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Ghana
Case Study Report

"Migration and natural resources scarcity in Ghana"

Kees van der Geest[1]

1. INTRODUCTION

In a survey among 203 migrants from Northwest Ghana, the majority mentioned environmental reasons for leaving their homes. The respondents were mostly farmers living in rural destinations in the Brong Ahafo Region in Central Ghana. They indicated that they decided to migrate because of scarcity of fertile land, low crop yields and/or food security problems in the North. They were attracted by the Brong Ahafo Region because of its abundance of fertile land. Unreliable rainfall or climate change was mentioned by much less respondents than expected. Some migrants indicated that it was impossible to make enough money out of farming to attain their ambitions, for example to build a 'modern' house. Many respondents also mentioned financial problems more generally without going into detail about the causes. Being farmers, one can reasonably expect a link between their lack of income and poor agro-ecological conditions. A minority mentioned non-environmental reasons for migrating, like family conflicts, witchcraft, cattle theft, lack of non-farm income opportunities and the desire to be free and independent. Lastly, a good number of respondents emphasized that they had come to the south because *somebody else* had asked them to. Their decision to migrate was influenced or even made by others, either in the destination area or at home.

The purpose of this paper is to determine the importance of the environment as a driver for migration from Northern Ghana to Southern Ghana. The survey findings that I summarised above indicate that this group of migrants (settler

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farmers in the Brong Ahafo Region) indeed experienced a certain degree of environmental push and pull. However, such survey findings are not enough to adequately assess the environment-migration link. If I had interviewed migrants in urban localities, for example, the answers would have been different. Moreover, one has to realise that certain underlying causes of migration and underdevelopment will not be mentioned by respondents who are asked about their *personal* motivation to migrate. The environment, on the contrary, easily becomes part of local discourses on migration because farmers experience the environment every day.

Massey et al's (1993) influential review of migration theories that explain migration flows is totally silent about environmental factors.[2] Though I think that this is a shortcoming, it is also a warning that scholars exploring the environmental causes of migration should be modest in their conclusions about the importance of the natural environment in causing migration flows. Explaining migration flows is an "enormously complex subject" (ibid, 433) and there are numerous overlapping theories that each have some explanatory power. Environmental push and pull can be important additional contributing factors in many migration flows, but except under very specific circumstances, it is never the only cause.

According to Bates (2002: 465), there is a "burgeoning literature" on environmental refugees. In what seems a paradox, she goes on to state there is a paucity of *empirical* research on migration-environment relations (Bates 2002: 466). The reason why so little sound empirical work has been carried out is the complexity of the matter. Multi-causality is a major complicating issue in migration-environment studies. Moreover, different levels of analysis often produce different findings, and there can be time lapses in causation. A migration flow that has been set in motion by environmental factors will often continue autonomously after the initial conditions that caused the migration have ceased to exist. Thus, contrary to what one would expect, migration can increase in times of environmental recovery. Cumulative causation (Portes 1978; Massey 1990, after Myrdal 1957), network theory (Fawcett, 1989) and 'culture of migration' theory (Stark, 2003) can explain this phenomenon. Also, migration can reduce in times of increased environmental stress if people's livelihoods are disrupted and they do not have the resources to migrate. This phenomenon can be explained by the so-called "migration hump theory" (Martin & Taylor 1996; de Haas 2005). According to this theory, migration propensities are not highest in the poorest countries, nor is migration most prevalent among the poorest sections of the population in poor countries. Very poor people usually lack the means to migrate, especially over longer distances.

A good practice in disentangling multi-causality is to distinguish proximate and underlying causes of migration. But there is even mixed causality in

[2] According to Gemene & Dun (2008), there is a large gap between migration studies and environmental science: "Just as most classical theories on migration tend to ignore the environment as a migration driver, most theories on environmental governance ignore migration flows."

underlying causes as the following example from Ghana will show. Underdevelopment and heavy out-migration in Northern Ghana has some of its root causes in colonial policy. The colonial rulers neglected the North to create a labour reservoir for the export-oriented plantation economy in the South (Plange 1979; Sutton 1989; Lentz 2006). But the underlying reason why they concentrated 'development' in the South was environmental: the North was less suitable for the cultivation of cash crops. This example also indicates that the quality of livelihood environments is largely relative to the demands of domestic and global markets.

One of the problems in migration-environment studies is the difficulty of establishing causal relations (see e.g. Black 2001; Castles 2002; Renaud et al 2007). In his critical review of the environmental refugee debate, Black (2001: 6) mentions:

> *For the environmental refugee thesis to be plausible in the Sahel and other semi-arid regions, what is required is not simply evidence of migration from what have always been harsh, marginal environments; rather evidence is needed of an increase in migration at times, or in places, of more severe environmental degradation.*

Indeed, if the environment is an important factor in explaining migration from the West African interior savanna to the moister forest and coastal zones, one can reasonably expect migration propensities to be higher (1) in less environmentally endowed areas; and (2) in times of increased environmental scarcity. In the first part of this paper, I will test these hypotheses for the case of Northern Ghana. I will draw on a variety of secondary data sources, including census data, meteorological data and remote sensing data. The unit of analysis is the district. All 24 districts in Northern Ghana[3] are included. In this part of the paper, the voices of migrants are virtually absent. In the second part of this paper I will present questionnaire survey findings that go into detail about people's personal motivations to migrate. None of these sources alone can adequately address the complex reality of migration-environment relations. It is only through a sensible triangulation of sources that a 'moving picture' can emerge that holds some degree of trustworthiness.

The surveys findings that are used in this paper result from a larger research project on migration, environment and development linkages in Ghana. The survey focused on a particular ethnic group: the Dagara from Northwest Ghana. Several questionnaires[4] were administered among a total of about 550 respondents in the source area of the migrants and in the region that receives most migrants from Northwest Ghana: the Brong Ahafo Region (Ghana Statistical Service 2005). To go into more detail about environmental causes of migration it was necessary to administer an extra questionnaire among thirty-six Dagara migrants in the Brong Ahafo Region. This

[3] At the time of the Ghana Census 2000, there were 24 districts. In the past few years, several new districts have been created.

[4] See http://users.fmg.uva.nl/kgeest/phd/phd.htm for the original questionnaires.

questionnaire was an adjustment of the original EACH-FOR questionnaire.[5] An additional questionnaire was also administered among thirty-one non-migrants and returned migrants in the Upper West Region. The purpose of this questionnaire was to find out what made people decide to *stay* in or *return* to an area with a strong culture of migration and poor agro-ecological and economic conditions.

The structure of this paper is as follows. In section two, the patterns and trends of North-South migration in Ghana will be introduced. This section starts with a broad history of North-South migration from pre-colonial to colonial times. It continues with a more detailed analysis of modern migrations. In section three, I will use *cross-sectional* vegetation, rainfall and rural population density data to show that indeed, migration propensities tend to be higher in districts with more resource scarcity. The *longitudinal* analysis of migration, rainfall and vegetation data in section four provides no evidence of increased migration in times of environmental stress. The findings from section three and four indicate that the environmental driver of migration from Northern Ghana is not so much *degradation*, but rather *structural* scarcity. Increasing cash needs and increasingly easy access to a well-endowed and settler-friendly destination for migrants further facilitates movement. The questionnaire data that are presented in section five confirm this finding: very few respondents talked of environmental *change*, while the vast majority did allude to structural characteristics of the environment in Northern Ghana (lack of fertile land especially). The survey data is further analysed to answer some questions that are raised in the environmental refugee debate. Before concluding, I will touch upon future scenarios of North-South migration and I will explain why I predict that environmental scarcity or degradation in Northern Ghana will not cause inter-continental migration to Europe. This paper will be concluded with a synthesis of the findings from the earlier sections to assess the role of environment factors in north-south migration.

