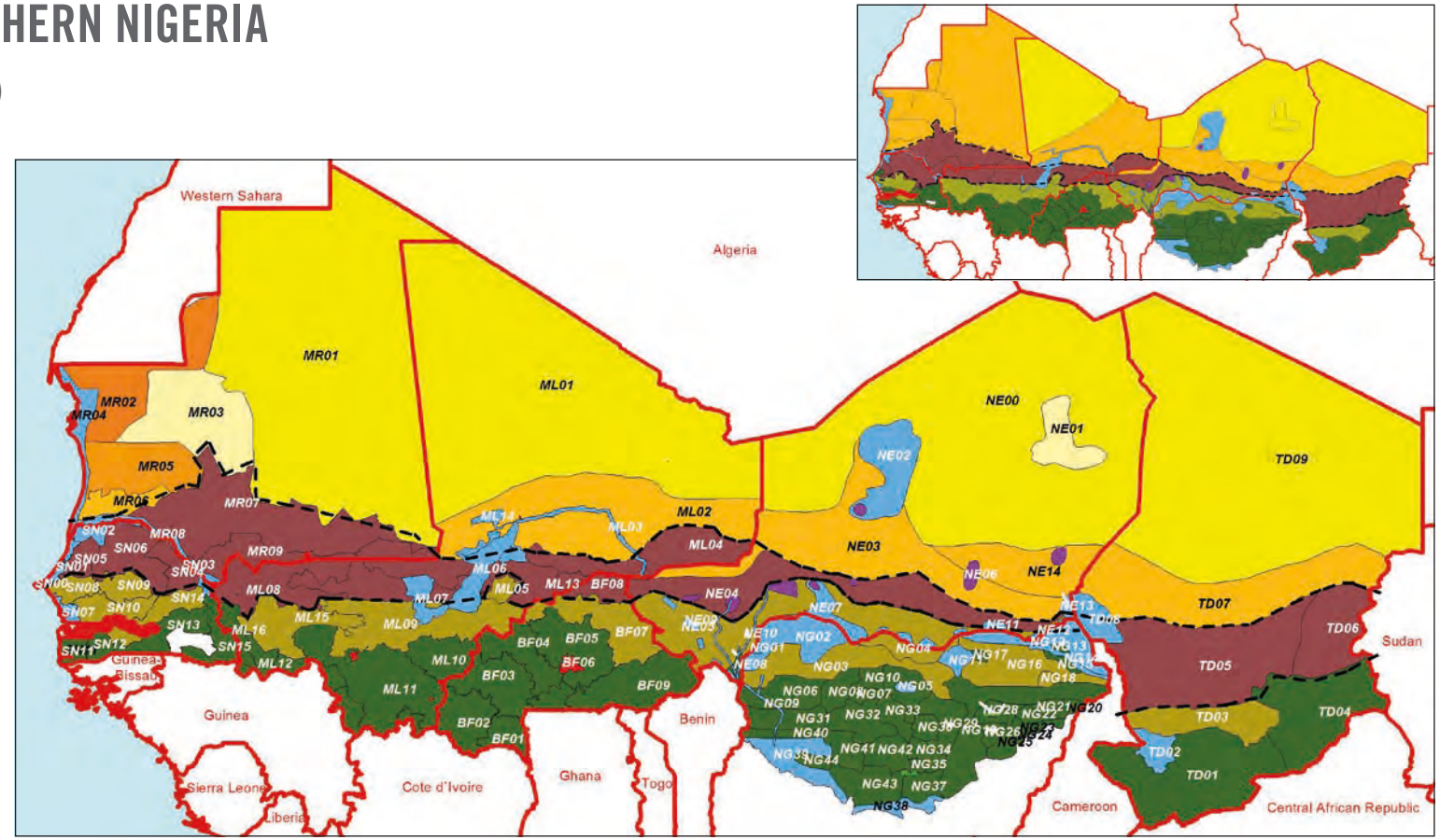
As explained in section 1.3 of the Introduction, due to the history of livelihood zones mapping and HEA baseline fieldwork, with the exception of Burkina Faso and Northern Nigeria, the areas covered by HEA studies have not always been formally taken as representing whole zones as shown in the national livelihood zones maps. For the present therefore, such HEA studies have retained a separate coding. In the following juxtaposition of the national maps and the HEA maps the reader can see easily which HEA study fits within which national livelihood zone.

THE SAHEL AND NORTHERN NIGERIA

LIVELIHOOD ZONES (DETAIL)

LEGEND

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



THE SAHEL AND NORTHERN NIGERIA

NATIONAL LIVELIHOOD ZONES

BURKINA FASO

- BF01 South tubers and cereals
- BF02 Southwest fruits, cotton and cereals
- BF03 West cotton and cereals
- BF04 West cereals and remittances
- BF05 Central plateau cereals and market gardening
- BF06 Ouagadougou peri-urban
- BF07 North and east livestock and cereals
- BF08 North transhumant pastoralism and millet
- BF09 Southeast cereals, livestock, forestry and fauna

CHAD

- TD01 Southern Staple and Cash Crops
- TD02 Southwest Rice
- TD03 South-central Cereals
- TD04 Southeast Flood Retreat and Gum Arabic
- TD05 Central Agropastoral
- TD06 Eastern Rainfed Cereals and Market Gardening
- TD07 Transhumance
- TD08 Western Agropastoral and Fishing
- TD09 N Oasis Cultivation with Camels and Natron

MALI

- ML01 Nomadism and Trans-Saharan Trade
- ML02 Northern Livestock
- ML03 Niger Loop Rice and Fishing
- ML04 Central Livestock, Millet and Remittances
- ML05 Dogon Plateau Millet and Shallots
- ML06 Niger Delta Rice, Cattle and Fishing
- ML07 Office du Niger Rice and Market Gardening
- ML08 NW Sorghum, Remittances and Livestock
- ML09 Central Sorghum and Millet
- ML10 Southeastern Sorghum, Millet and Cotton
- ML11 Southern Maize, Cotton and Fruits
- ML12 SW Maize, Livestock and Gold Mining
- ML13 Center-eastern Millet and Livestock
- ML14 Lakes Recessional Millet and Sorghum
- ML15 Western Groundnut, Sorghum and Maize
- ML16 Southwestern Gold Mining and Maize

MAURITANIA

- MR01 Nomadic pastoralist
- MR02 Mine and pastoral
- MR03 Mixed pastoral, oases and wadis
- MR04 Littoral coastal fishing
- MR05 Pastoral and trade
- MR06 Transhumant pastoralism
- MR07 Agropastoralism
- MR08 Senegal valley agriculture
- MR09 Rainfed agriculture

NIGER

- NE00 Not Zoned (Desert)
- NE01 North-east Oases: Dates, Salt and Trade
- NE02 Aïr Massif Irrigated Gardening
- NE03 Transhumant and Nomad Pastoralism
- NE04 Agropastoral Belt
- NE05 Rainfed Millet and Sorghum Belt
- NE06 Cropping/Herding with High Out-migration
- NE07 Southern Irrigated Cash Crops
- NE08 Southwestern Cereals with Fan-Palm Products
- NE09 Niger River Irrigated Rice
- NE10 Dallols Seasonal Water-Course Irrigated Crops
- NE11 SE Natron Salt and Small Basin Irrigated Dates
- NE12 Komadougou Irrigated Peppers
- NE13 Lake Chad Flood-Retreat Cultivation and Fishing
- NE14 Transhumant and Nomad Pastoralism – Camels

THE SAHEL AND NORTHERN NIGERIA

NATIONAL LIVELIHOOD ZONES continued

NIGERIA

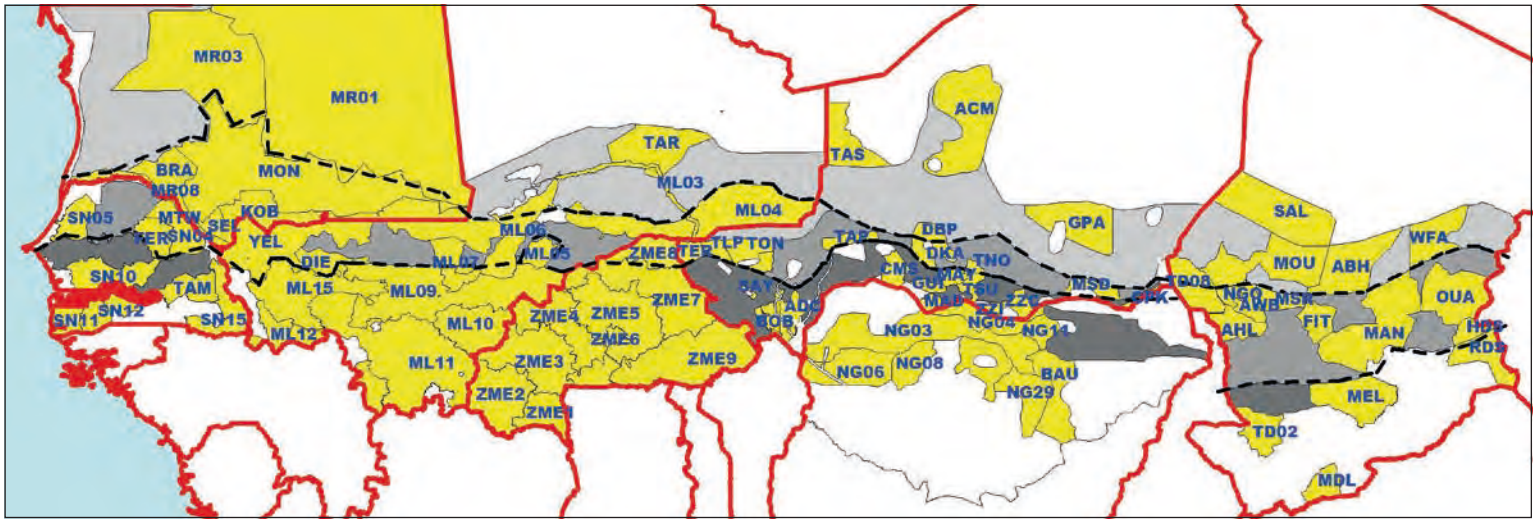
- NG01 NW Fishing and Rice
- NG02 Rimasokoto Irrigated Rice, Millet, Vegetables
- NG03 NW Millet, Cowpeas and Groundnuts
- NG04 NW Millet and Sesame
- NG05 NW Irrigated Wheat and Vegetables
- NG06 NW Sorghum, Cowpeas and Groundnuts
- NG07 NW Cotton, Maize, Rice
- NG08 NW Cotton, Groundnuts and Mixed
- NG09 Niger River Rice Dominant
- NG10 NW Cotton and Maize
- NG11 Hadejia Valley Mixed Economy
- NG12 NE Fishing Dominant
- NG13 NE Rice and Chilli Peppers
- NG14 NE Fishing, Maize and Cowpeas
- NG15 NE Wheat and Chili Peppers
- NG16 NE Millet and Cowpeas
- NG17 NE Yobe Lowland Rice
- NG18 NE Millet, Cowpeas and Groundnuts
- NG19 NE Sorghum, Millet and Cowpeas
- NG20 NE Maize and Sorghum
- NG21 NE Sorghum, Groundnuts and Cowpeas
- NG22 NE Maize, Cotton and Soybeans
- NG23 NE Vegetables and Maize
- NG24 NE Rice, Maize and Sorghum
- NG25 NE Sorghum, Cotton and Cowpeas
- NG26 NE Maize, Cowpeas and Cotton
- NG27 NE Special Grazing Area
- NG28 NE Maize and Groundnuts
- NG29 NE Sorghum, Maize and Cowpeas
- NG30 NE Rice and Sweet Potatoes
- NG31 NC Maize and Sorghum
- NG32 NC Maize, Groudnuts and Rice
- NG33 NC Maize Dominant, Sorghum, Tubers
- NG34 NC Yams, Cassava and Sorghum
- NG35 NE Rice, Sweet Potatoes and Cotton
- NG36 NC Sweet Potatoes Dominant
- NG37 NC Sorghum, Sesame, Rice
- NG38 River Benue Fishing Dominant
- NG39 Niger River Floodplain Rice, Sorghum
- NG40 NC Maize and Yams
- NG41 NC Yams, Maize and Sorghum
- NG42 NC Ginger, Sorghum, Maize, Tubers
- NG43 NC Cassava and Sorghum
- NG44 NC Rice, Sorghum, Melon, Cassava

SENEGAL

- SN00 Urban Area – Dakar
- SN01 Niayes Gardening and Fishing
- SN02 Delta Rice, Horticulture and Agricultural Labour
- SN03 Valley Rice and Remittances
- SN04 Dieri Millet and Remittances
- SN05 Rainfed Cowpea and Groundnut
- SN06 Sylvopastoral Livestock and Gathering
- SN07 Small Coast Fishing and Tourism
- SN08 Rainfed Groundnut and Millet
- SN09 Agropastoral Groundnut
- SN10 Rainfed Groundnut and Cereals
- SN11 Forest and Rainfed Rice
- SN12 Forest, Rainfed Rice and Groundnut
- SN13 Rainfed Maize, Cotton and Cattle
- SN14 Rainfed Maize and Lumber
- SN15 Rainfed Maize and Artisanal Gold Mining

THE SAHEL AND NORTHERN NIGERIA

HEA BASELINE COVERAGE



LEGEND

Livelihood Zones (and parts of LZs) with full baseline

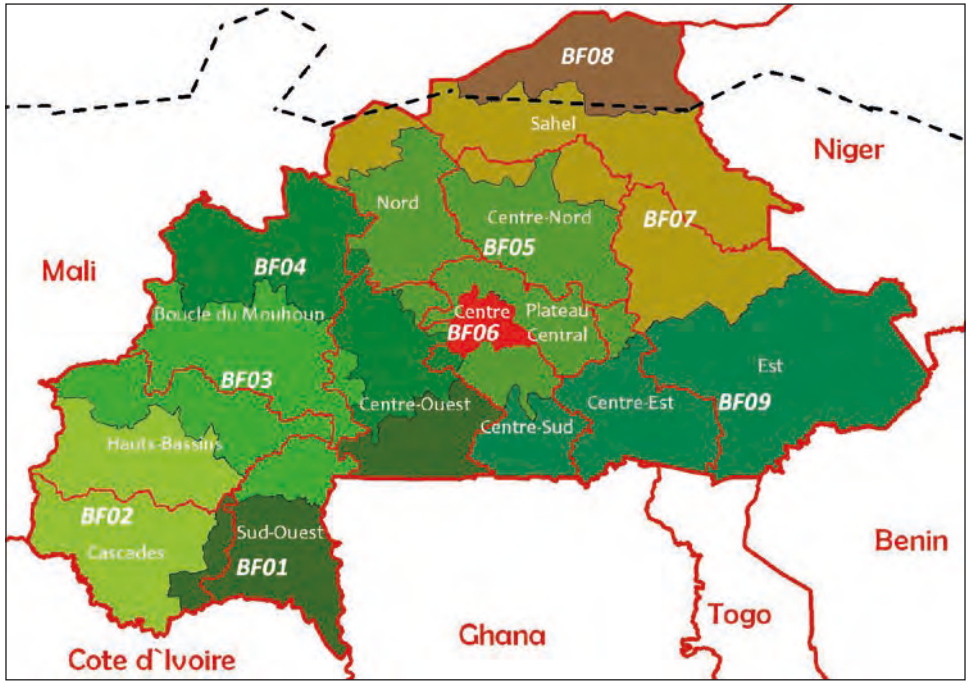
Grey-shading indicates livelihood zones that are part of the following general sahelian zones:

- Pastoral
- Agropastoral
- Rainfed agriculture (sahelian)

--- Dotted lines indicate boundaries between these three general zones.