2. Migration from Northern Ghana: patterns and trends

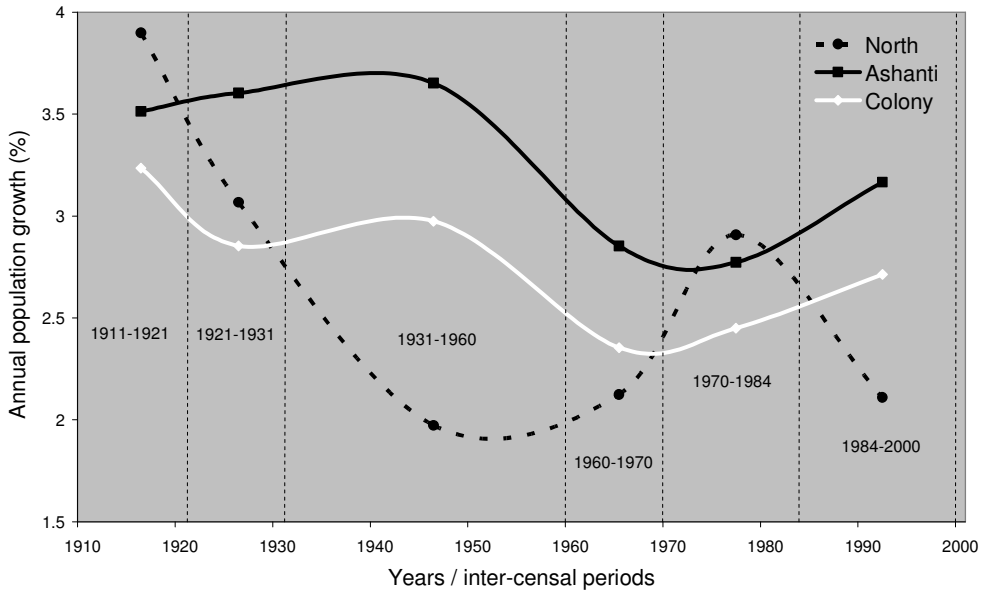
Northern Ghana's migration history quite neatly follows the three stages in Portes' (1978) model of migration and underdevelopment. In stage one, which lasted until the early 20th century, there was very little migration from Northern Ghana to the South. This is the time before the Northern Territories of the Gold Coast were colonized by the British. Cleveland (1991: 222) aptly describes the pre-colonial situation as "a tradition of local migration by many and long-distance migration by a minority of warriors and traders." People migrated over shorter distances in search of fertile lands and to escape conflict, oppressive rulers and slave raiders. The only substantial flow of people that moved from North to South consisted of captured slaves that were either sold to European traders and shipped to the Americas or ended up working for big farmers in Southern Ghana who benefited from the increased trade in agricultural goods after the abolition of Transatlantic slave trade. In this period (second half of the 19th century) domestic slavery was not yet

[5] The EACH-FOR questionnaire was adjusted to better suit the local situation.

abolished (Swindell 1995). The movement of slaves from Northern Ghana to Southern Ghana was clearly involuntary. Large-scale *voluntary* migration was impeded by the situation of conflict and insecurity resulting from the wars between the Ashanti, the Gonja and the Dagomba and the related activities of slave raiders. Furthermore, there may have been little reason to migrate from North to South. Before the demise of the Trans-Saharan trade routes and before the advent of a plantation economy in the South, the savanna seems to have been the more benign livelihood environment (Varley and White 1958). This changed after the British 'pacified' and colonized the then Northern Territories of the Cold Coast.

In the second stage of Portes' (1978) model, contact between the 'core' and the 'outlying areas' increases through trade, but people do not yet migrate voluntarily. This is the time of induced migration through forced recruitment, mediated by local authorities. For Northern Ghana, this stage was very well documented by historical anthropologist Carola Lentz (2006). The time of recruitment lasted about two decades, from 1906 to 1927 (ibid, 139-142). The 'core' for which labourers were recruited consisted of the mines in Southern Ghana. The colonial government also recruited substantial labour from Northern Ghana for railway construction. An indirect way of inducing migration was the introduction of head taxes. Very little money circulated in Northern Ghana and to be able to pay the taxes, labour migration was one of the few options.

The third stage of Portes' model starts when recruitment is no longer necessary because of structural changes in the economy, culture and social organization. In the case of Northern Ghana, I doubt whether the economy fundamentally changed before migration became voluntary. As Lentz (2006: 143) documented, voluntary migration started not long after the first forced migrants returned from the mines in Southern Ghana. Although most mine workers returned with possessions that impressed their friends and relatives at home, the reports about work in the mines were not positive. The conditions were poor and the death rates were high. There were much better opportunities for work in the booming cocoa sector where wages and working conditions were better. Another advantage of work in the cocoa sector was that labour demand peaked during the off-season in the North, which lasted from October to April. In the early stages of the North-South migration system, migration was predominantly seasonal and male-dominated. Migrants tried to return to the North for the farming season even though up until the 1930s, they had to walk all the way to the South.



North:
Upper East
Upper West
Northern
Region

Ashanti:
Ashanti
Brong Ahafo

'**Colony**':
Western
Central
Eastern
Volta
Greater
Accra

See map below

Figure 1: *Inter-censal population growth* (1911-2000). The figure is based on population figures from Engman (1983) and Ghana Statistical Service (2005). Census years: 1911. 1921, 1931, 1960, 1970, 1984 and 2000. Figures for 1948 are excluded.

Figure 1 shows the trend in annual inter-censal population growth for different zones. From the figure, one can read the rough[6] trend in migration propensity in Northern Ghana. Declining population growth indicates increasing out-migration. This is the case for Northern Ghana between the 1910 and 1960 censuses and in the last inter-censal period (1984-2000). Increasing population growth is an indication of reduced out-migration and/or increased return migration. This is the case for Northern Ghana in the 1970s and early 1980s, a time of widespread economic crisis, political instability and high food prices in the South (Mensah-Bonsu 2003: 35). The adverse conditions in the South made many decide to refrain from migrating. Many migrants also returned to the North. As we will see below, this was a time of prolonged droughts in the North. In the late 1980s and in the 1990s, the economic and political conditions in the South improved and migration from the North increased again even though the rainfall conditions in the North also improved.

Obviously, population growth is not only influenced by migration, but also by fertility and mortality. Fortunately, Ghanaian censuses provide information about people's birthplace. People who were born in Northern Ghana and enumerated in Southern Ghana are considered to be migrants. In the archives of the African Studies Centre in Leiden, I found old census reports that enabled me to reconstruct the North-South migration trend in the second half

[6] The figures are rough because the quality of the early census data is questionable and because population change is not only determined by migration rates, but also by fertility and mortality. Engman (1983) reports in detail on some of the problems of the early censuses conducted in Ghana. There were especially severe problems with the 1948 census and these are excluded from figure one.

of the 20th century (see table 1). The figures confirm the gradual increase in migration propensities with a temporary decline in the 1970-1984 inter-censal period. After this temporary decline, migration propensities increased sharply in the last inter-censal period (1984-2000). The general increase in migration propensities can almost exclusively be attributed to increased female participation in migration flows (see table 1).

Table 1: *Migration trend indicators* (1931-2000)

Year	1931	1948	1960	1970	1984*	2000
North-South Migrants	44,013	152,960	189,160	293,415	121,324	677,069
as % of people born in N-Ghana	5.8	13.3	15.6	16.5	9.6	18.4
as % of population S-Ghana	2.1	5.0&	3.5	4.2		4.7
female migration (as % of total)		27	34			47
Important destinations for N-Ghanaians (in descending order)	AR ER WR	AR# ER# WR#	AR BAR WR	AR BAR WR		AR BAR GAR

AR = Ashanti Region; BAR = Brong Ahafo Region; GAR = Greater Accra Region; WR = Western Region; ER = Eastern Region (see map below)
* Ghanaian census go into detail about inter-regional migration in a volume called “detailed demographic characteristics”. In 1984, this volume was never published. Therefore, some data for 1984 are lacking. The figure for 1984 was taken from Ewusi (1977: 19-19) who had access to the raw census data. The figure applies to the population aged fifteen and above.
& The 1948 census had serious problems. The population was under-estimated for Southern Ghana (Engman 1983). Therefore, the figure of 5.0 Northern migrants in Southern Ghana was probably lower in reality.
# At the time of the 1948 census, the administrative districts differed from later censuses. The three most popular destinations for Northern migrants were Kumasi (AR), Birim (ER) and Wasaw Aowin (WR).
Sources: Census Office, Gold Coast (1932: 21); Census Office, Gold Coast (1950: 360, 362-366); Census Office (1962: 13-14); Ewusi (1977: 17-19); Ghana Statistical Service (1993: 157); Ghana Statistical Service (2005: 130-131).

A disadvantage of studying migration flows by looking at birthplace and current residence is that second and subsequent generations of migrants are excluded. Table 2 lists the largest ethnic groups that originate in Northern Ghana. In the last three columns, one can read the percentage of ethnic group members that were living in Southern Ghana in the years 1948, 1960 and 2000. These figures include the original migrants and their descendents who stayed in the South. Several observations can be made from this table. Firstly, migration rates are much higher when second and subsequent generations are included. On average, about one of every three persons with a ‘Northern’ ethnic background is now living in the South. Secondly, migration propensities still varied widely between ethnic groups at the time of the 1948

census. These differences have gradually decreased in the second half of the 20th century. Even a group like the Bimoba that virtually did not engage in migration five decades ago, now has more than a third of its members living in the South. Thirdly, column four shows that high female participation in the North-South migration flow applies to all ethnic groups.

Table 2: *Migration by ethnic grouping – % of group living in Southern Ghana*, 1948-2000[&]

Group[#]	Source region	Group Size 2000	Female Migration 2000 (%)	1948	1960[*]	2000
Dagomba	NR	746,924	47.4	6.6	14.1	19.0
Dagarti[†]	UWR	641,926	50.1	9.8	17.6	35.7
Konkomba	NR	474,293	47.6	1.6	21.3	35.4
Frafra	UER	426,019	46.2	4.7	22.3	33.6
Kusasi	UER	379,007	48.8	2.1	13.6	47.1
Gonja	NR	211,703	49.3	2.9	16.4	36.6
Mamprusi	UER	200,393	47.5	1.8	6.9	26.1
Wala	UWR	173,536	47.7	12.0	20.9	42.8
Sisala	UWR	165,535	47.1	4.5	13.5	40.5
Busanga	UER	137,740	49.8	18.3	45.6	58.9
Builsa	UER	118,709	46.4	2.5	13.1	37.3
Kassena	UER	116,141	48.6	2.0	1.6	43.3
Bimoba	NR	113,130	50.0	0.0	0.2	35.3

& Data for 1970 and 1984 are missing.
# Ethnic groups with less than 100,000 members in 2000 are excluded from this list.
† In early census reports, the Dagaba and Dagara were labelled Dagarti.
* Some data for 1960 are missing in this table, but they are available. CHECK A.S.C., Leiden
Sources: Census Office (1950: 367-369); Gil et al (1964: 10-24); Ghana Statistical Services (2005b, table 7)

In the early stages of the migration system, travelling to southern Ghana was a young-adult-men-affair and a rite de passage to prove growth into manhood. At the turn of the 21st century, migration has become a family affair. Men usually take the lead and explore the possibilities in Southern Ghana. After some years of seasonal migration they typically use their earnings to marry and bring their new wives from the North to start a family. Independent migration of women is also becoming much more common. A very visible group of female migrants from Northern Ghana, for example, are the *kayayei* head porters in Southern Ghanaian cities (see Adu Opare 2003 and Van den Berg 2007). The strong taboos against women travelling that existed in the past gradually disappear or lose their strength. Moreover, formal education has become much more common among women. Enrolment rates of primary schools are gender balanced nowadays. Higher levels of education certainly play a role in increasing female migration.

Another trend is that in the course of the 20th century migration has become more permanent. This does not mean that seasonal migration has ceased or even reduced. Seasonal labour migration is still an important source of income for North-Ghanaian farmers. The survey data from the Nandom Area indicate that of the male household heads, the vast majority (83%) had engaged in seasonal labour migration, and 34% of those aged 20-60 had done so in the previous year. The census data indicate that migration to southern Ghana during the slack season in the North is especially common in the Upper West Region.[7] But still it is clear that more and more Northerners settle in Southern Ghana for longer periods. The large difference in migration propensities between table 1 (migration by birthplace) and table 2 (migration by ethnic grouping) shows that the second and subsequent generations already outnumber the first generation.

The fact that migration has become more permanent does not mean that migrants will never return. The vast majority of the migrants I interviewed expressed their intention to return to their homes some day. To some of them, the so-called 'myth of return' (Anwar 1979) may apply, but many in fact do return. In my sample of 204 households in Northern Ghana, eighty-four household heads were returned migrants. Fifty of them had stayed in Southern Ghana for more than five years. Through the EACH-FOR questionnaire that I administered among non-migrants and returned migrants I found out that migrants' return is very closely related to responsibilities at home. At least one 'strong man' has to be at home to farm the ancestral land, look after the family house and assume the position of 'yir-sob' (head of the house).

[7] The census distinguishes 'usual resident population' and 'counted population'. A person is considered a 'usual resident' if he or she resides in the locality for a minimum of six months per year. The census was taken in the dry season. Having more 'usual resident population' than counted population is an indication of seasonal out-migration. The Upper West Region had a 'deficit' of 7.3 percent, while the difference was only 0.4 and 0.6 percent respectively for the Northern Region and the Upper East Region.