BURKINA FASO

NATIONAL LIVELIHOOD ZONES

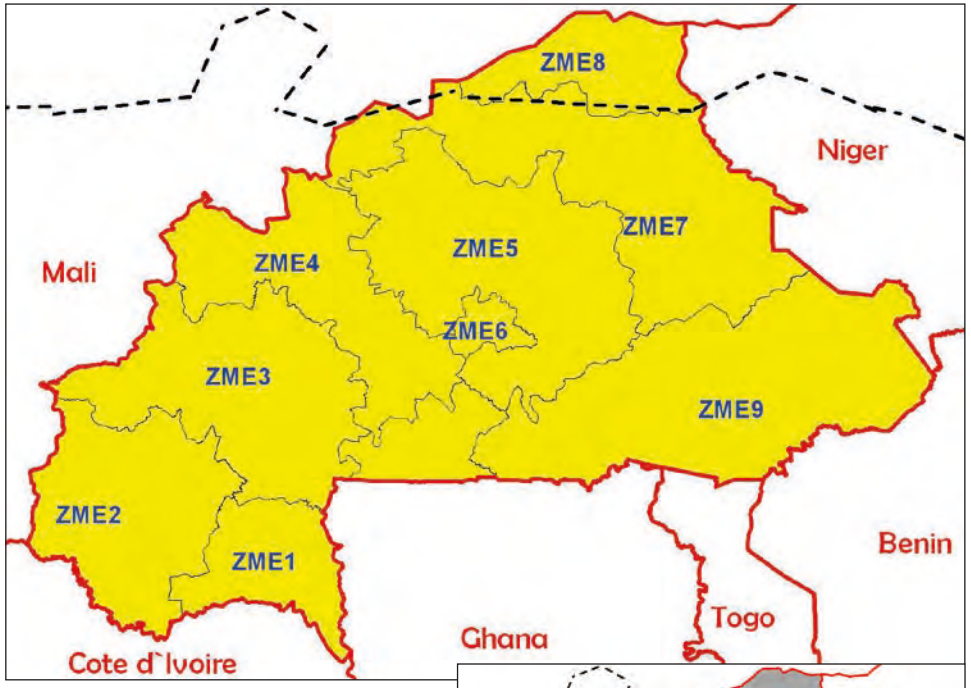


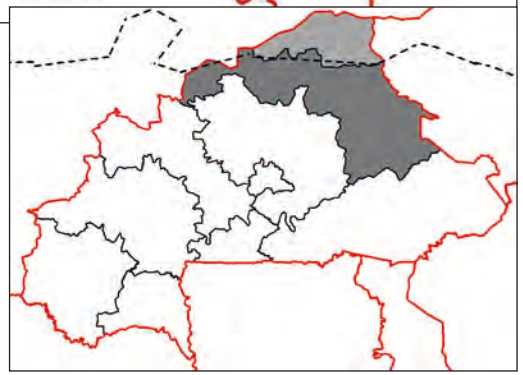
SOURCE: USAID/FEWS NET

LEGEND

- Region boundaries
- BF01 South tubers and cereals
- BF02 Southwest fruits, cotton and cereals
- BF03 West cotton and cereals
- BF04 West cereals and remittances
- BF05 Central plateau cereals and market gardening
- BF06 Ouagadougou peri-urban
- BF07 North and east livestock and cereals
- BF08 North transhumant pastoralism and millet
- BF09 Southeast cereals, livestock, forestry and fauna

HEA BASELINE COVERAGE





LEGEND

- Livelihood Zones (and parts of LZs) with full baseline

Grey-shading (see main map and inset) indicates livelihood zones that are part of the following general sahelian zones:

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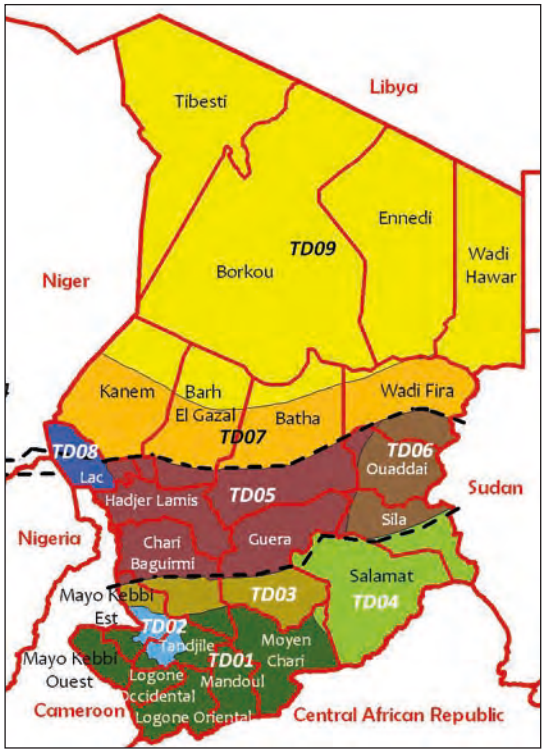
- --- Dotted lines indicate boundaries between these three general zones.

CHAD

NATIONAL LIVELIHOOD ZONES

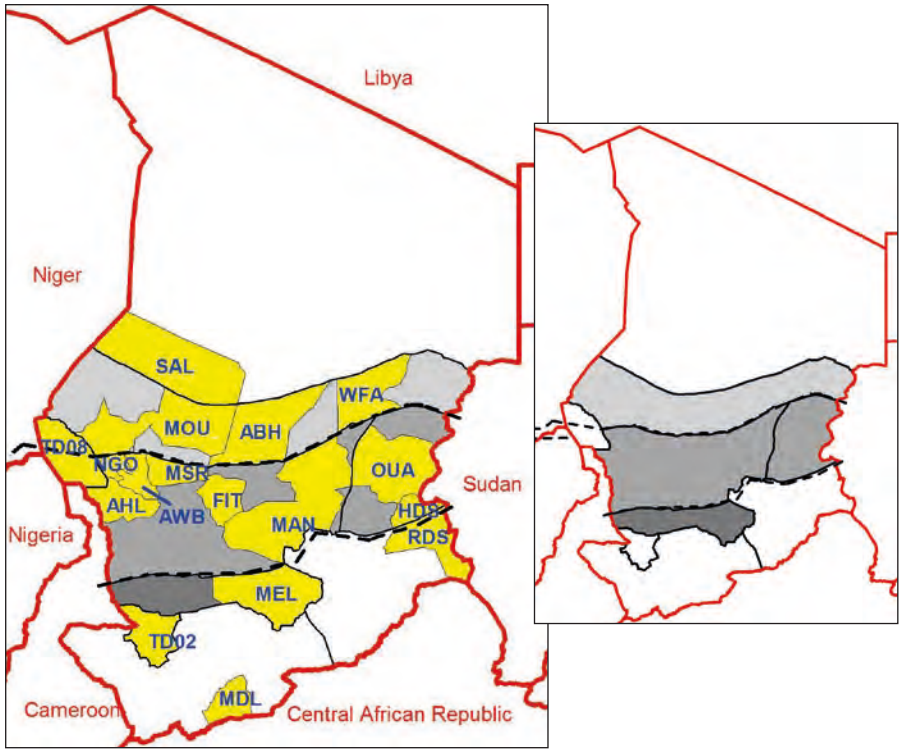


SOURCE: USAID/FEWS NET

LEGEND

- Region boundaries
- TD01 Southern Staple and Cash Crops
- TD02 Southwest Rice
- TD03 South-central Cereals
- TD04 Southeast Flood Retreat and Gum Arabic
- TD05 Central Agropastoral
- TD06 Eastern Rainfed Cereals and Market Gardening
- TD07 Transhumance
- TD08 Western Agropastoral and Fishing
- TD09 N Oasis Cultivation with Camels and Natron

HEA BASELINE COVERAGE



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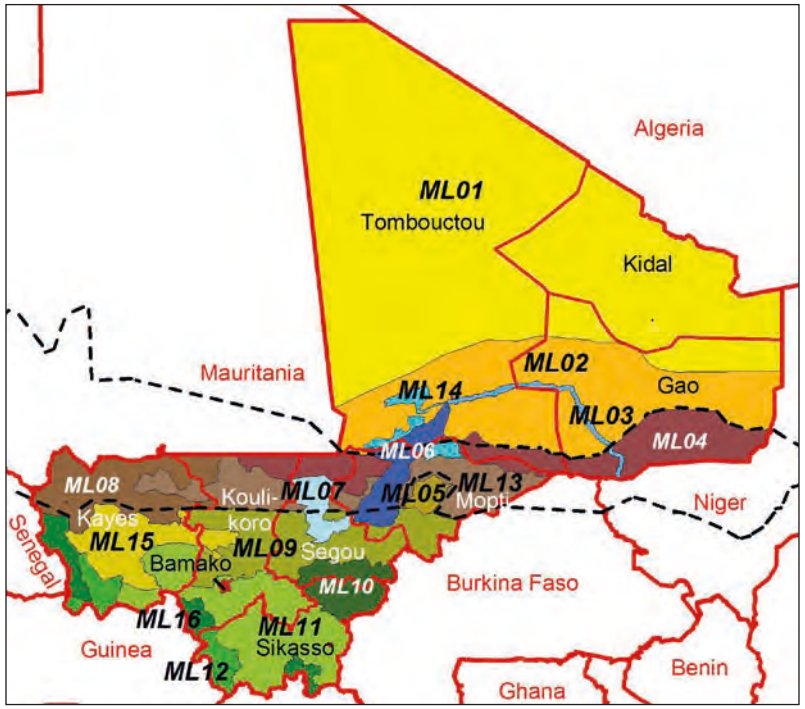
MALI

NATIONAL LIVELIHOOD ZONES

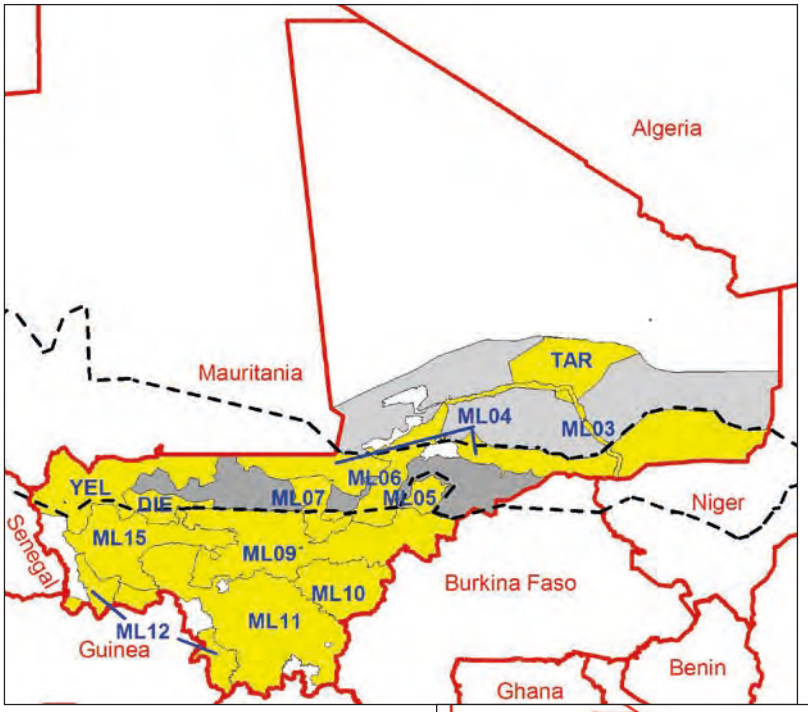


SOURCE: USAID/FEWS NET

LEGEND

- Region boundaries
- ML01 Nomadism and Trans-Saharan Trade
- ML02 Northern Livestock
- ML03 Niger Loop Rice and Fishing
- ML04 Central Livestock, Millet and Remittances
- ML05 Dogon Plateau Millet and Shallots
- ML06 Niger Delta Rice, Cattle and Fishing
- ML07 Office du Niger Rice and Market Gardening
- ML08 NW Sorghum, Remittances and Livestock
- ML09 Central Sorghum and Millet
- ML10 Southeastern Sorghum, Millet and Cotton
- ML11 Southern Maize, Cotton and Fruits
- ML12 SW Maize, Livestock and Gold Mining
- ML13 Center-eastern Millet and Livestock
- ML14 Lakes Recessional Millet and Sorghum
- ML15 Western Groundnut, Sorghum and Maize
- ML16 Southwestern Gold Mining and Maize

HEA BASELINE COVERAGE



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- Rainfed agriculture (sahelian)
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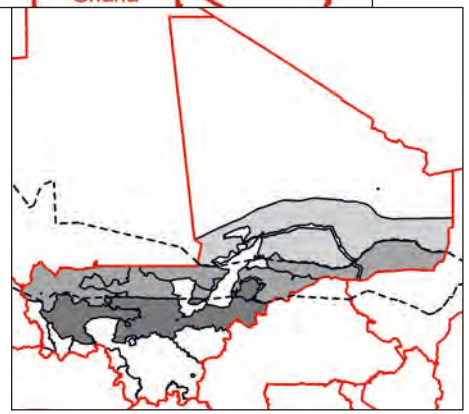


MAURITANIA

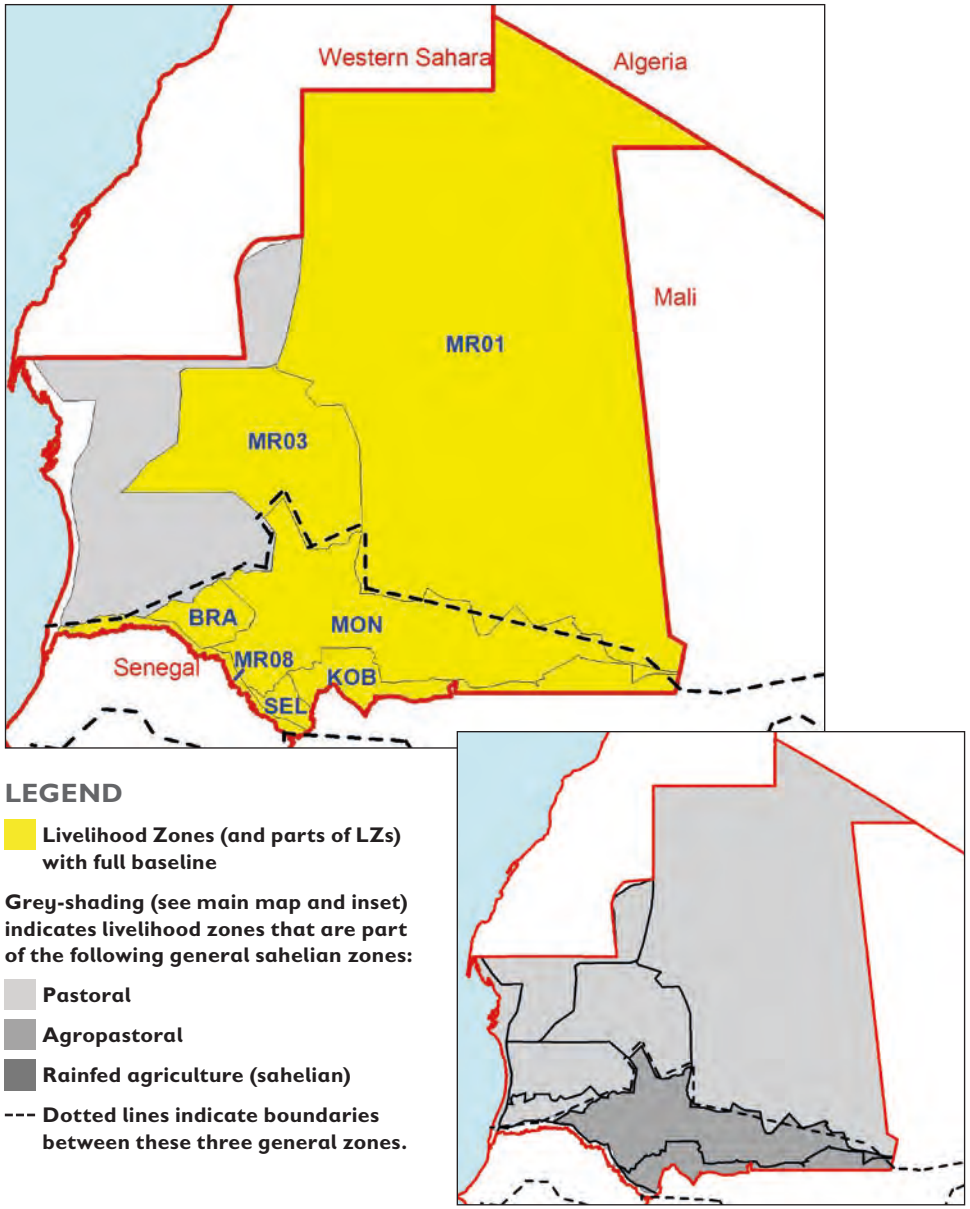
NATIONAL LIVELIHOOD ZONES

SOURCE: USAID/FEWS NET

LEGEND

- Region boundaries
- MR01 Nomadic pastoralist
- MR02 Mine and pastoral
- MR03 Mixed pastoral, oases and wadis
- MR04 Littoral coastal fishing
- MR05 Pastoral and trade
- MR06 Transhumant pastoralism
- MR07 Agropastoralism
- MR08 Senegal valley agriculture
- MR09 Rainfed agriculture

HEA BASELINE COVERAGE



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- Livelihood Zones (and parts of LZs) with full baseline

Grey-shading (see main map and inset) indicates livelihood zones that are part of the following general sahelian zones:

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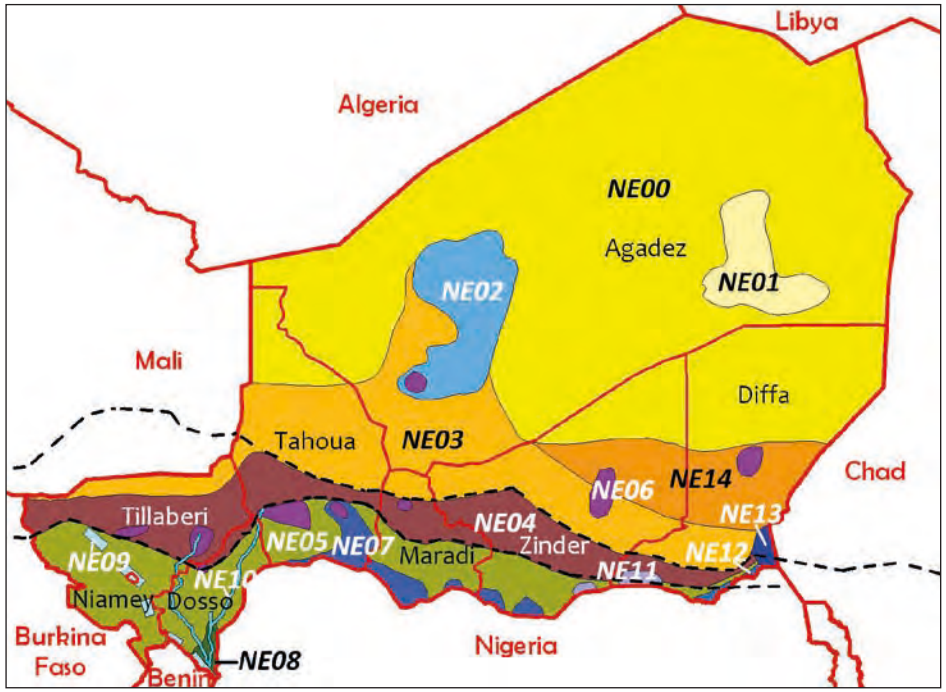
- Rainfed agriculture (sahelian)
- --- Dotted lines indicate boundaries between these three general zones.