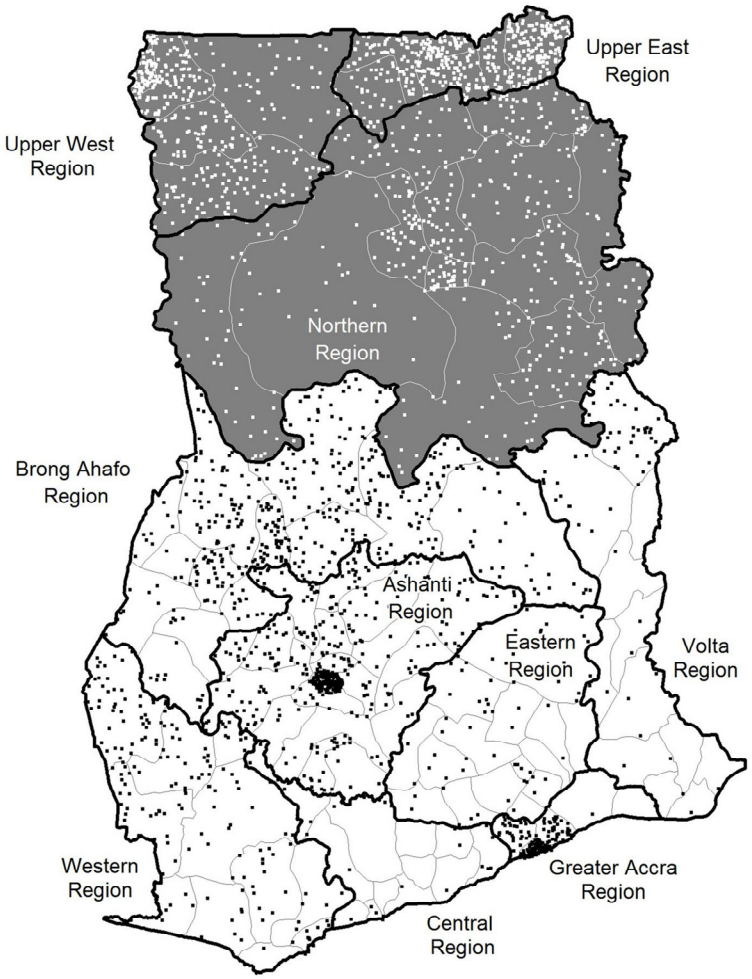


Figure 2: Map of North-South migration in Ghana. Each dot represents 500 migrants. The white dots in the North symbolize the number of out-migrants per district of origin. The black dots in the South correspond to the number of Northern in-migrants in the destination districts. A migrant is defined here as someone born in the North and presently living in the South, so this excludes second or subsequent generation migrants. Source: Calculated from Ghana census 2000 (Ghana Statistical Service 2005).

Figure 2 shows the map of North-South migration in Ghana, based on data from the population census of the year 2000. The densely populated Northeast is a principal source area of migrants, but the Upper West Region has the highest out-migration rate: 30.8 percent of the people born in that region lived in another region at the time of the 2000 population census. The majority of these migrants were living in the South: 26.9 percent (see table 3). There are indications that the Upper East Region has experienced more out-migration than the Upper West Region in the last inter-censal period (1984-2000). The population of the Upper East Region has increased with only 1.1% per year in that period (table 3). In the previous two inter-censal periods, population growth was lowest in the Upper West Region. Migration propensities are substantially lower in the Northern Region.

Table 3: *Migration indicators from the 2000 population census*

		Northern	Upper East	Upper West
(1)	Born in region (*1000)	1,880	1,053	740
(2)	Living in region (*1000)	1,741	852	549
(3)	Born in region, living in other region (*1000)	256	256	228
(4)	Living in region, born elsewhere (*1000)	117	54	36
	Out-migration rate = (3)/(1)*100%	13,6	24,3	30,8
	In-migration rate# = (4)/(2)*100%	6,7	6,4	6,6
	Born in region, living in S-Ghana (*1000)	244	234	199
	Born in region, living in S-Ghana (%)	13.0	22.2	26.9
	Proportion of women in migration flow (%)	47.8	46.5	46.0
	Annual population growth ('84-'00)	2.8	1.1	1.7
	Total fertility rate (average 1988, 1993, 1998)	7.06	5.93	6.46
	Dominant immigrant group in:	Accra; Volta	Ashanti; Western	Brong Ahafo

Sources: Calculated from Ghana Statistical Service 2005. The fertility data are from the Demographic and Health Surveys 1988, 1993, 1998 (Ghana Statistical Service 1989; 1994; 1999).
For the Upper Regions, the 'immigrant population' mainly consists of children of returned migrants who were born in Southern Ghana. In the Northern Region forty percent of the immigrant population hails from the Upper Regions.

The food crop producing middle belt (Brong Ahafo and Ashanti Regions), the cocoa frontier in the northern part of the Western Region, and the cities of Kumasi and Accra are prime destination areas of migrants from the North (figure 2). The mining towns in the Southern part of the Western Region and in the Central Region were once important destination areas for Northern migrants. This is no longer the case because the demand for unskilled labour in the mines has virtually dried up. The map does not specify the region of origin of Northern settlers in Southern Ghana. It is interesting to note, however, that migrants concentrate in certain destination areas. Migrants from Upper West dominate in the Brong Ahafo Region; those from the Upper East are concentrated in the Ashanti and Western Regions; and migrants from the Northern Region are most numerous in Greater Accra and especially the Volta Region (see table 3). Geographical distance may play a role, but there are other forces at work, too. It seems that migrant networks and perhaps historic links between places are important facilitators of movement, creating a system of chain migration.

In this section, I have described some patterns and trends in migration from Northern Ghana to Southern Ghana. For the cross-sectional analysis (see below), it is important to note that there are pockets of high migration propensities in the Upper West and Upper East Region. For the longitudinal analysis of migration and environmental dynamics, the important information is that out-migration from Northern Ghana has gradually increased in the

course of the 20th century with a temporary decline in the 1970s and early 1980s.

3. Cross-sectional analysis

In this section, I will look at the geographic relation between out-migration propensities and different indicators of natural resources scarcity. The unit of analysis is the district (N=24). The indicators of natural resources scarcity I use are rainfall, vegetation cover and rural population density. With this analysis, I will test the hypothesis that migration propensities are higher in environmentally less endowed areas, as proposed by Black (2001: 6). The maps and scatter plots in the figures below show the distribution of migration propensities and natural resources scarcity. Figure 3 shows that migrant propensities increase from North to South and that the highest migration figures are found in three districts in the extreme Northwest. In these districts, it is estimated that out-migration rates are in the range of 40 to 46 percent.[8]

Figure 3: *Out-migration propensities in Northern Ghana* (source: calculated from Ghana Statistical Service 2005)

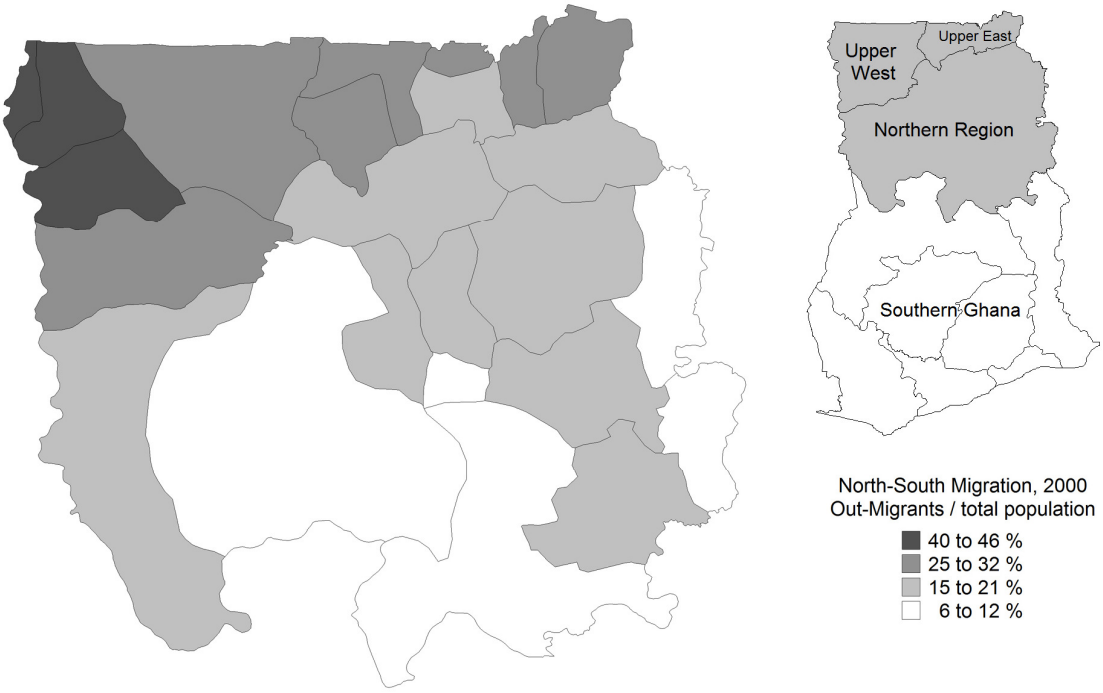


Figure 4 shows the geographical distribution of rainfall in Northern Ghana. It is based on 'half degree' rainfall data from the Global Precipitation Climatology Centre[9] for the years 1986 to 1995. GIS software was used to aggregate cell data to the district level. In general, annual rainfall amounts decrease to the North. The districts in the Southeast corner of Northern Ghana receive most

[8] These percentages are calculated over the total counted population in the district. This includes in-migrants and excludes out-migrants. The out-migration rates in the tables above are calculated as a percentage of the people born in the region. The Ghana census does not inquire after district of birth (only region of birth).

[9] see http://daac.gsfc.nasa.gov/www/islscp

rain. As expected, there is a negative relation between precipitation and out-migration (R = -0.67). Districts that receive less rainfall tend to experience more out-migration. The scatter plot shows that the three districts with the highest out-migration rate (in the Northwest) receive relatively low amounts of rain, but not less than some other districts (in the Northeast). Annual rainfall is a rather crude measure, and for farmers in Northern Ghana, the *distribution* of rainfall over the year and the occurrence of dry spells may be more important. However, previous efforts to develop measures that take intra-annual variability into account failed to predict crop yields in Northern Ghana better than the crude measure of total annual rainfall (see Van der Geest 2004 and Dietz et al 2004 for more details).

Figure 4: Average annual rainfall in the 24 districts of Northern Ghana (1986-1995)

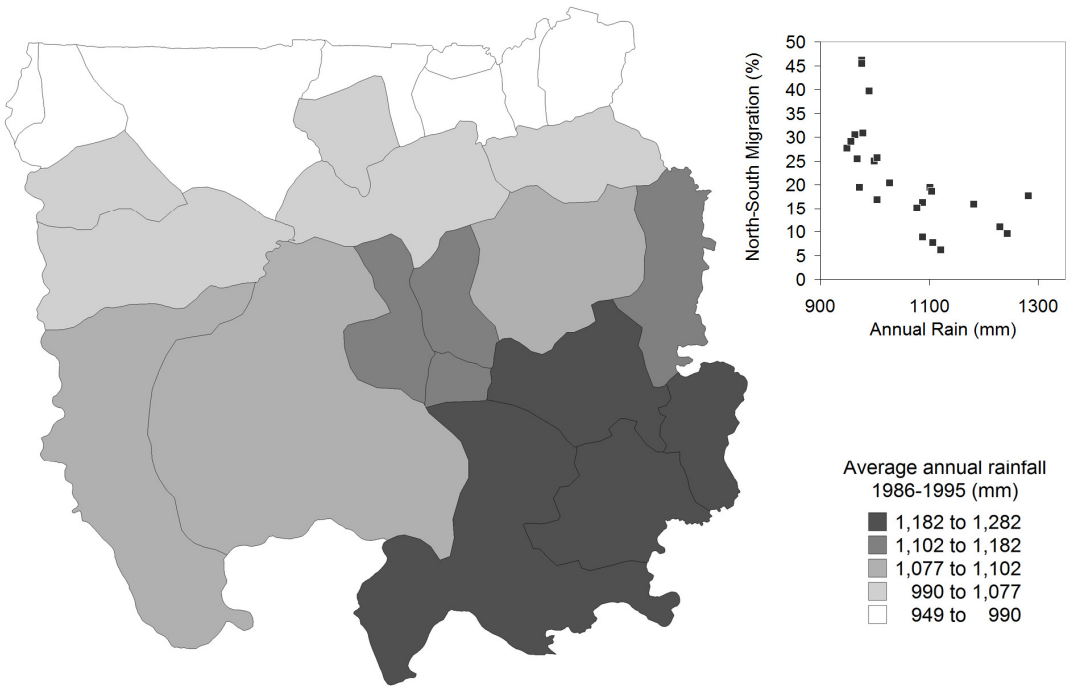


Figure 5 shows the average 'greenness of the environment' as measured by the Normalized Difference Vegetation Index[10] (NDVI). The greenness of the environment is determined primarily by rainfall, soil and human influence. Low NDVI values are an indicator of natural resources scarcity. The high rainfall districts in the Southeast have a lower vegetation index than the districts in the Southwest because of poorer soil quality. As expected, the map and scatter plot show that there is a negative relation between migration propensities and the vegetation index. However, the relation is less strong than for rainfall (R = -0.42). Some districts in the Upper West Region, for example, combine high migration propensities with a relatively 'green' environment.

[10] The NDVI is measured by a satellite of the NASA. See http://earthobservatory.nasa.gov.

Figure 5: *Average vegetation cover (NDVI) in the 24 district of Northern Ghana*

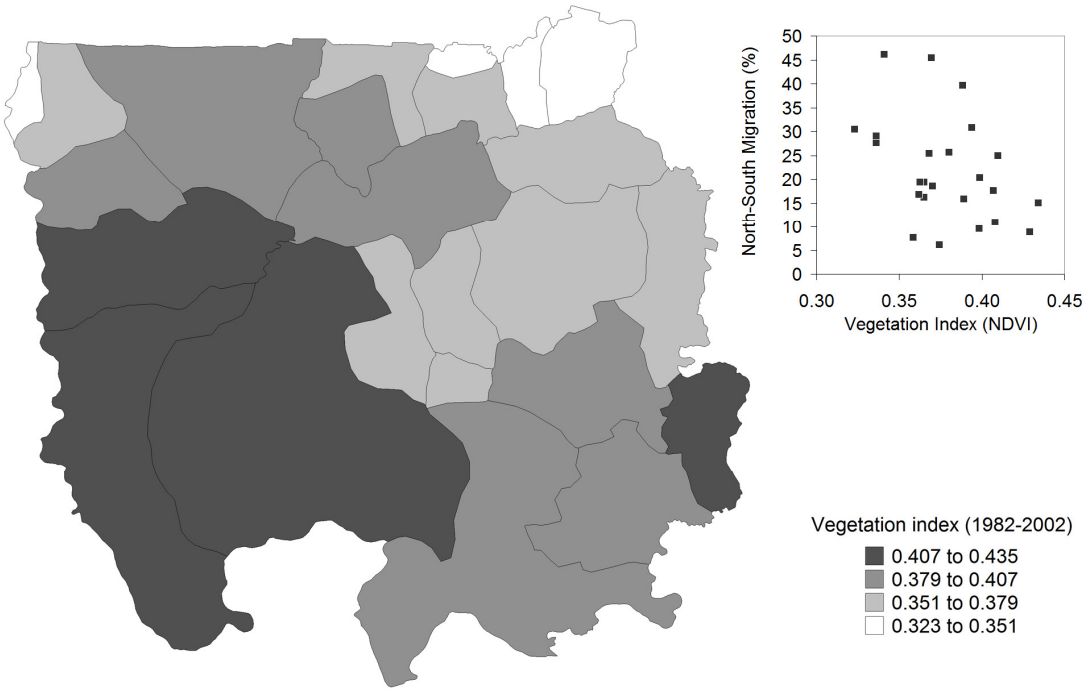
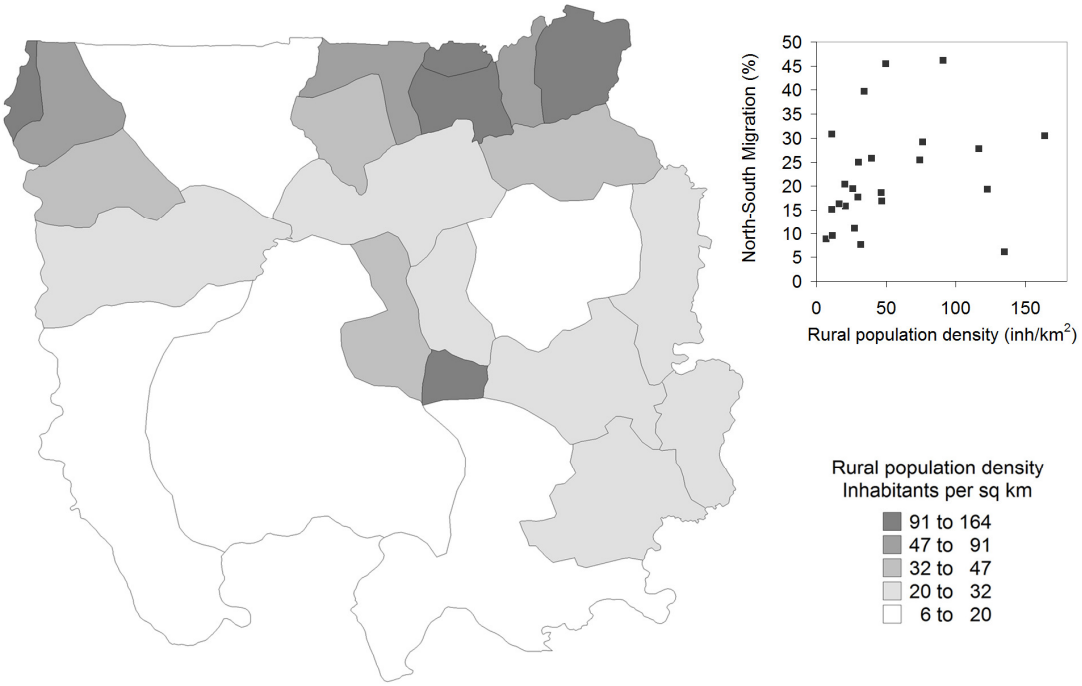