NIGER

NATIONAL LIVELIHOOD ZONES



SOURCE: USAID/FEWS NET

LEGEND

- Region boundaries
- NE00 Not Zoned (Desert)
- NE01 North-east Oases: Dates, Salt and Trade
- NE02 Aïr Massif Irrigated Gardening
- NE03 Transhumant and Nomad Pastoralism
- NE04 Agropastoral Belt
- NE05 Rainfed Millet and Sorghum Belt
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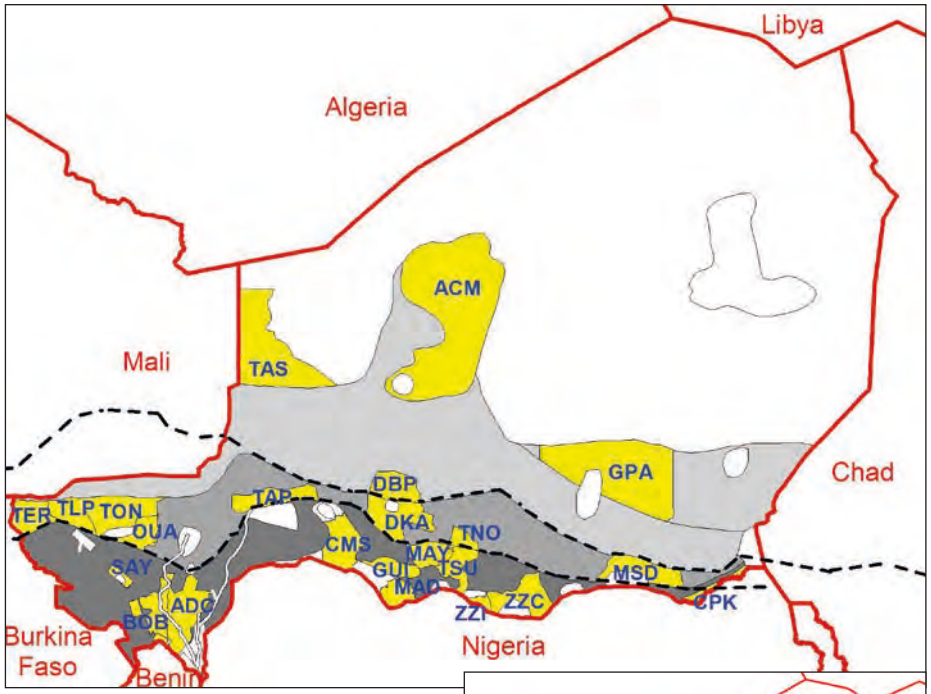
- NE11 SE Natron Salt and Small Basin Irrigated Dates
- NE12 Komadougou Irrigated Peppers
- NE13 Lake Chad Flood-Retreat Cultivation and Fishing
- NE14 Transhumant and Nomad Pastoralism – Camels

HEA BASELINE COVERAGE



LEGEND

- Livelihood Zones (and parts of LZs) with full baseline

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- Rainfed agriculture (sahelian)
- --- Dotted lines indicate boundaries between these three general zones.

NORTHERN NIGERIA

LIVELIHOOD ZONES*

LEGEND

- State boundaries
- NG01 NW Fishing and Rice
- NG02 Rimasokoto Irrigated Rice, Millet, Vegetables
- NG03 NW Millet, Cowpeas and Groundnuts
- NG04 NW Millet and Sesame
- NG05 NW Irrigated Wheat and Vegetables
- NG06 NW Sorghum, Cowpeas and Groundnuts
- NG07 NW Cotton, Maize, Rice
- NG08 NW Cotton, Groundnuts and Mixed
- NG09 Niger River Rice Dominant
- NG10 NW Cotton and Maize
- NG11 Hadejia Valley Mixed Economy
- NG12 NE Fishing Dominant
- NG13 NE Rice and Chilli Peppers
- NG14 NE Fishing, Maize and Cowpeas
- NG15 NE Wheat and Chili Peppers
- NG16 NE Millet and Cowpeas
- NG17 NE Yobe Lowland Rice
- NG18 NE Millet, Cowpeas and Groundnuts
- NG19 NE Sorghum, Millet and Cowpeas
- NG20 NE Maize and Sorghum
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- NG23 NE Vegetables and Maize
- NG24 NE Rice, Maize and Sorghum
- NG25 NE Sorghum, Cotton and Cowpeas
- NG26 NE Maize, Cowpeas and Cotton
- NG27 NE Special Grazing Area
- NG28 NE Maize and Groundnuts
- NG29 NE Sorghum, Maize and Cowpeas
- NG30 NE Rice and Sweet Potatoes
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- NG32 NC Maize, Groudnuts and Rice
- NG33 NC Maize Dominant, Sorghum, Tubers
- NG34 NC Yams, Cassava and Sorghum
- NG35 NE Rice, Sweet Potatoes and Cotton
- NG36 NC Sweet Potatoes Dominant
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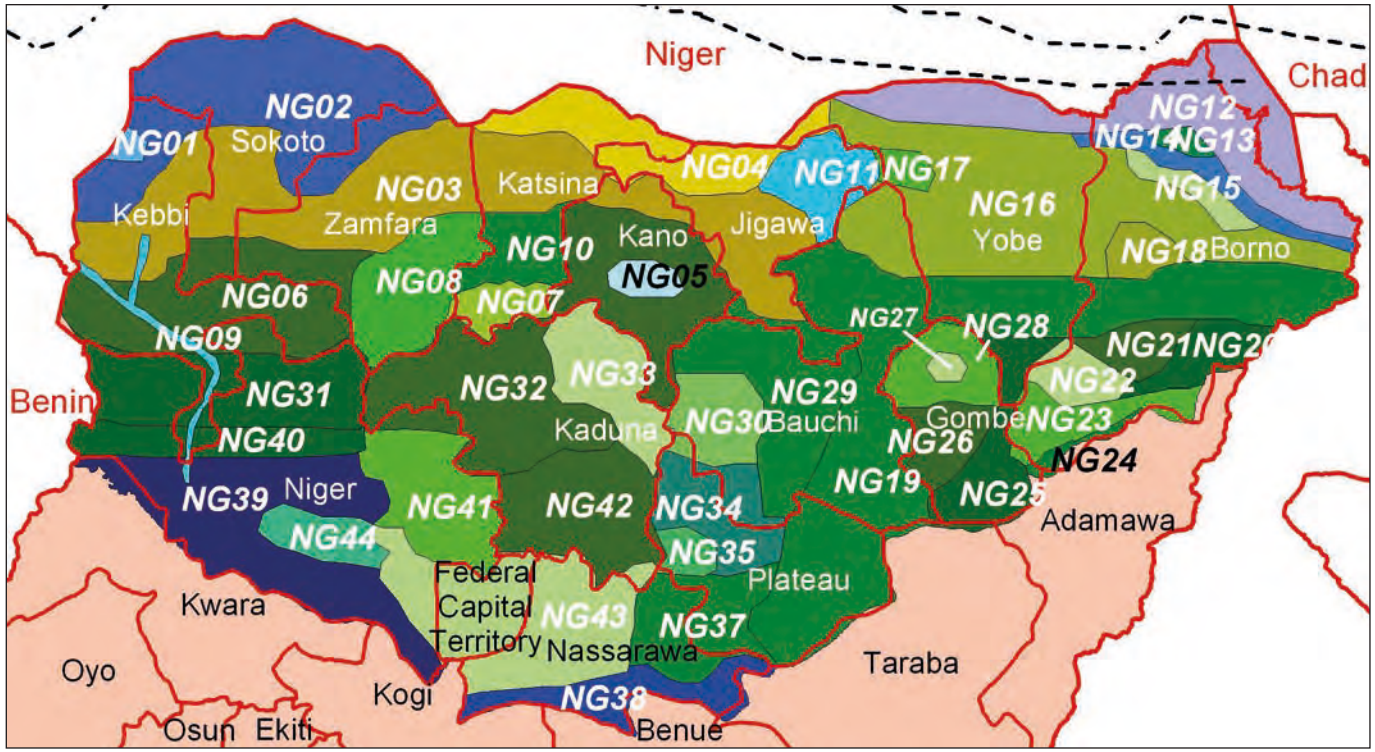
- NG38 River Benue Fishing Dominant
- NG39 Niger River Floodplain Rice, Sorghum
- NG40 NC Maize and Yams
- NG41 NC Yams, Maize and Sorghum
- NG42 NC Ginger, Sorghum, Maize, Tubers
- NG43 NC Cassava and Sorghum
- NG44 NC Rice, Sorghum, Melon, Cassava



SOURCE: USAID/FEWS NET

* Livelihood zones for northern Nigeria as defined by FEWS NET in 2007

HEA BASELINE COVERAGE

LEGEND

Livelihood Zones (and parts of LZs) with full baseline

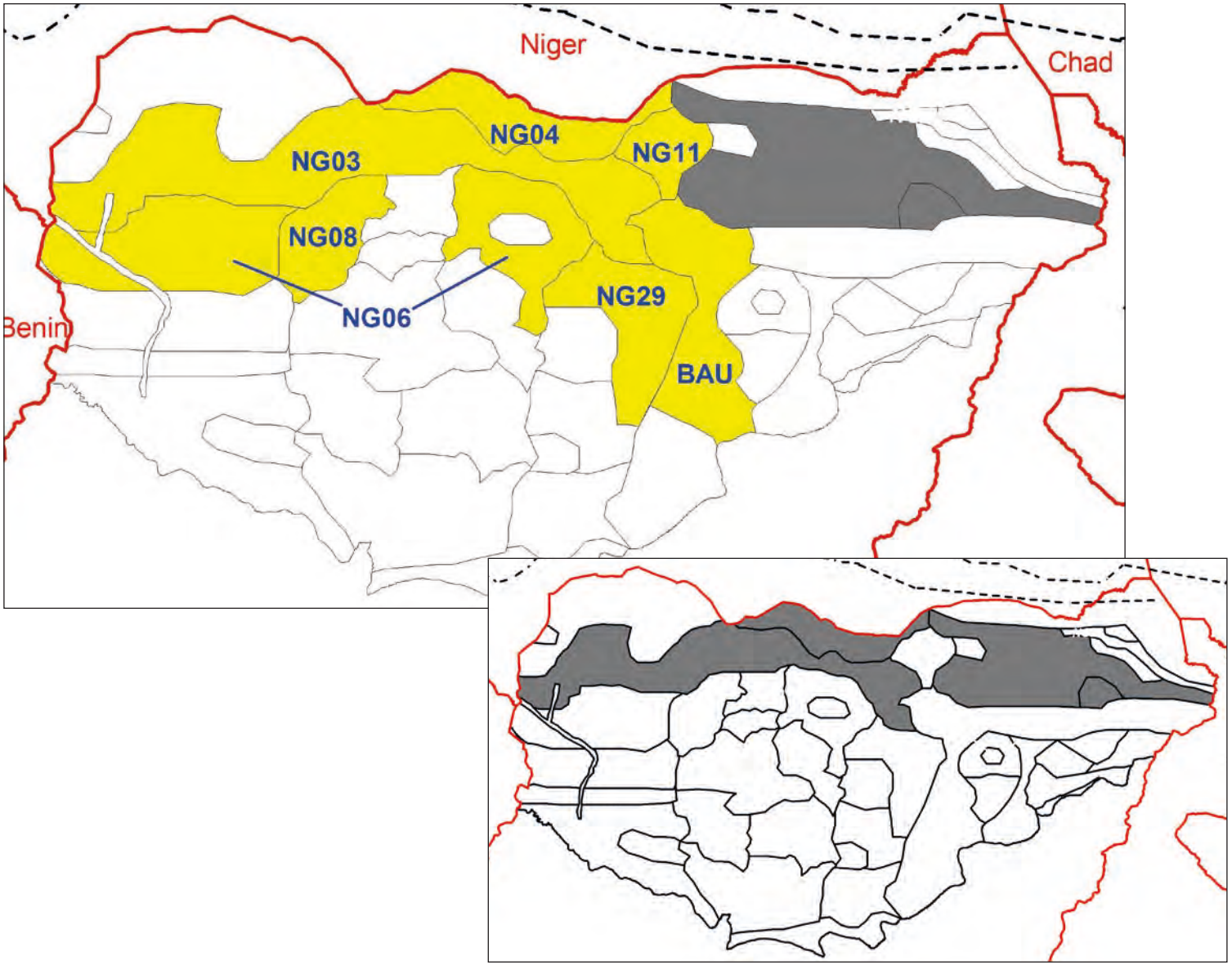
Grey-shading (see main map and inset) indicates livelihood zones that are part of the following general sahelian zones:

Pastoral

Agropastoral

Rainfed agriculture (sahelian)

--- Dotted lines indicate boundaries between these three general zones.



SENEGAL

NATIONAL LIVELIHOOD ZONES

LEGEND

- Region boundaries
- SN00 Urban Area – Dakar
- SN01 Niayes Gardening and Fishing
- SN02 Delta Rice, Horticulture and Agricultural Labour
- SN03 Valley Rice and Remittances
- SN04 Dieri Millet and Remittances
- SN05 Rainfed Cowpea and Groundnut
- SN06 Sylvopastoral Livestock and Gathering
- SN07 Small Coast Fishing and Tourism
- SN08 Rainfed Groundnut and Millet
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- SN12 Forest, Rainfed Rice and Groundnut
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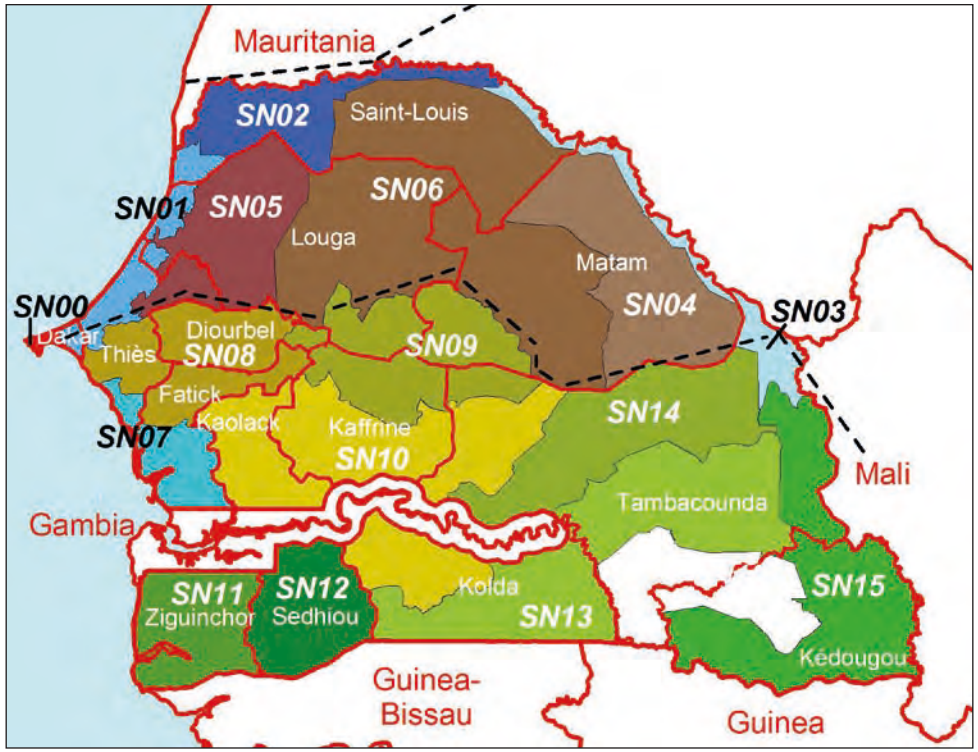
- SN14 Rainfed Maize and Lumber
- SN15 Rainfed Maize and Artisanal Gold Mining