Figure 6 shows rural population densities. Rural population density is calculated as the population living in localities with less than five thousand inhabitants divided by the district surface area (expressed in square kilometres). High rural population density is an indicator of scarcity of land for farming, which was one of the prime motives for migrating mentioned by my survey respondents. Since the vast majority of the population of Northern Ghana depends on farming as its principle source of livelihood, rural population density is expected to be a positive driver of migration. Although indeed, densely populated districts tend to have higher out-migration rates, the relation is not straightforward. As one could expect, the regional capital of Northern Ghana (Tamale, the outlier in the lower right corner of the scatter plot) combines high population density with a low out-migration rate. Tamale rather attracts migrants because it is a centre of economic activity and 'development'. One could argue that it would be better to exclude Tamale from the analysis of *rural* population density because the district in essence is urban. If one excludes Tamale from the analysis the correlation (R) is 0.42. A more important observation is that the Upper East Region is more densely populated than the Upper West Region (see figure 6), while out-migration rates are higher in the Upper West Region than in the Upper East Region (see figure 3).

Figure 6: *Rural population density in the 24 districts of Northern Ghana*



This cross-sectional analysis of migration and environmental pressure shows that migration propensities are indeed higher in districts that experience more resource scarcity. But the relation is not straightforward. Combined, rainfall, vegetation and rural population density explain 44.2% of the estimated migration propensities at the district level. Of the three variables, rainfall has the strongest correlation with out-migration propensities. This is not surprising. High population pressure on scarce farm lands may be a disadvantage for farmers as it keeps crop yields down, but high population density also has a number of advantages. Public services are more accessible; there are usually more non-farm activities; and access to markets is often better in densely populated than in sparsely populated areas. This may explain why densely populated districts do not necessarily experience more out-migration. Indirectly, the same applies to NDVI as the greenness of the environment in Northern Ghana is quite strongly – inversely – related to population density (R= -0.72).

Another finding from the cross-sectional analysis is that migration propensities are highest in the Upper West Region while environmental pressure is at least as high in the Upper East Region. This may be partly due to the early influence of Christianity in the Upper West Region, especially in Jirapa and Nandom. In the Upper West Region much more people have converted to Christianity than in the Upper East and especially the Northern Region where Islam is dominant. This may have two relevant consequences for migration propensities. Firstly, Southern Ghana is predominantly Christian and this may make it a more attractive destination area for potential migrants with a Christian background. It may be easier for them to integrate in the southern Ghanaian society. Secondly, the first schools in the North were founded by Christian missionaries and in the areas where they have been most active,

people are still higher educated, which has a positive effect on migration propensities.

The analysis presented above focused on environmental *push* from Northern Ghana. A similar analysis could be done for environmental *pull* to Southern Ghana, looking at in-migration rates of North-Ghanaians, rainfall conditions, soil suitability for agriculture, vegetation index and rural population density. The findings are not presented in this paper in detail, but the conclusion is that Northern migrants settle predominantly in areas that combine low population density with good agro-ecological conditions. In more densely populated areas with good conditions for farming, tenure arrangements for migrant farmers are unfavourable, especially because this area largely coincides with Ghana's cocoa belt, which has a long tradition of private land ownership and high prices for renting land.

4. Longitudinal analysis

In this section, I will test the hypothesis that migration propensities increase in times of environmental stress. Figure 7 and table 4 show the trends in annual rainfall and migration propensities in Northern Ghana. The figure clearly shows that after the relatively wet 1960s[11], rainfall conditions deteriorated in the late 1970s and early 1980s. This is the time of the great Sahelian droughts. If environmental degradation is a prime driver of migration, then one would expect an increase in migration in this period. Surprisingly, this was rather a period of reduced out-migration from Northern Ghana (see also figure one and table one).

Table 4: *Average annual rainfall* (1960-2002) *and migration propensities* (1960-2000) *in Northern Ghana*

	1960-1970	1970-1984	1984-2000
Average annual rainfall (mm)	1111	951	979
Average annual population growth (%)	2.12	2.91	2.11
North-South migration rates	15.6 □ 16.5	16.5 □ 9.6	9.6 □ 18.5

Source: Ghana Meteorological Services Department and Census Reports

[11] Dietz et al (2004: 156) show Ghana's rainfall trend for the entire 20th century. The 1950s and 1960s were by far the wettest decades. The rainfall situation in the 1990s and early 2000s is slightly below the long-term average.

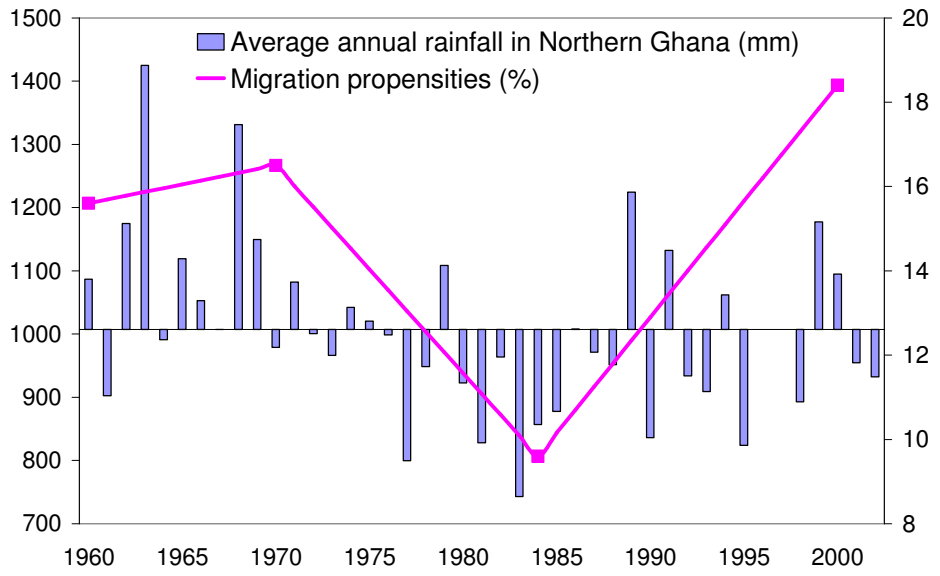


Figure7:Average annual rainfall and migration propensities in Northern Ghana

Based on twenty rainfall gauges in Northern Ghana. The data for 1996 and 1997 are missing.