SOURCE: USAID/FEWS NET

HEA BASELINE COVERAGE

LEGEND

Livelihood Zones (and parts of LZs) with full baseline

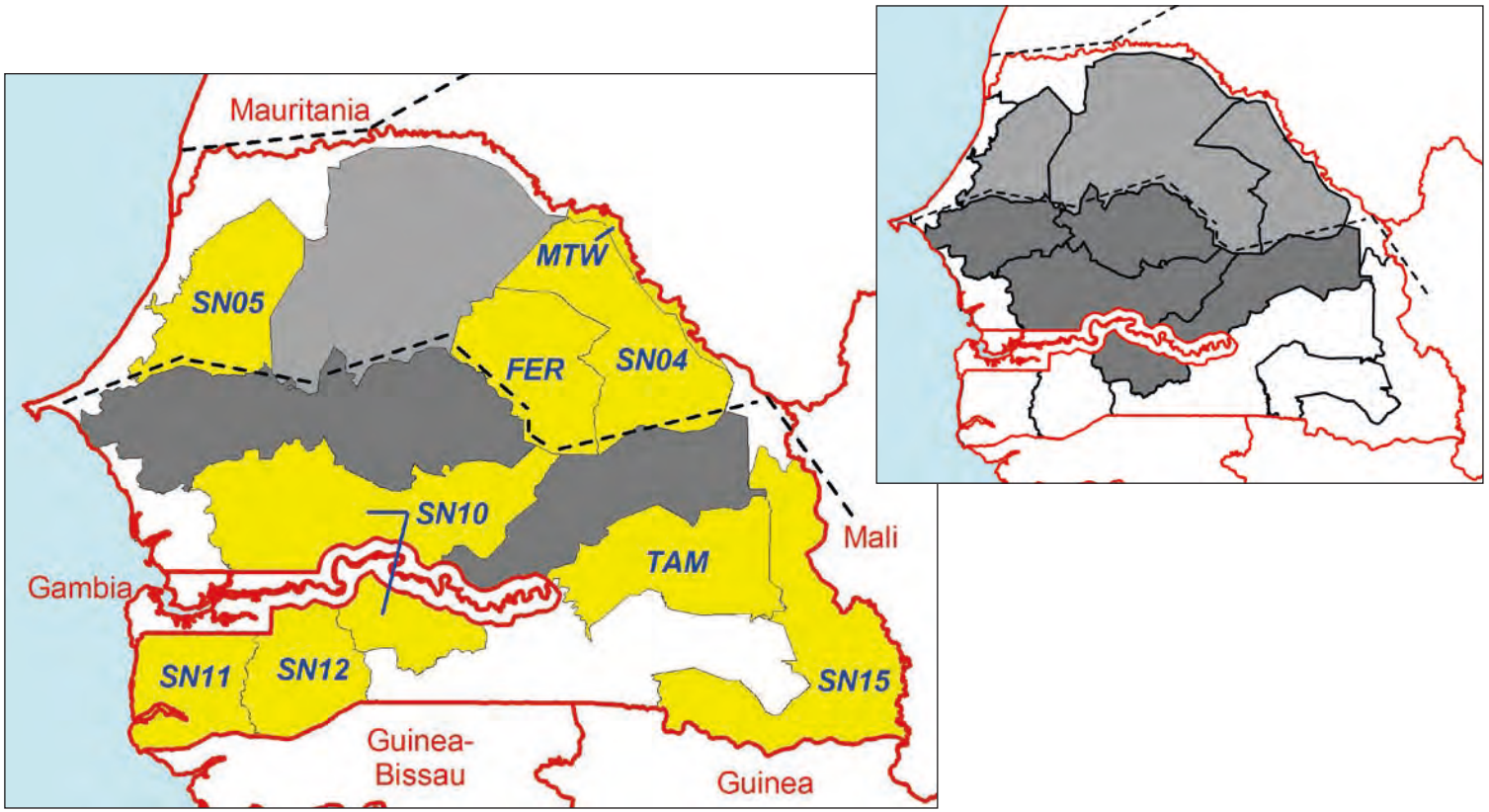
Grey-shading (see main map and inset) indicates livelihood zones that are part of the following general sahelian zones:

Pastoral

Agropastoral

Rainfed agriculture (sahelian)

--- Dotted lines indicate boundaries between these three general zones.



Annex 2: Wealth group breakdowns

PROPORTION OF POPULATION OF LIVELIHOOD ZONES BY WEALTH GROUP

Livelihood Zone	Very Poor	Poor	Middle	Better Off
Burkina Faso – ZME8	20%	43%	22%	15%
Burkina Faso – ZME7	12%	32%	32%	25%
Burkina Faso – ZME5	23%	34%	25%	18%
Burkina Faso – ZME6	13%	35%	28%	25%
Burkina Faso – ZME4	9%	34%	32%	26%
Burkina Faso – ZME9	10%	29%	37%	24%
Burkina Faso – ZME3	6%	47%	32%	15%
Burkina Faso – ZME2	48%	23%	17%	12%
Burkina Faso – ZME1	14%	27%	33%	26%

Livelihood Zone	Very Poor	Poor	Middle	Better Off
Chad – SAL	21%	25%	24%	30%
Chad – WFA	27%	23%	25%	24%
Chad – ABH	22%	23%	23%	31%
Chad – MOU	22%	27%	28%	24%
Chad – LAC	21%	20%	33%	26%
Chad – NGO	20%	29%	33%	19%
Chad – MSR	16%	28%	31%	25%
Chad – FIT	25%	23%	26%	26%
Chad – MAN	18%	27%	28%	27%
Chad – HDS	22%	28%	26%	24%
Chad – RDS	21%	25%	26%	28%
Chad – MEL	18%	32%	24%	26%
Chad – MDL	10%	26%	36%	28%

Livelihood Zone	Very Poor	Poor	Middle	Better Off
Mali – TAR	18%	22%	25%	36%
Mali – TEM	19%	27%	28%	26%
Mali – NAR	11%	27%	35%	27%
Mali – YEL	13%	30%	33%	24%
Mali – DIE	17%	32%	30%	21%
Mali – BAN	27%	26%	29%	17%
Mali – NIO	11%	32%	32%	25%
Mali – STO	10%	32%	39%	19%
Mali – YOR	21%	20%	28%	32%
Mali – KOL	8%	27%	40%	25%
Mali – KEN	11%	24%	33%	32%
Mauritania – AOU	30%	23%	30%	17%
Mauritania – AIP	39%	24%	19%	18%
Mauritania – MON	43%	24%	19%	14%
Mauritania – BRA	39%	23%	21%	17%
Mauritania – VFS	15%	25%	31%	28%
Mauritania – KOB	39%	25%	18%	18%

Livelihood Zone	Very Poor	Poor	Middle	Better Off
Niger – ACM	17%	37%	28%	17%
Niger – GPA	18%	32%	29%	21%
Niger – DBP	35%	23%	25%	17%
Niger – MSD	14%	41%	25%	20%
Niger – TNO	30%	26%	26%	17%
Niger – DKA	27%	21%	25%	27%
Niger – TAP	18%	33%	24%	26%
Niger – TON	12%	31%	34%	23%
Niger – TLP	20%	29%	27%	24%
Niger – OUA	18%	29%	29%	24%
Niger – ADC	16%	27%	33%	24%
Niger – CMS	28%	26%	27%	19%
Niger – MAY	16%	29%	32%	24%
Niger – TSU	33%	25%	24%	18%
Niger – MAD	23%	25%	31%	21%
Niger – ZZC	21%	27%	27%	25%
Niger – ZZI	23%	31%	28%	18%
Niger – CPK	38%	26%	23%	13%

Livelihood Zone	Very Poor	Poor	Middle	Better Off
Nigeria – MAS	34%	32%	19%	16%
Nigeria – HVM	38%	20%	23%	19%
Nigeria – MCG	34%	21%	20%	26%
Nigeria – SCG	33%	20%	23%	24%
Nigeria – CGC	26%	26%	26%	22%

Livelihood Zone	Very Poor	Poor	Middle	Better Off
Senegal – MTW	16%	31%	28%	24%
Senegal – MTD	21%	30%	32%	18%
Senegal – FER	13%	39%	33%	15%
Senegal – TAM	17%	34%	30%	19%
Senegal – KDA	9%	43%	29%	19%
Senegal – ZIG	34%	27%	22%	18%

PROPORTION OF POPULATION OF LIVELIHOOD ZONES BY WEALTH GROUP AND MODE OF PRODUCTION

		Very Poor	Poor	Middle	Better Off
Pastoral					
Mauritania	MR01	39%	24%	19%	18%
	MR03	30%	23%	30%	17%
Mali	TAR	11%	26%	38%	24%
Niger	DBP	23%	27%	28%	21%
	GPA	18%	32%	29%	21%
	TAS	29%	30%	26%	15%
Chad	ABH	22%	23%	23%	31%
	MOU	21%	24%	27%	28%
	SAL	22%	25%	29%	23%
	WFA	27%	23%	25%	24%

		Very Poor	Poor	Middle	Better Off
Agro-pastoral					
Senegal	FER	13%	39%	33%	15%
	SN04	13%	33%	33%	21%
	SN05	12%	31%	39%	18%
Mauritania	BRA	39%	23%	21%	17%
	KOB	39%	25%	18%	18%
	MON	30%	23%	21%	25%
	SEL	46%	24%	18%	12%
Mali	DIE	17%	32%	30%	21%
	ML04	11%	27%	35%	27%
	YEL	13%	30%	33%	24%
Burkina Faso	BF8	20%	43%	22%	15%

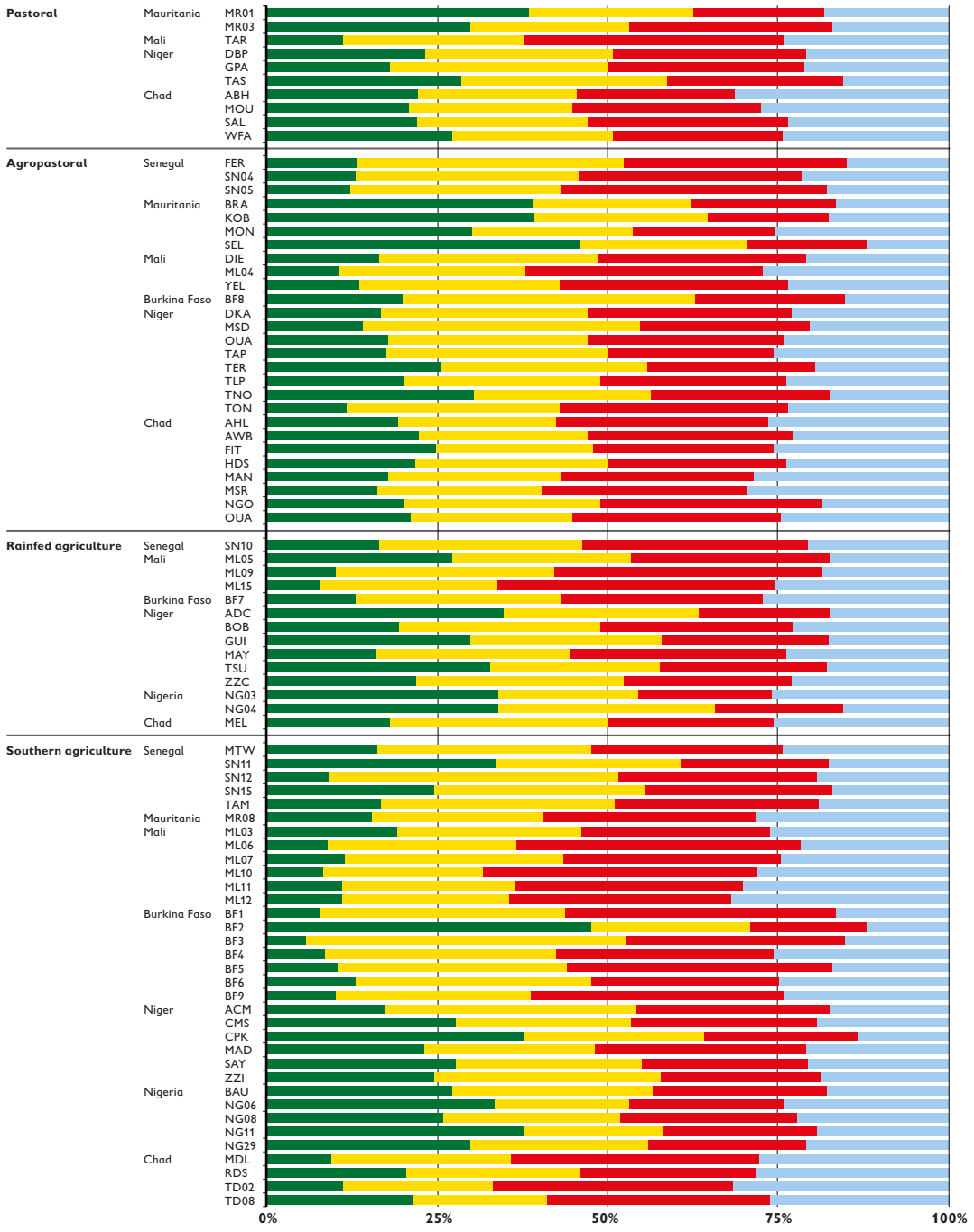
		Very Poor	Poor	Middle	Better Off
Niger	DKA	17%	30%	30%	23%
	MSD	14%	41%	25%	20%
	OUA	18%	29%	29%	24%
	TAP	18%	33%	24%	26%
	TER	26%	30%	25%	19%
	TLP	20%	29%	27%	24%
	TNO	30%	26%	26%	17%
	TON	12%	31%	34%	23%
Chad	AHL	19%	23%	31%	27%
	AWB	22%	25%	30%	23%
	FIT	25%	23%	26%	26%
	HDS	22%	28%	26%	24%
	MAN	18%	25%	28%	29%
	MSR	16%	24%	30%	30%
	NGO	20%	29%	33%	19%
	OUA	21%	24%	31%	25%

		Very Poor	Poor	Middle	Better Off
Rainfed agriculture					
Senegal	SN10	17%	30%	33%	21%
Mali	ML05	27%	26%	29%	17%
	ML09	10%	32%	39%	19%
	ML15	8%	26%	41%	25%
Burkina Faso	BF7	13%	30%	29%	27%
Niger	ADC	35%	29%	19%	17%
	BOB	19%	29%	29%	23%
	GUI	30%	28%	24%	18%
	MAY	16%	29%	32%	24%
	TSU	33%	25%	24%	18%
	ZZC	22%	31%	25%	23%
Nigeria	NG03	34%	21%	20%	26%
	NG04	34%	32%	19%	16%
Chad	MEL	18%	32%	24%	26%

		Very Poor	Poor	Middle	Better Off
Southern agriculture					
Senegal	MTW	16%	31%	28%	24%
	SN11	34%	27%	22%	18%
	SN12	9%	43%	29%	19%
	SN15	25%	31%	27%	17%
	TAM	17%	34%	30%	19%
Mauritania	MR08	15%	25%	31%	28%
Mali	ML03	19%	27%	28%	26%
	ML06	9%	28%	42%	22%
	ML07	11%	32%	32%	25%
	ML10	8%	24%	40%	28%
	ML11	11%	25%	34%	30%
	ML12	11%	24%	33%	32%
Burkina Faso	BF1	8%	36%	39%	17%
	BF2	48%	23%	17%	12%
	BF3	6%	47%	32%	15%
	BF4	9%	34%	32%	26%
	BF5	10%	34%	39%	17%
	BF6	13%	35%	28%	25%
	BF9	10%	29%	37%	24%

		Very Poor	Poor	Middle	Better Off
Niger	ACM	17%	37%	28%	17%
	CMS	28%	26%	27%	19%
	CPK	38%	26%	23%	13%
	MAD	23%	25%	31%	21%
	SAY	28%	27%	24%	21%
	ZZI	25%	33%	24%	19%
Nigeria	BAU	27%	29%	25%	18%
	NG06	33%	20%	23%	24%
	NG08	26%	26%	26%	22%
	NG11	38%	20%	23%	19%
	NG29	30%	26%	23%	21%
Chad	MDL	10%	26%	36%	28%
	RDS	21%	25%	26%	28%
	TD02	11%	22%	35%	32%
	TD08	21%	20%	33%	26%

GRAPH OF PROPORTION OF POPULATION OF LIVELIHOOD ZONES BY WEALTH GROUP AND MODE OF PRODUCTION



LEGEND

- Very Poor
- Poor
- Middle
- Better Off

Annex 3: HEA data graphed

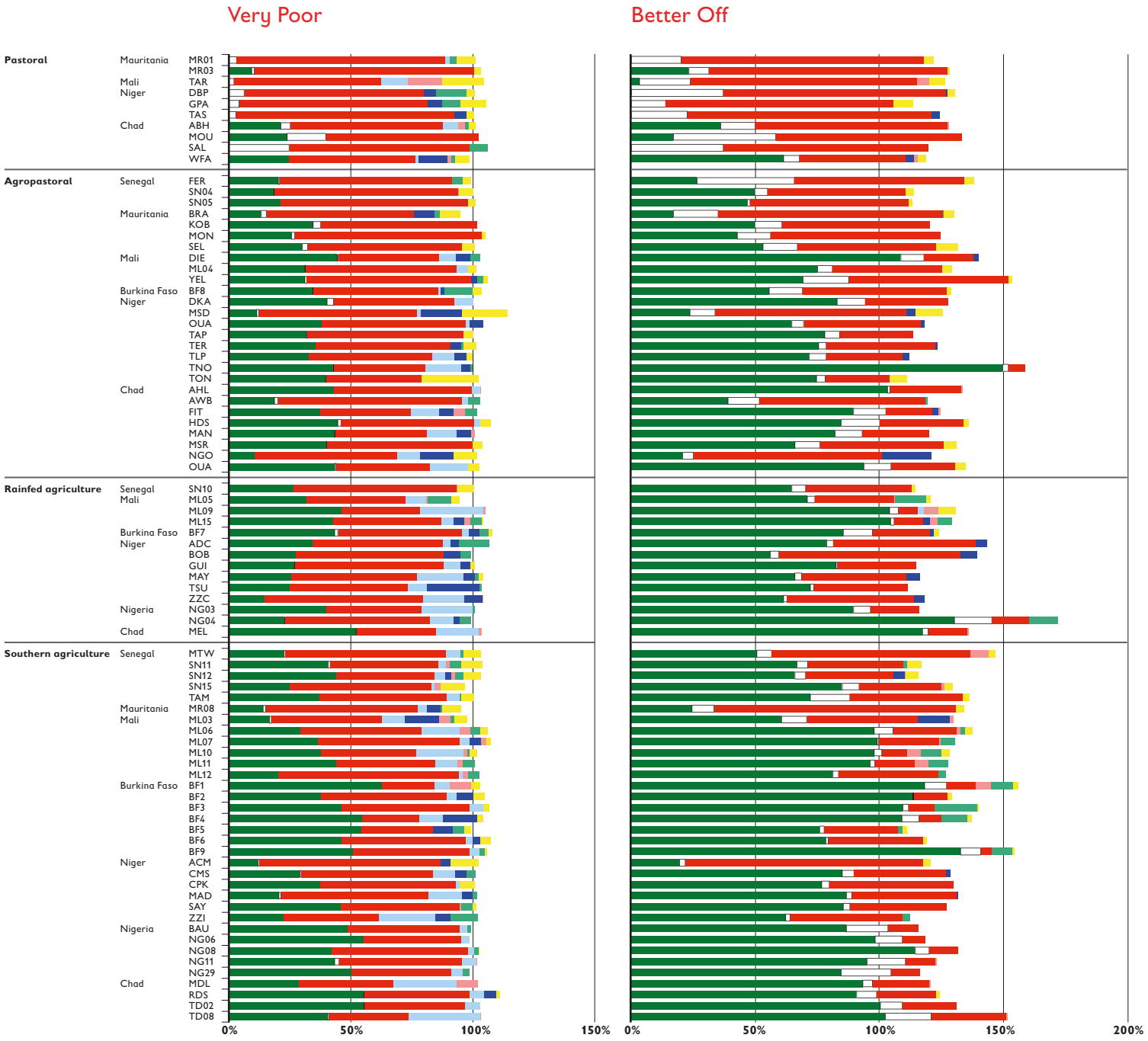
The purpose of mapping the HEA information is to see it more clearly in spatial terms so that geographical comparisons can be far more easily made. However, a readable map cannot contain a plethora of variables, and so the maps show one variable, or composite variable, in terms of percentage thresholds or divisions of absolute amounts. (Only Map 34, summarising production hazards, shows five variables.) It may be of interest to readers to see the essential data in graph form. Below we offer composite graphs for all the 85 rural HEA baselines across the region, according to the four pillars of HEA baseline analysis: Sources of Food; Sources of Cash; Sources of Expenditure; and Total Income – Food + Cash. The graphs are for each wealth group, and each graph is composed in blocks of general modes of production: pastoral, agropastoral, rainfed (sahelian) agriculture, and southern agriculture; 'southern' here includes irrigated areas anywhere (see Map 3 for the different modes of production – where, however, 'southern' is shown as 'other agriculture' south of the sahelian band, while irrigated areas are shown in their own right).

It should be noted that the variables shown in these graphs are themselves composed from a great amount of information. For instance, where we see the red 'purchase' bar in the first set of graphs on food sources this represents a conversion of the many different types of purchased food into a single value of calories as a percentage of household requirement: cereals, pulses, vegetables, fruits, oil, sugar, dairy and meat together. If separate quantified information for all these constituents were wanted, the information is to be found among the 600+ variables lines in each HEA Baseline Spreadsheet for a zone.

The Average graphs refer to all four wealth groups in the databases – Very Poor, Poor, Middle, Better Off – and the values are weighted to take account of the different proportion of each of the wealth groups in the total number of households.

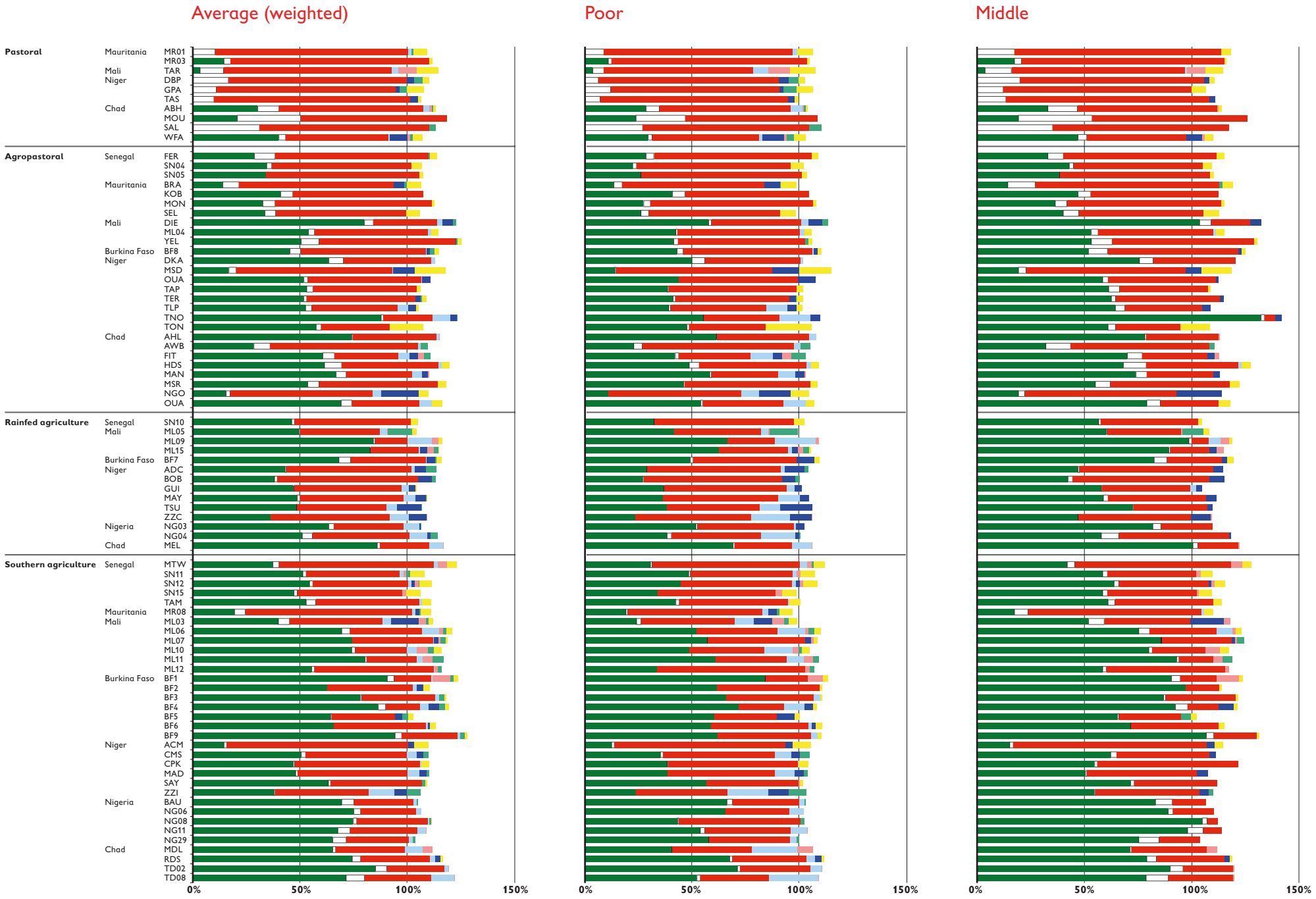
SOURCES OF FOOD

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



LEGEND

- Own crops
- Own-produced milk/meat
- Purchased food
- In-kind food payment for local work
- In-kind food payment for migrant work
- Collected wild foods
- Gifted food, other
- Food aid


Average (weighted)
Poor
Middle
Pastoral
Agropastoral
Rainfed agriculture
Southern agriculture
Mauritania
Mali
Niger
Chad
Burkina Faso
Senegal
Nigeria
MR01
MR03
TAR
DBP
GPA
TAS
ABH
MOU
SAL
WFA
FER
SN04
SN05
BRA
KOB
MON
SEL
DIE
ML04
YEL
BF8
DKA
MSD
OUA
TAP
TER
TLP
TNO
TON
AHL
AWB
FIT
HDS
MAN
MSR
NGO
OUA
SN10
ML05
ML09
ML15
BF7
ADC
BOB
GUI
MAY
TSU
ZZC
NG03
NG04
MEL
MTW
SN11
SN12
SN15
TAM
MR08
ML03
ML06
ML07
ML10
ML11
ML12
BF1
BF2
BF3
BF4
BF5
BF6
BF9
ACM
CMS
CPK
MAD
SAY
ZZI
BAU
NG06
NG08
NG11
NG29
MDL
RDS
TD02
TD08
0%
50%
100%
150%

The large pattern shown in these graphs is the relative importance of own crop consumption (the dark green bar) and purchased food (the red bar). But first there are ten pastoral areas, ie, where livelihoods are overwhelmingly dependent on livestock raising, even if in some localities a minor production of cereals may occur. The transition from pastoralism to agropastoralism as we move south is geographically irregular and nuanced, and there is no 'line in the sand' or absolute rule that divides pastoralists from others unless we insist that they must be 'pure' pastoralists who never produce crops. We don't. Pastoralists are not generally so pure in their vocation that they will not try to plant a little millet or sorghum, or at least a garden, if conditions allow from one year to the next. This may be opportunistic, a gamble on what looks like a good year for rain, or it might be more regular, where one or two wadis or depressions hold moisture from run-off long enough for a crop. As they remain overwhelmingly pastoral by vocation, these people have not been counted in the 'agropastoral' mode.

But sometimes it might look as if they should have been. In WFA – Wadi Fira in Bhiltine, north Chad – the fieldwork was carried out at the tail end of two particularly good rainfall years. Had it been carried out a year later, when there was a serious drought, there would probably have been no green bar at all. By contrast, the people of FER (the *ferlo* of Senegal), the first zone in the agropastoral block, are by vocation transhumant cattle pastoralists, but they are also regular, substantial crop-producers in an environment much further south of the Sahara Desert than WFA group in Chad. In MR03, the Mauritanian zone of pastoralism with oases and wadis, the crop component is essentially dates, otherwise fundamentally important to people's cash earnings. Finally, TAR – Tarkhint Tilemsi Valley in north-east Mali – shows an anomaly: the green bar here is in fact not own crops but grain received as salary, therefore in fact a form of in-kind payment. The wealthier stock-owners who pay these herders and shepherds must themselves buy grain that comes in on the market from agricultural areas.

Just as we expect little if any agriculture among pastoralists, we might expect them to consume a great amount of milk, if not meat (which is, in fact, only occasionally consumed). And if we look at the Average chart, let alone the Better Off chart, we see that they mainly drink more milk than others down the chart (the cattle of the people of the FER zone just referred to are so concentrated in the hands of the Better Off that only they rival the people we have put in the 'pastoral' block). Still, we might have expected the Average of the pastoralists to show a more prominent white line. But only among the camel pastoralists of Salale (SAL) in Chad, together with their cattle- and camel-herding neighbours to the south in Moundjoura (MOU), does milk consumption reach above 25% of calories.

The main message is twofold. First, given the usual limits to pasture and water in the pastoral ecology, the natural increase of pastoralist populations has long and by far outstripped the capacity of the land to carry the number of

livestock that would be required to allow a human diet mainly of milk. The value of their animals lies principally in their sale value on the hoof or to traders with trucks, and specifically in the end-value of meat they finally provide to town and city dwellers living hundreds if not thousands of kilometres distant. With these earnings, even the richer pastoralist lives substantially on purchased grain, and even more so do their poorer neighbours who live far more by cash from contract herding for the wealthy than by their own very limited number of animals. And so for the pastoralist block as a whole, the red 'purchase' lines are longer than for most other zones down the chart. The second message, therefore, is that the pastoralists subsist much more on grain that they do not produce than on milk that they do produce.

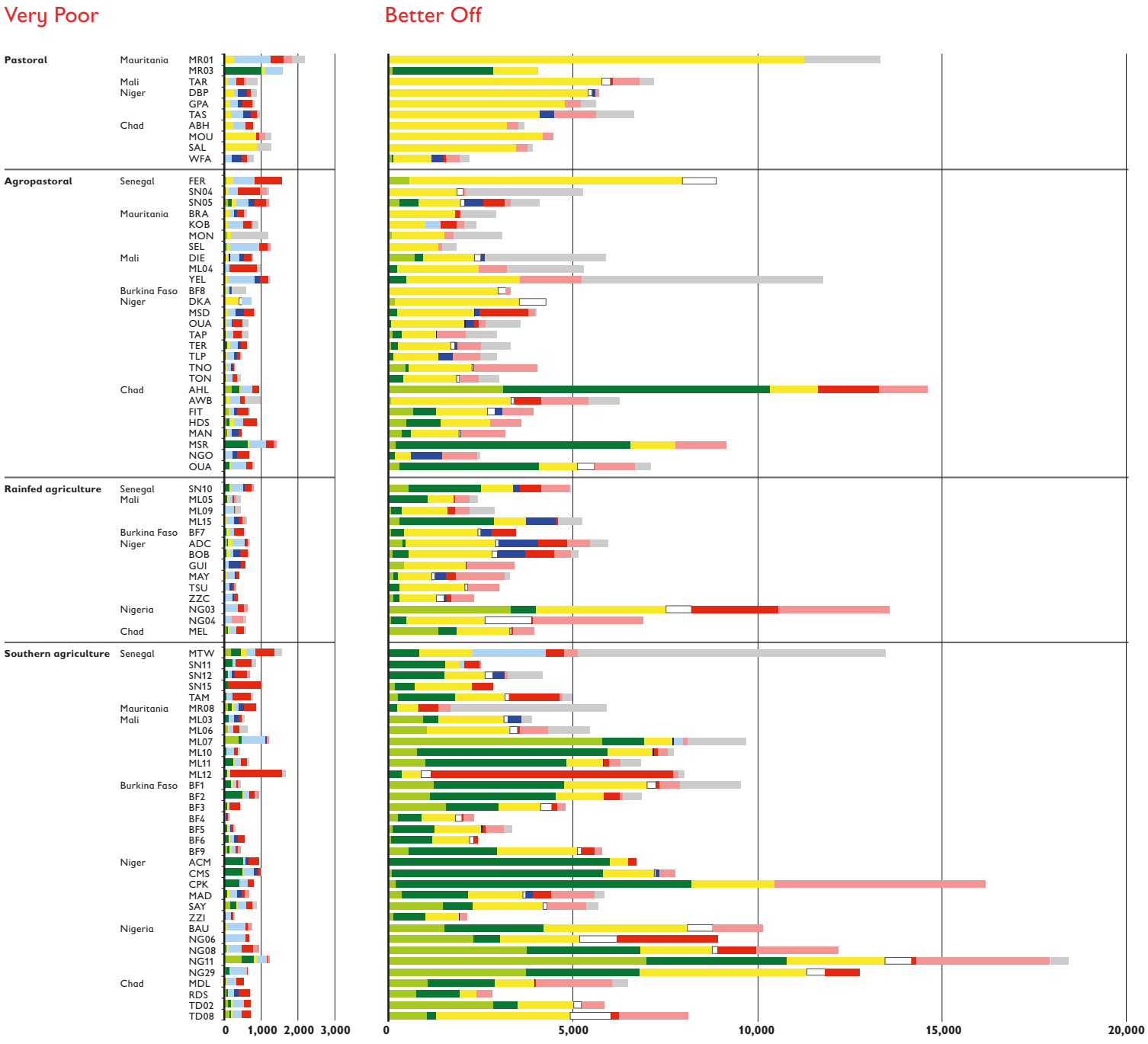
Among the crop cultivating populations, including the agropastoralists, the majority do not on Average reach 50% of calories from consumption of their own crops and very few reach 75%. By contrast, 70–75% of the Middle and Better Off in these zones do. By the same token, therefore, the red lines of food purchase are long among the poorer half of households across the zones.

On the whole, Sahel looks far from self-sufficient in food. But this is deceptive. The cereals deficit in the sahelian areas tends to be filled through the market from the surplus areas, often in the southernmost, higher rainfall zones, and mostly within the same country, but with also some cross-border flow of grain. But all the countries do import some rice – and Senegal and Mauritania import large quantities of both rice and wheat. This is mostly destined for the urban dwellers, but some amount is also bought in villages, especially by the wealthier households that can afford to vary their millet/sorghum-based diet with this preferred food. This in turn means that Better Off households rarely consume even nearly 100% of their calories from their own production – yet they are often the very people who are producing the surplus to keep most countries near-self-sufficient most of the time.