Source: Ghana Meteorological Services Department

The late 1980s and 1990s did not only show a partial recovery in precipitation, but also a regeneration of vegetation cover (see figure 8). The vegetation cover, as measured by the Normalised Difference Vegetation Index (NDVI), is very much related to rainfall. In dry years, NDVI scores tend to be lower and in wet years, NDVI scores tend to be higher. After the prolonged droughts of the late 1970s and early 1980s it comes as no surprise that the vegetation cover shows a positive trend. Unfortunately, no NDVI data of the pre-droughts period exist. In the absence of good data on land degradation, NDVI is often taken as a proxy for land status. Declining NDVI scores are associated with land degradation, while rising NDVI scores represent regeneration. The data for Northern Ghana show the 1990s were a period of regeneration or at least recovery. Despite environmental recovery, out-migration from the area has increased very sharply in the last inter-censal period (1984-2000).

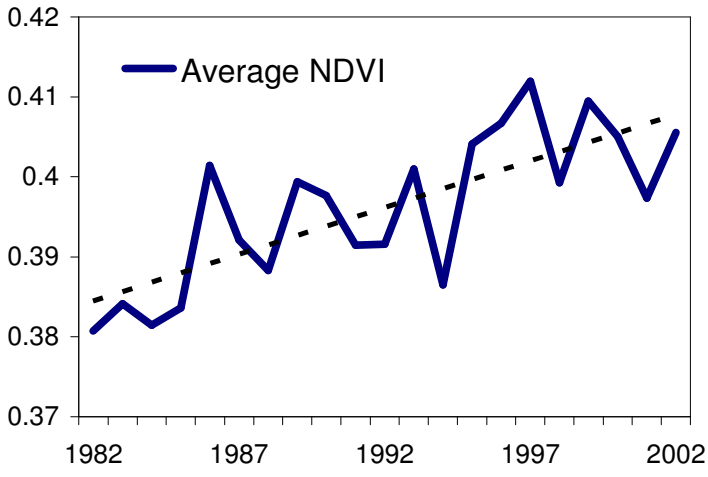


Figure 8: *NDVI trend Northern Ghana* (1982-2002).
NDVI is the Normalised Difference Vegetation Index.

The index measures the 'greenness of the environment'. Since the early 1980s, Northern Ghana has become greener, mostly because of increased rainfall after the great droughts of the 1970s and early 1980s.
Source: NASA.

If we turn around the causality, it could also be argued that large-scale out-migration decreased pressure on natural resources and that together with improved rainfall, this facilitated regeneration of the land. There is a strong and significant correlation between NDVI trend and out-migration rate at the district level (R= 0.73). In districts that experience more out-migration, the vegetation cover (or the 'greenness of the environment') has increased more than in districts that experienced less out-migration.

Although the NDVI trend gives an indication of environmental change, it does not fully cover the different environmental processes on the ground. To some observers, it may come as a surprise that Northern Ghana has experienced regeneration rather than degradation in the past two decades. We are rather used to hearing reports about environmental *degradation* and even desertification. In most parts of Northern Ghana, the population is still growing (2.11 percent in the last inter-censal period, see table 4) despite large-scale out-migration. Hence pressure on farmland is still increasing and farmers complain that the land does not produce as much as it used to do. The point here is that out-migration declined sharply in a period of intensified environmental stress (1970-1984), while it increased sharply in a time of environmental recovery (1984-2000). So apparently, stronger forces were at play.

Indeed, the 1970s and 1980s were a time of widespread economic crisis, political instability and high food prices in Southern Ghana, the main destination area of Northern migrants. The adverse conditions in the South made many decide to refrain from migrating. Many migrants also returned to the North. What we do not know is whether this was a gradual process or a sudden event. The pre-census year (1983) was a particularly hectic time. The drought also reached Southern Ghana, causing widespread bush fires and destroying large areas planted with cocoa. 1983 was also the year that about one million Ghanaians were forcefully expelled from Nigeria. The shops were almost empty and people had to queue long hours to buy basic commodities and foodstuff. In the same year, the Ghanaian government had to accept the structural adjustment policies of the IMF resulting and many government workers were laid off.

5. Survey findings

In this part of the paper the focus will shift from the 24 Districts of Northern Ghana to a specific North-South migration system. In a survey among 203 Dagara settlers in the Brong Ahafo Region, the reasons for migrating were asked. The Dagara originate from Ghana's Upper West Region in Northern Ghana. The settlers were first asked what situation made them to migrate from the Upper West Region. A second question asked what made them choose to settle in the Brong Ahafo Region. In order to cover the full range of possible migration reasons, I decided to ask open questions that I later coded into relevant categories. The answers of these two hundred settlers give a good overview of the local discourse on migration causes. The questionnaire

did not focus specifically on environmental causes of migration. Hence, respondents were not pushed in their answers in any way.

A migration decision usually results from a complex set of overlapping causes at different levels. There are individual reasons pertaining to the specific situation of the respondent. At a higher geographical level, there are underlying causes of migration that are related to the characteristics of the source area and the destination area of the migrants. In Hugo's (1996: 111) "simple model of environmentally induced migration" the latter are called 'predisposing conditions'. Hugo further distinguishes 'precipitating events' and 'facilitators and constraints to migration'. All such factors could potentially surface in the respondents' answers. Indeed, one can see from Table 5 that some respondents chose to mention underlying causes (e.g. 'poor conditions for farming'); others mentioned the objective of their migration (e.g. 'to make money to build a house in the Upper West Region'); some referred to individual circumstances (e.g. 'my parents couldn't cater for me'); others emphasized factors relating to the *process* of migrating (e.g. 'I worked here as a seasonal labourer and saw that it was a good place to settle'); and facilitators of migration were also mentioned ('relatives settled here before me'). A major constraint to migration surfaced in the survey among non-migrants[12]: one adult man has to stay put to act as the family head and to maintain the family's claim on the land.

[12] The questionnaire that was administered among non-migrants and return migrants in Nandom, Upper West Region is not discussed in detail in this report. Though it yielded interesting findings, these findings did not contribute much to answering the central question of this report.