For the poorer households, an important part of their food balance often comes from different in-kind transactions. Only the light blue bar represents in-kind wages as we normally think of them, ie, wages for field labour paid directly in grain. The dark blue bar mainly represents the 'saving' on home consumption during the time that one or more household members are away on migrant work; but it may include a bag or two of grain that they return with. Finally, the pink bar represents collected wild foods. Clearly these sources are mainly associated with the poorer households, as is food aid. Some of the food aid is food-for-work under development/social protection programmes. Some simply reflects the addition to the household consumption provided by school-feeding programmes for one or two members, without which many a Very Poor household might not reach the 100% threshold of their minimum calories requirement. In Niger, in Maine-Soroa (MSD) and Tondiwiki (TON) the reference years for the data were poor production years, and it is drought relief food aid that extends the yellow bars. Elsewhere, the reference years very largely began with normal or 'acceptable' harvests.

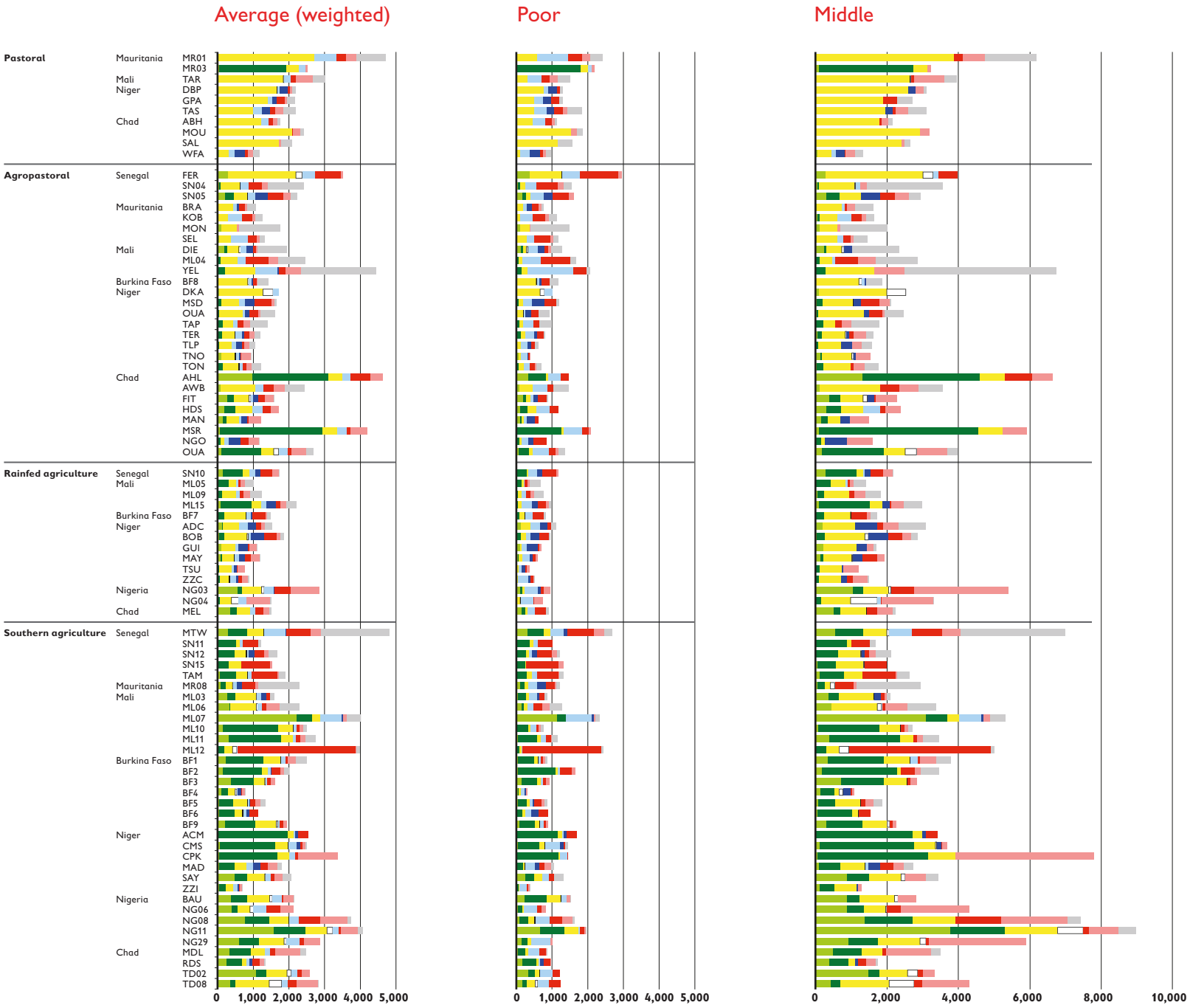
SOURCES OF CASH

(US$ per person per year)



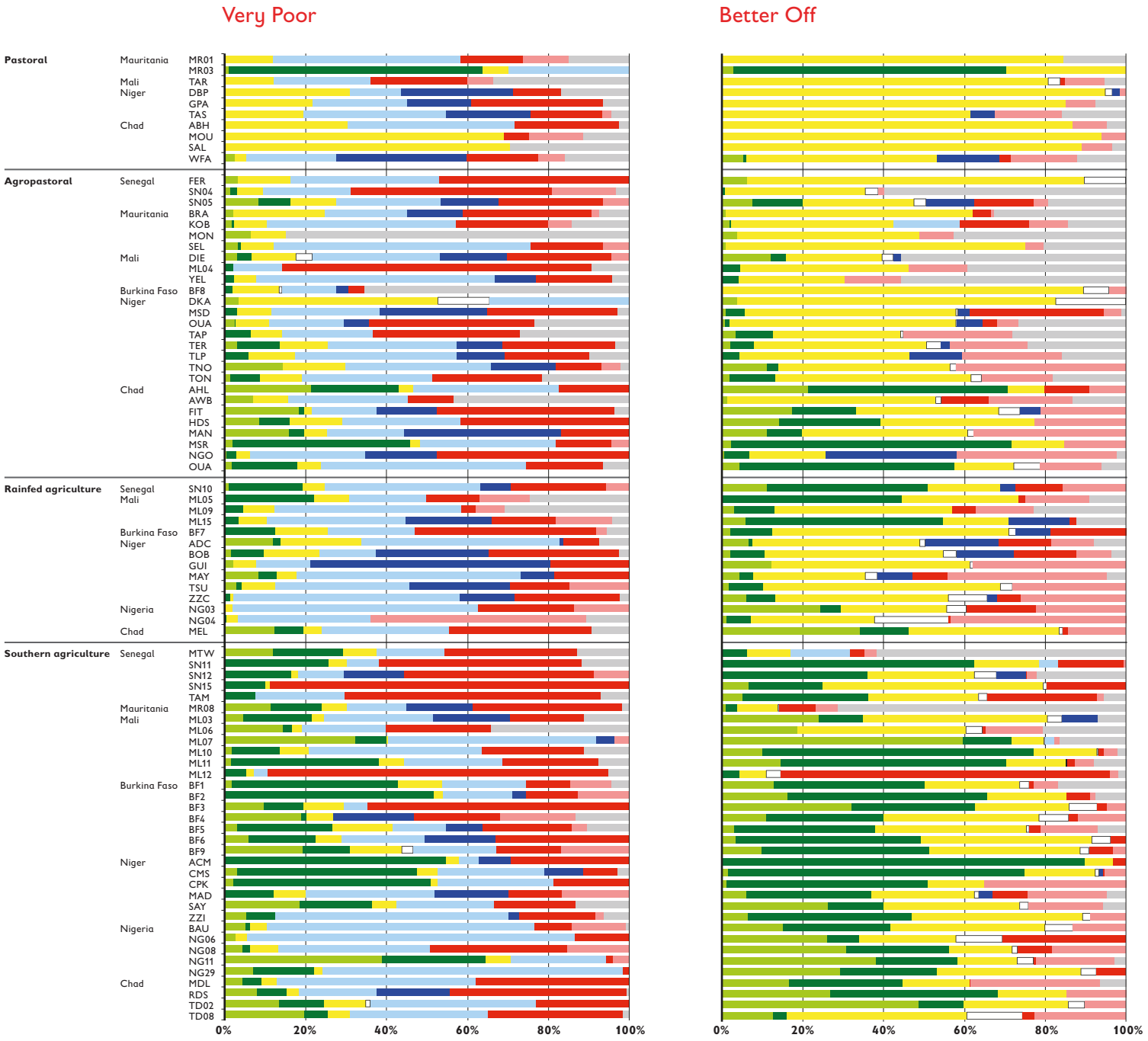
LEGEND

- Sale of non-cash crops including staple food crops
- Sale of cash crops
- Sale of livestock
- Sale of livestock products
- Paid local work
- Migrant work
- Self-employment/collected wild items
- Petty trade
- Other


Average (weighted)
Poor
Middle
Pastoral
Agropastoral
Rainfed agriculture
Southern agriculture
Mauritania
Mali
Niger
Chad
Burkina Faso
Senegal
Nigeria
MR01
MR03
TAR
DBP
GPA
TAS
ABH
MOU
SAL
WFA
FER
SN04
SN05
BRA
KOB
MON
SEL
DIE
ML04
YEL
BF8
DKA
MSD
OUA
TAP
TER
TLP
TNO
TON
AHL
AWB
FIT
HDS
MAN
MSR
NGO
OUA
SN10
ML05
ML09
ML15
BF7
ADC
BOB
GUI
MAY
TSU
ZZC
NG03
NG04
MEL
MTW
SN11
SN12
SN15
TAM
MR08
ML03
ML06
ML07
ML10
ML11
ML12
BF1
BF2
BF3
BF4
BF5
BF6
BF9
ACM
CMS
CPK
MAD
SAY
ZZI
BAU
NG06
NG08
NG11
NG29
MDL
RDS
TD02
TD08
0
1,000
2,000
3,000
4,000
5,000
6,000
8,000
10,000

SOURCES OF CASH

(Percentage of total)



LEGEND

- Sale of non-cash crops including staple food crops
- Sale of cash crops
- Sale of livestock
- Sale of livestock products
- Paid local work
- Migrant work
- Self-employment/collected wild items
- Petty trade
- Other


Average (weighted)
Poor
Middle
Pastoral
Agropastoral
Rainfed agriculture
Southern agriculture
Mauritania
Mali
Niger
Chad
Burkina Faso
Senegal
Nigeria
MR01
MR03
TAR
DBP
GPA
TAS
ABH
MOU
SAL
WFA
FER
SN04
SN05
BRA
KOB
MON
SEL
DIE
ML04
YEL
BF8
DKA
MSD
OUA
TAP
TER
TLP
TNO
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AHL
AWB
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NG04
MEL
MTW
SN11
SN12
SN15
TAM
MR08
ML03
ML06
ML07
ML10
ML11
ML12
BF1
BF2
BF3
BF4
BF5
BF6
BF9
ACM
CMS
CPK
MAD
SAY
ZZI
BAU
NG06
NG08
NG11
NG29
MDL
RDS
TD02
TD08
0%
20%
40%
60%
80%
100%

Having noted the critical importance of food purchase to at least the poorer households (overall expenditure is shown in the following set of graphs) the next step is to see where they get the money from. Looking at the first set on absolute cash income, it is striking how much higher incomes are in certain areas on Average. In fact, the pattern holds clearly enough for the Very Poor as well as the Better Off, suggesting that some livelihood zones are wealthier in this sense than others, and that if the Better Off have comparatively high earnings, the rest of households tend to as well. However, any further analysis of this question would have to take account of the comparative cost of living, whether in terms of local prices or, for instance, in relation to the fact that all pastoralists, unlike most cultivators, have to purchase the great bulk of their food.

Among the outstandingly high-earning zones (above US$3,000 per capita per year on Average), MR01 in Mauritania is pastoral, as is TAR (Tarkhint) in Mali; and FER (*ferlo*) in Senegal is technically 'agropastoral' but they are herders with the largest cattle holdings of any of the studies across the region; MAT (Matam *walo*) in Senegal and YEL (Yelimane) in Mali are part of the high-remittance complex along the Senegal River (remittances being the bulk of the 'other' grey bar, noticeable for MR01 too); and ML07 (the Office du Niger irrigated rice scheme) in Mali, and in Nigeria NG11 (the Hadejia Valley part-irrigated economy) and NG08 (Zamfara cotton, groundnuts and cereals) are all particularly successful surplus cereals or cash crop producers.

As regards pastoralists, it is perhaps surprising that those in SAL (Salale) in Chad, with their great wealth in camels, do not join the upper echelon. It seems that, like pastoralists more widely in a former era, they drink a great deal of milk, and sell what animals they need to for grain and essential expenses, but otherwise do little to earn other money – even the Very Poor. Their livestock-rich neighbours of MOU (Moundjoura), also in Chad, show the same pattern. Perhaps the great distances to centres of commerce and labour demand are also a factor here.

Turning to the second set – the proportional graphs – the main message in terms of food security is to be seen in the combination of light blue, dark blue and red bars so prominent for the Very Poor and Poor. These are the bars for casual employment near and far, and for self-employment such as cutting and selling firewood, and also collecting and selling wild foods. The message is that, as farmers, they cannot nearly live financially by selling their own crops and livestock (green and yellow bars), just as we have seen in the Sources of Food graphs that they cannot nearly manage to eat enough from their own fields. In other words, across the Sahel a good half of farming households need to get much more than half of their cash income from activities outside their own farms.

Next, our eyes are perhaps particularly drawn to the great splash of yellow in the Better Off graph, well reflected also in the Average graph – the bars representing income from livestock sales (to which we can add the white bars for dairy sales). Here we are not just looking at substantially herding-based zones (which do have the longest yellow bars) but at a whole range of farming zones. In the zones of Burkina Faso, with its complete HEA coverage, apart from the more livestock-oriented northerners (BF7 and BF8) we see important livestock earnings for Western Cereals farmers (BF4), for Central Plateau mixed farmers (B5), and even for farmers of the more humid forest area in the far south-east (BF9). Livestock is crucial to household budgets across the region, except where there is simply too little room to keep them, as in the irrigation economies of ML07 in Mali and of the Aïr Mountains (ACM) in Niger. The yellow bars among the Very Poor are generally short, as we

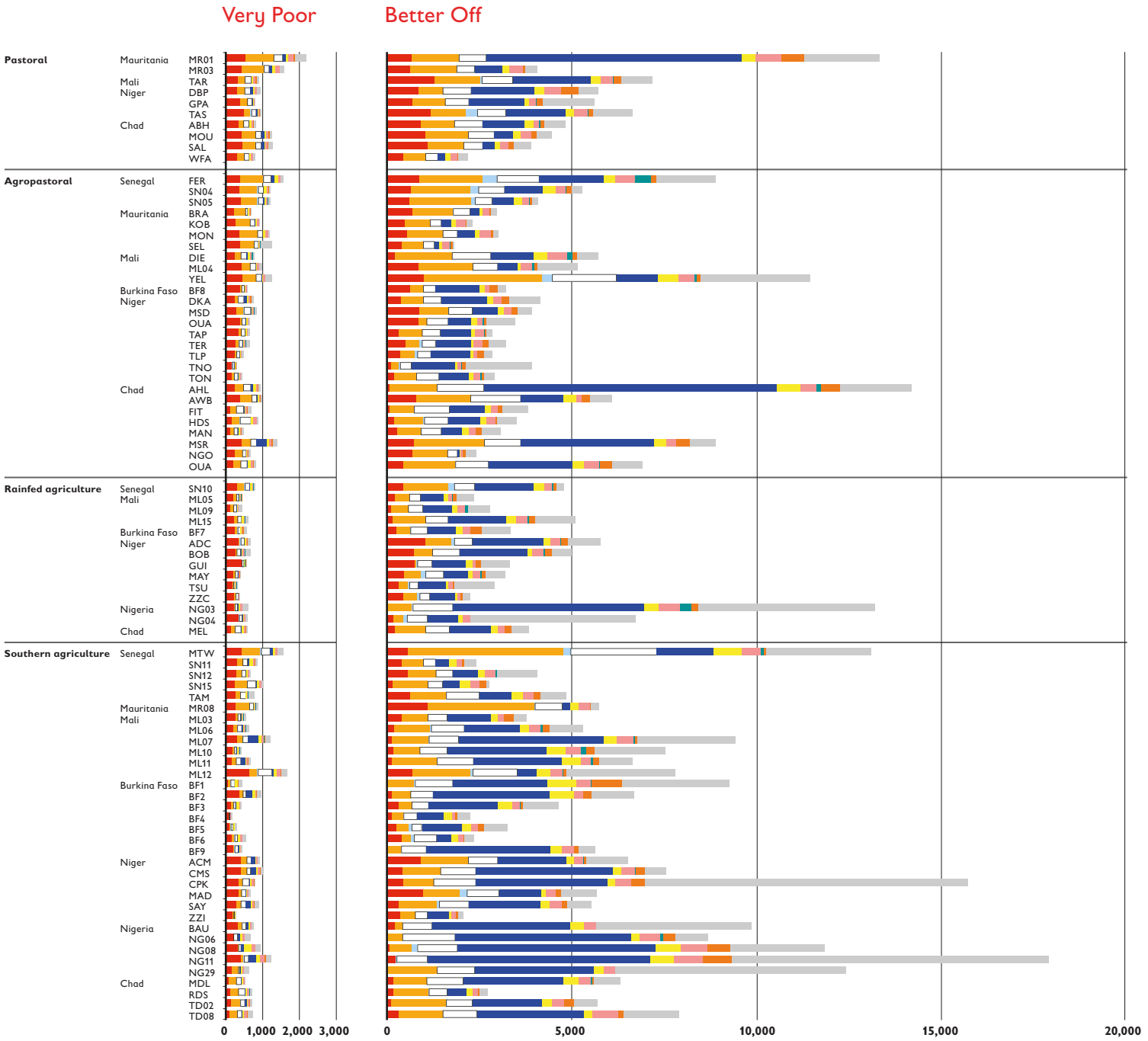
would expect, but we should note that these people are almost always living on the thinnest of budget margins, and so their livestock earnings, modest as they are, are often crucial for them to make it through the year in terms of food purchase.

We have seized on the livestock earnings to point to their perhaps surprising degree of importance for crop farmers. But we must not underestimate the importance of crop cultivation, especially food crops, even if crop earnings on this showing do not generally exceed livestock earnings. Of course food crops are fundamental for own consumption, but it is interesting to note that, as can be seen by comparing the light green (essentially food crops) with the dark green (cash crops), food crops are also overall a greater source of money than cash crops (see the definitions of both in the Commentary for Map 8 on page 18). And this is after home consumption.

PHOTO: RAINER SCHWENZFEIER/SAVE THE CHILDREN

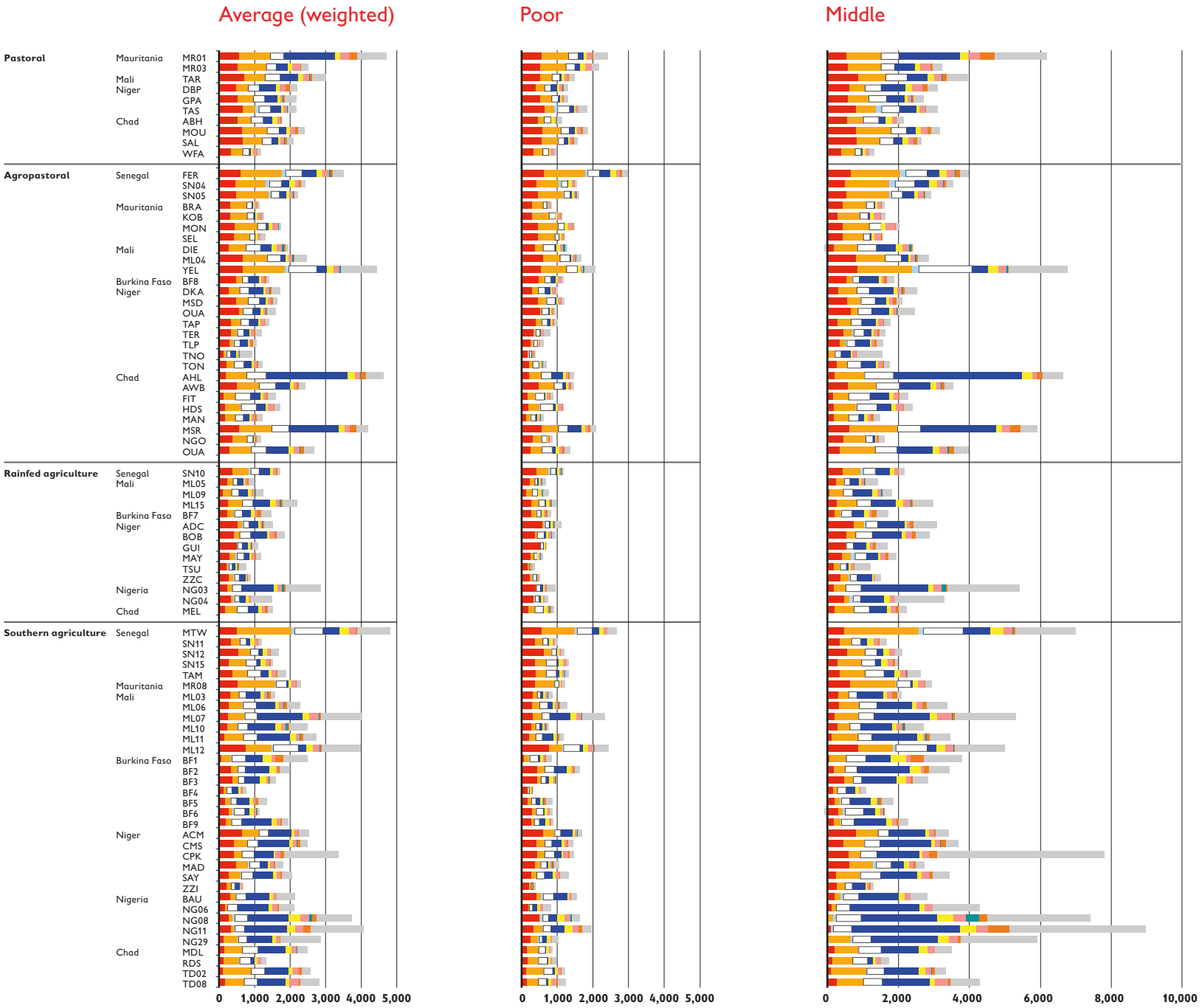
SOURCES OF EXPENDITURE

(US$ per person per year)



LEGEND

- Staple food
- Non-staple food
- Water
- Household items
- Inputs for agricultural and livestock production
- Education and health costs
- Clothes
- Tax
- Gifts
- Other


Average (weighted)
Poor
Middle
Pastoral
Agropastoral
Rainfed agriculture
Southern agriculture
Mauritania
Mali
Niger
Chad
Senegal
Burkina Faso
Nigeria
MR01
MR03
TAR
DBP
GPA
TAS
ABH
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SAL
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BF1
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BF6
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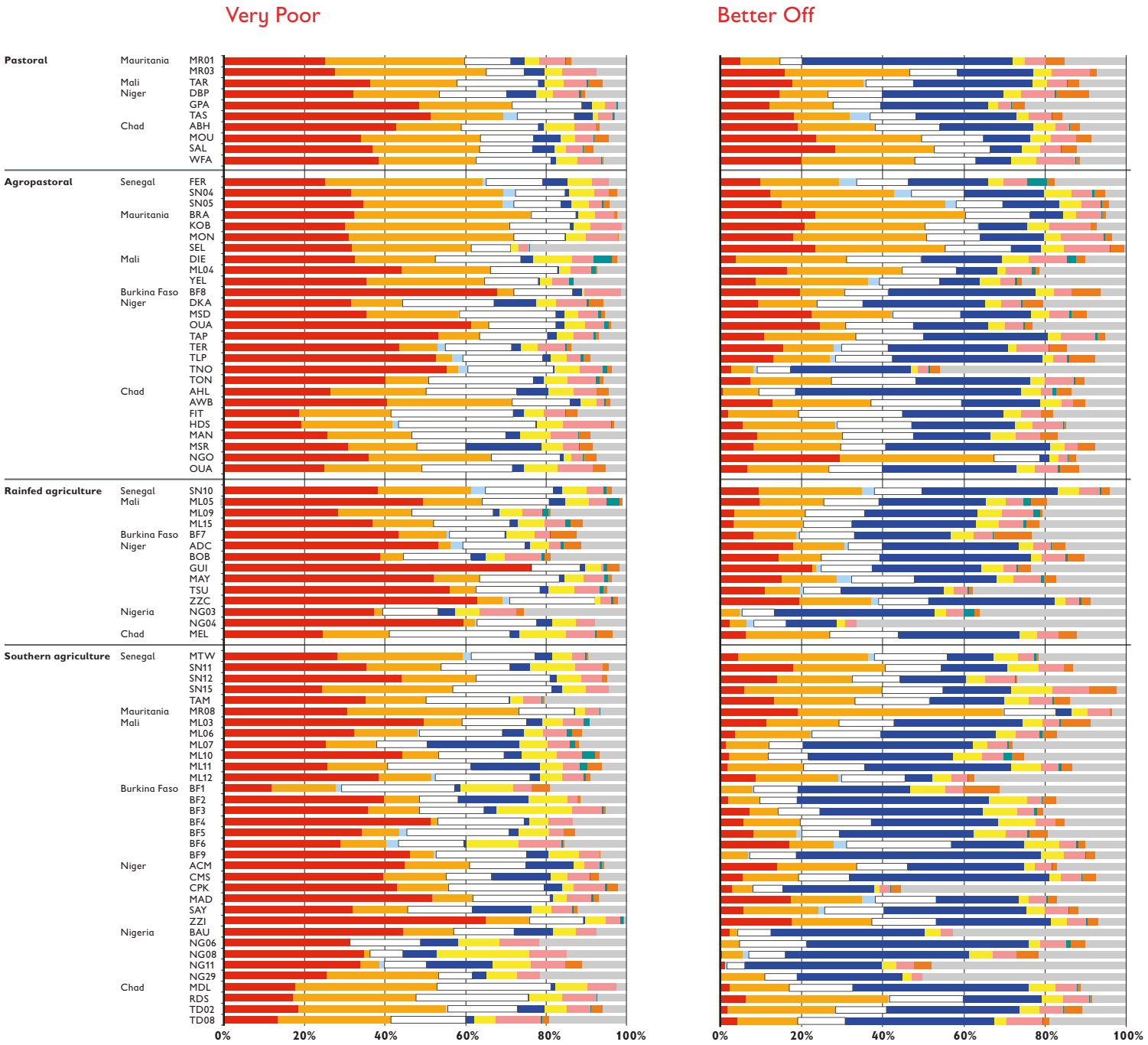
ACM
CMS
CPK
MAD
SAY
ZZI
BAU
NG06
NG08
NG11
NG29
MDL
RDS
TD02
TD08
0
1,000
2,000
3,000
4,000
5,000
0
1,000
2,000
3,000
4,000
5,000
0
2,000
4,000
6,000
8,000
10,000

SOURCES OF EXPENDITURE
(Percentage of total)



LEGEND

- Staple food
- Non-staple food
- Water
- Household items
- Inputs for agricultural and livestock production
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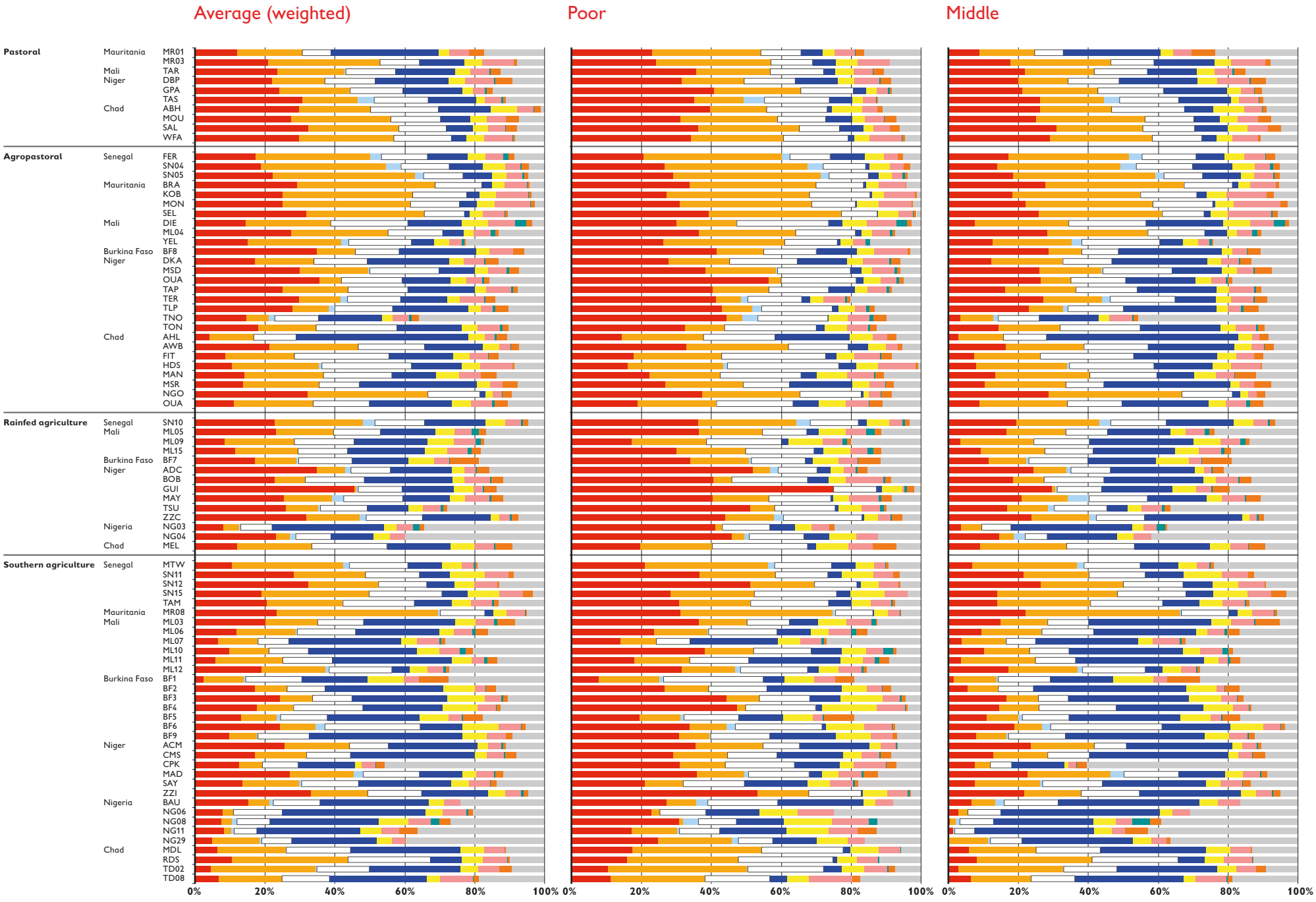
- Gifts
- Other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BF6
BF9
ACM
CMS
CPK
MAD
SAY
ZZI
BAU
NG06
NG08
NG11
NG29
MDL
RDS
TD02
TD08
0%
20%
40%
60%
80%
100%

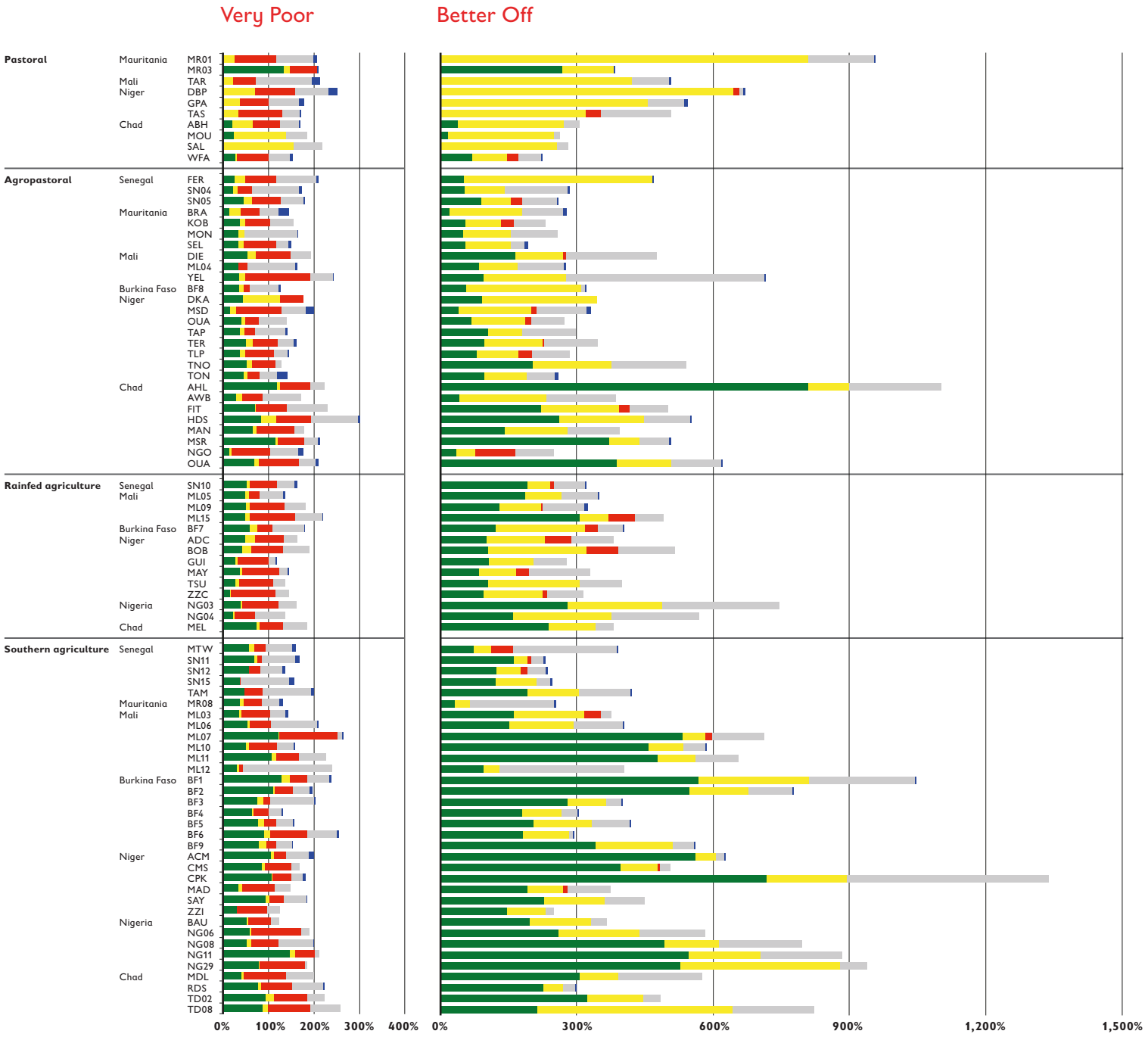
The levels of annual expenditure basically match the levels of annual income. It is still rare for even Better Off villagers to keep money savings in bank accounts. Profits from one year to the next are essentially kept in the form of livestock purchased or grain kept stored, although the storing of grain from one year to another seems much less common today than in former times, perhaps because of a greater and more reliable market network.

'Staple food' (red bar) means the staple cereals, and non-staple food (orange bar) is anything else eaten. Non-staple foods for most people most of the time are from a very limited repertoire, including the ubiquitous cowpeas, vegetable oil and sugar. For poorer households they rarely stretch beyond this: meat, for instance, is consumed at festivals (sometimes as a gift from wealthier kin or neighbours) but is otherwise rarely consumed (even poultry), unless it is in the form of the treat of a kebab bought on market day. Indeed, for poorer people even vegetables – even onions – are not purchased without thought, because they have to compete with other needs, for instance daily/weekly household purchases (white bar) that include a plethora of items from condiments to matches to soap – which as we see on Average collectively amount to a not insignificant proportion of total household expenditure. For poorer people this leaves little room for other basic expenditure, whether on clothes (pink bar), or education and medical treatment (yellow bar), let alone more elective expenditure on, for instance, social obligations – transport for visits to kin, contributions to baptisms, etc (under the 'other' grey bar). In particular, little is left for expenditure on inputs for production (dark blue bar) – eg, fertilisers, hired labour, veterinary care, purchase of animals to increase/replenish the stock.

By contrast, inputs expenditure is generally a large proportion of the spending of Better Off farmers. One quite visible, almost symbolic, result here is the strong tendency that the longer the dark blue bar, the shorter the red bar for staples purchase; in other words high inputs expenditure boosts self-sufficiency. On the other hand, Better Off people generally spend roughly as big a proportion of their budget on non-staple foods as do the Very Poor. But here we must remember that, given their level of income, the absolute amounts will be several times more per capita. This means that wealthier village people can effectively afford what in rural terms is a far higher standard of living, although to the outsider it may not materially look like it. They can buy more vegetables, pulses, milk and meat for a more balanced and simply more pleasurable diet. They can buy more clothes, more kerosene for lamps, more torches and portable radios and batteries for both; and as a particular element in a benign cycle, they can 'buy' more education for their children, at least through secondary school, if not beyond. It is true they are also expected to spend very much more on social obligations, but this underpins their status and secures them some insurance in the goodwill of others if they find themselves in a time of need.

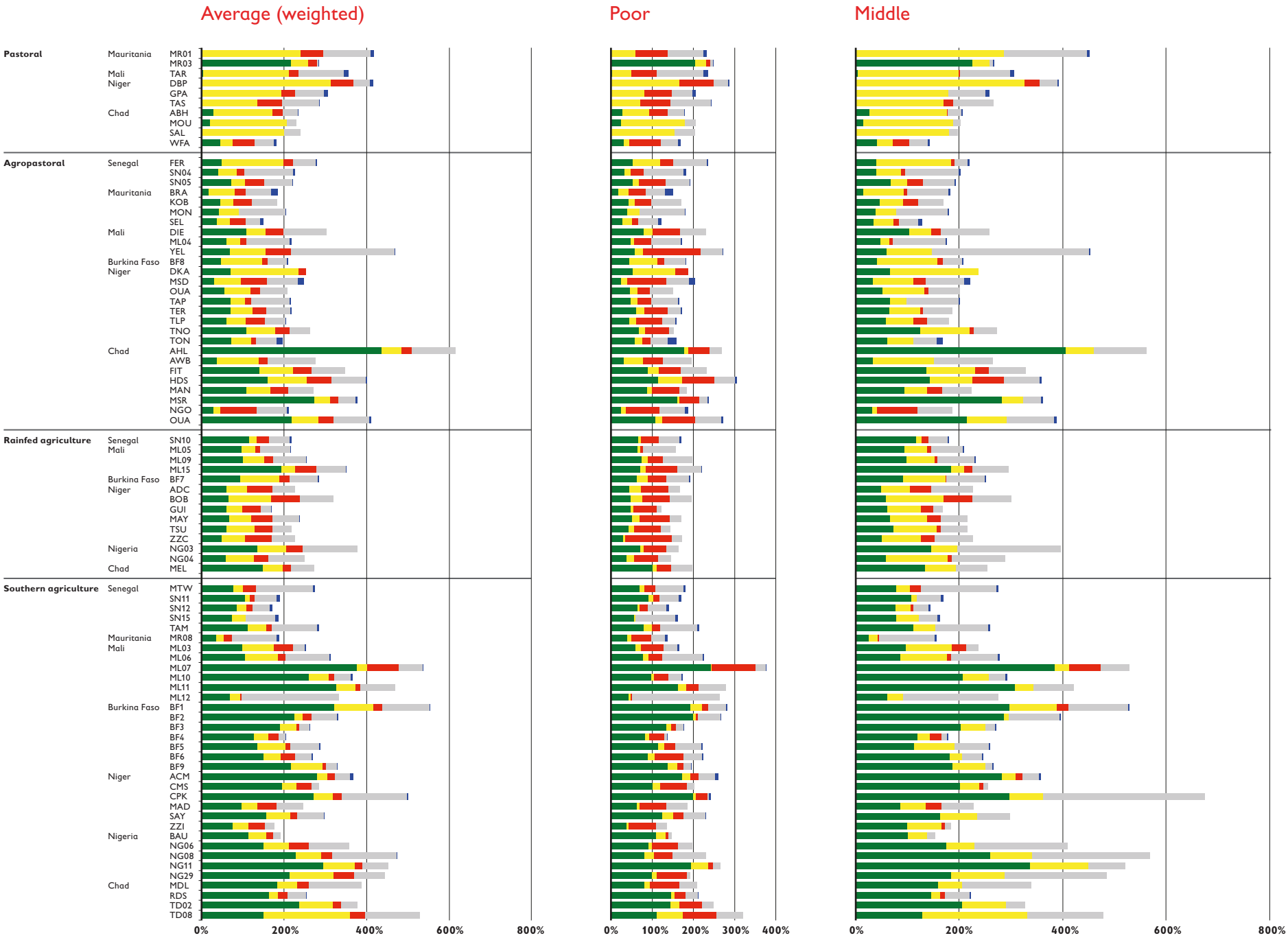
TOTAL INCOME – FOOD + CASH

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



LEGEND

- Consumption and sale of own crops
- Consumption and sale of own livestock and livestock products
- Paid work: cash and in-kind food earnings
- Other
- Food and cash aid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400%
600%
800%
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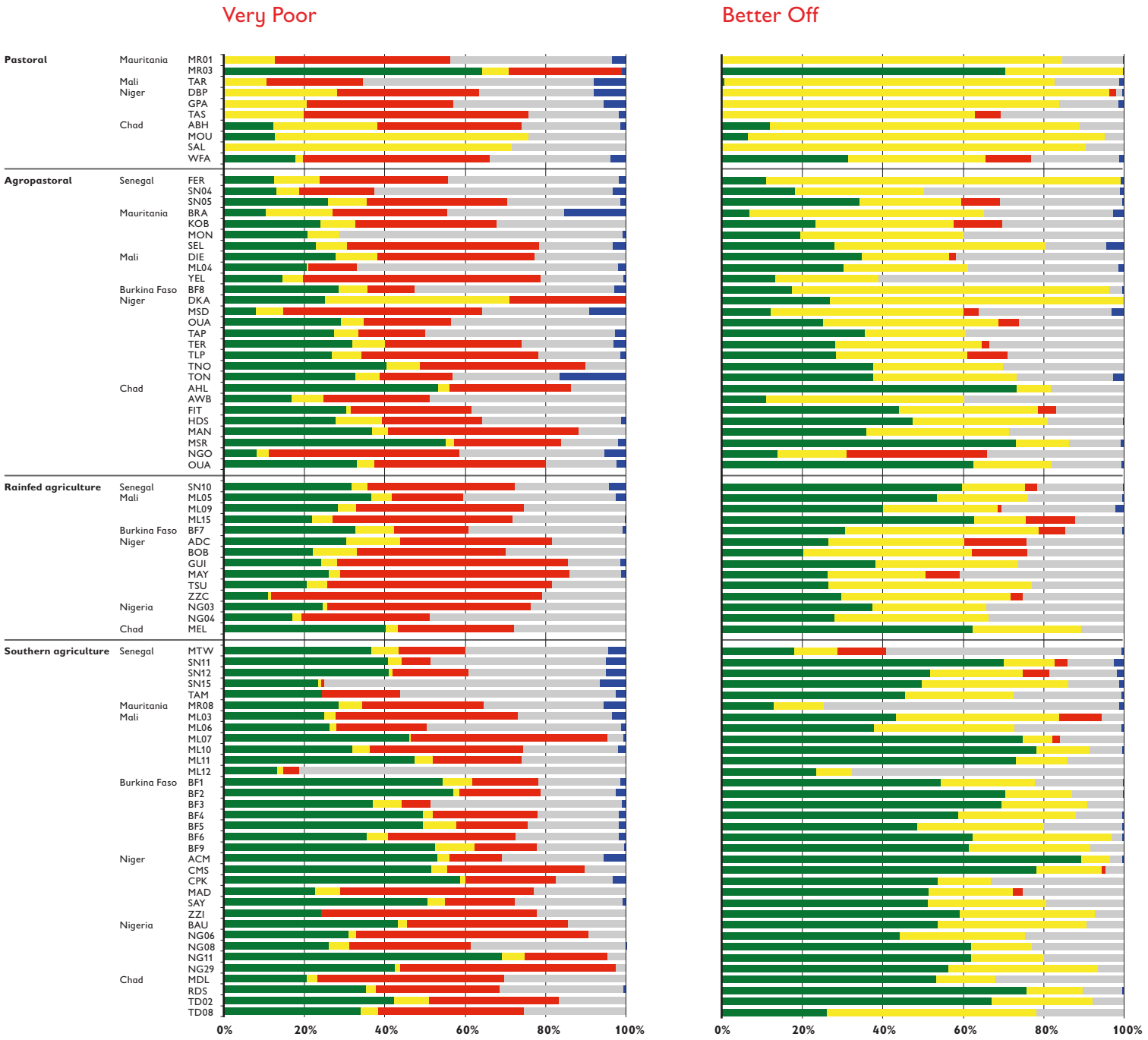
100%
200%
300%
400%
0%
200%
400%
600%
800%

TOTAL INCOME – FOOD + CASH
(Percentage of total)



LEGEND

- Consumption and sale of own crops
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- Paid work: cash and in-kind food earnings
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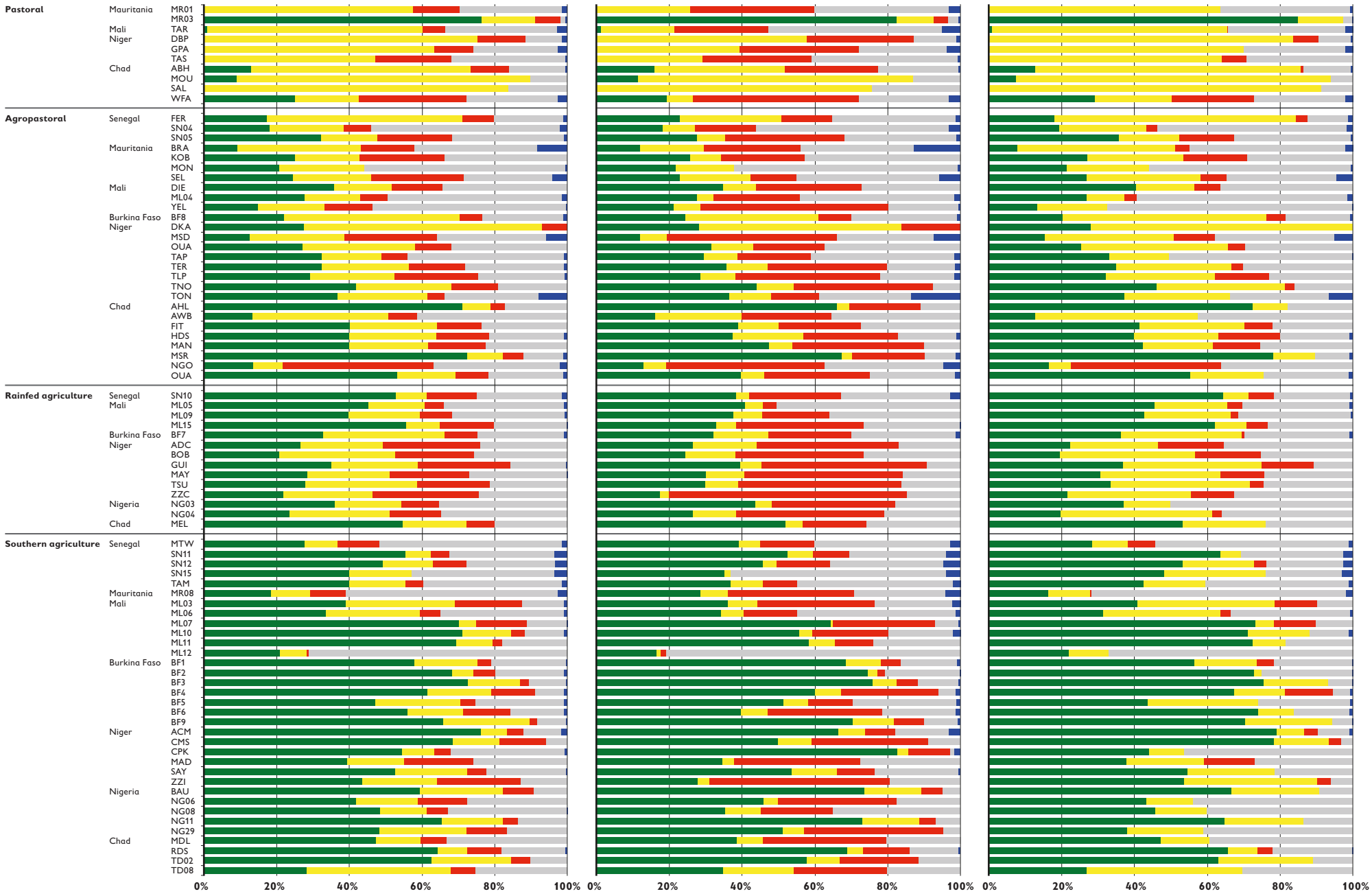
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60%
80%
100%

COMMENTARY TOTAL INCOME

Households have cash income but also food income in the sense of the food they consume directly from their fields and livestock. How can we compare the value to households of these different elements? To do this we need a way of combining cash earned from crop and livestock sales, and employment, etc with home consumption of own food crops and dairy. The method is to convert all to a single unit value of reference, in this case calories. Thus what is calculated are actual calories consumed directly from own production, plus the calories that could be purchased if all the cash earnings from all sources 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 requirement of 2,100 kcal per person per day. This gives a way of showing and comparing the overall value of a household's economic output – the 'total income'.

Under the cash income graphs, we highlighted the prominence of livestock earnings but also indicated the importance of crops. That importance is underlined here because it includes the value from own crop consumption. This does not by any means eclipse the contribution of livestock, but it does substantially redress the balance on Average as well as for the Better Off. For the Very Poor it at least impressively reduces the imbalance – but in this case in relation to their income from earnings off their own farms (labour in red, self-employment as the big component of the grey 'other'). These earnings are still paramount, but own harvest consumption is a surprisingly significant element overall (they sell very few food crops), given their usually very small land holdings, their lack of expenditure on inputs, and indeed their tendency to reduce their attention to their own cultivation in favour of paid work on other people's fields. They also sometimes leave for migrant work even well before the family harvest is in – decisions forced on them by the pressing need for cash to see them through to that harvest. Compared with their sources of cash graphs, the Very Poor here look surprisingly less like a low rural salariat and more like farmers.

The grey 'other' bar is important across the graphs, but it means very different things for the Very Poor and the Better Off. For the poorer in general, it means adding whatever value they can through their capacity for physical work and manual skills, especially in exploiting the free gifts of nature: firewood to sell or convert into charcoal, grasses to cut and sell to cattle-owners in the depths of the dry season, other grasses and reeds to use for basketry hand-crafts for sale, wild foods and products like gum arabic to collect and sell, and clay-heavy soils with water in proximity to make and sell bricks. For the wealthier, it denotes a more commercial set of activities, including petty trade and even wholesale grain trade, ox and plough hire, ox cart hire for carrying people and commodities, and brokering livestock transactions in the market – an important money-earner among pastoralists. The grey bar also includes remittances, which are very much more received by wealthier than by poorer households.