Table 5: *Migration causes of Dagara settlers in the Brong Ahafo Region* (N=196)

	Why migrate...	
	... from UWR	... to BAR
Land / soil		
Fertility of land in BAR	0	79
Availability / abundance of land in BAR	1	53
Low soil fertility in UWR	34	1
Land scarcity in UWR	28	1
Land / soil (unspecified)	3	8
Total (land)	***66***	***142***
Rainfall		
Good rainfall pattern in BAR	1	16
Poor rainfall pattern in UWR	5	1
Rain (unspecified)	3	1
Total (rain)	***9***	***18***
Other, major causes of migration		
Poverty, financial difficulties, 'to make money'	49	16
Farming conditions / yield levels (unspecified)[13]	18	34
Hunger, food shortage, 'I couldn't cater for my household'	35	13
'Hard to make a living in UWR'; 'life is easy in BAR'	14	2
	116	***65***
Chain migration / network		
Relatives settled here before me / I came to join a relative	5	11
I was sent / invited by someone else	10	2
I worked here as a seasonal labourer and saw the place was good	0	9
I had the information that the BAR was a good place	0	8
Total (chain/network)	***17***	***30***
Non-environmental reasons for migrating from UWR to BAR		
Short distance from BAR to UWR, central location of BAR	0	19
Family conflicts at home; BAR is peaceful	6	5
For adventure, 'to see the world', to become independent	9	1
Lack of employment opportunities in UWR	6	1
To make money to build a house in UWR	7	0
Salary job: respondent was posted here	3	1
To learn or practice a non-farm activity	2	3
Witchcraft, spells, 'our children were dying because of a curse'	5	0

[13] Poor conditions for farming and low crop yields can result from infertile land, erratic rainfall or other factors. Respondents' answers were put in this category if they did not specify *what* made the conditions poor in the Upper West Region (or good in the Brong Ahafo Region).

I was orphaned / widowed and neglected by other relatives	3		0	
For studies / to further my education	2		0	
Low cost of living in BAR	0		1	
Proximity to food market centres	0		1	
Total non-environmental		***43***		***32***
Indirect environmental reasons for migrating from UWR to BAR				
Large family size at home; pressure on resources	14		0	
Farm labour opportunities in BAR	1		9	
Lack of support; 'my parents couldn't cater for me'	8		0	
To support family at home / send remittances	3		4	
Cattle theft		3		0
Total indirect environmental	***29***		***13***	

Source: Fieldwork 2004

Table 5 shows the different answers I received from the Dagara settlers, and the relative importance of each category of answers. The second and third columns of Table 5 show the number of respondents that mentioned the cause category, either in their answer to why they had migrated from the Upper West Region (second column) or why they had chosen to settle in the Brong Ahafo Region (third column). For some respondents the questions were 'not applicable' because they were born or grew up in the destination area. Each respondent's answer to an open question could contain several migration causes. In some respondents' answers, up to six migration causes were mentioned. Table 5 includes all the categories I distinguished, including the migration causes that were mentioned by few respondents. Many of these reasons for migrating also apply to other migrants who did not mention them. In the sections below, I will discuss the results by focusing on theoretical issues in the environmental refugee debate. This should assist in answering the complicated question whether North-South migration in Ghana is induced environmentally and to what extent migrants are *forced* to migrate.

5.1. Relative importance of environmental reasons

Land turned out to be the key factor in causing Dagara migration to Brong Ahafo Region. Many respondents mentioned land scarcity (29) or infertility (35) at home, but even more indicated that they were attracted to the Brong Ahafo Region because of the abundance (54) and fertility (79) of land. Seventy percent of the respondents mentioned one of these four reasons for migrating. More generally, one can say that Dagara migrants settle in the Brong Ahafo Region because the conditions for farming are much better than at home. Surprisingly, few Dagara settlers referred to the poor rainfall pattern at home (6) or the more attractive rainfall pattern in the destination area (17). The Upper West has only one rainy season while most of the Brong Ahafo Region has two rainy seasons with enough precipitation to sustain two harvests per year. Moreover, farmers in the Upper West Region often complain about the *increased unreliability of rainfall* (Van der Geest 2004). None of the respondents mentioned this factor, and neither were droughts or floods mentioned. Another important observation is that no other environmental stresses than those related to soil and rain were mentioned. Obviously, this has to do with the livelihood system of the respondents: being farmers, they primarily depend on the land and the rain for survival and accumulation.

The second most important reason that Dagara settlers mentioned for their migration to the Brong Ahafo Region is financial (65). This category included a wide range of answers to the open questions. The answers had in common that migrants were either pushed to migrate because of poverty or that they were attracted by prospects of making money in Southern Ghana. Prior to their migration, most of the respondents were farmers depending on the natural resource base for their livelihood. Hence, the causes of their poverty were at least partly environmental. The same applies to 'hunger' and 'food scarcity', which were mentioned as causes of migration by 48 respondents. In a more benign natural environment, food insecurity would not be a major problem. In sum, the most-mentioned causes of migration are either directly or indirectly environmental. It is quite remarkable that a common migration cause like 'lack of employment opportunities' was mentioned by only seven respondents. Other non-environmental reasons were also mentioned by relatively few respondents. However, one has to bear in mind that the respondents were almost exclusively farmers in rural destinations. It is hardly surprising that farmers mention factors pertaining to the natural environment rather than wage employment opportunities.

Indeed, in a much smaller survey among thirty Dagara settlers in Wenchi Town[14], non-environmental reasons proved to be more important than environmental reasons. Seven respondents were born in the Brong Ahafo Region. Six were posted in Wenchi Town to work as civil servants (mostly

[14] Wenchi Town is a district capital in the Brong Ahafo Region with 28,141 inhabitants (Ghana Statistical Service 2005).

teachers). Five respondents came to learn or engage in a non-farm activity like tailoring. And four female household heads had originally come to join their husbands. Most of the rural-urban migrants that engaged in non-farm activities also referred to the low cost of foodstuff, which made life in the Brong Ahafo Region easier for them.

5.2. Generalizability

From the above, one can conclude that causes of migration differ between rural and urban destinations and per occupation.[15] For Dagara settlers in villages who engage in farming, environmental reasons are more important than for migrants in towns who engage in non-farm activities. The local discourse on migration causes that I try to reconstruct in this part of the paper pertains to farmer migrants who settle in rural destinations in the Brong Ahafo Region. To determine how representative the sample is for Dagara migrants in general, it is important to know which proportion of Dagara migrants has a rural destination and which proportion engages in farming. Possibly, migrant farmers with other destination regions have different migration histories and motivations. Therefore, it is also important to know which proportion of Dagara migrants settle in the Brong Ahafo Region. Tables B, C and D serve to shed a light on the generalizability of the figures presented in this part of the paper.

Table 6: *Destination regions of Dagara migrants* (including 2nd generation migrants)

Destination region	*Dagara settlers in S-Ghana*	*%*
Brong Ahafo	115,900	50.6
Ashanti	45,998	20.1
Western	34,383	15.0
Greater Accra	15,678	6.8
Eastern	12,131	5.3
Central	3,717	1.6
Volta	1,302	0.6
Total	229,109	100

Source: Ghana Statistical Service (2002: 23)

[15] In an extensive study on rural-urban migration from Northern Ghana, Kasanga and Avis (1988) found – to their surprise – that scarcity of good farmland was hardly mentioned as a reason for migrating. This confirms that rural-rural migrants and rural-urban migrants seem to have fundamentally different reasons to migrate.

Table 7: *Destination of 519 migrant relatives of 204 surveyed households in Nandom, Upper West Region (region and rural/urban)*

Destination Region	*Rural*	*%*	*Urban*	*%*
Brong Ahafo	144	63	83	37
Ashanti	56	37	97	63
Greater Accra	2	3	78	98
Central	2	7	28	93
Eastern	15	58	11	42
Western	0	0	2	100
Volta	1	100	0	0.0
Total	220	42	299	58

Source: fieldwork 2004

Table 8: *Destination region and occupation of 519 migrant relatives of 204 surveyed households in Nandom, Upper West Region*

Destination Region	*Farm*	*%*	*Non-Farm*	*%*	*Total*	*%*
Brong Ahafo	157	69	70	31	227	100
Ashanti	51	33	102	67	153	100
Greater Accra	1	1	79	99	80	100
Central	3	10	27	90	30	100
Eastern	12	46	14	54	26	100
Western	0	0	2	100	2	100
Volta	1	100	0	0	1	100
Total	225	43	294	57	519	100

Source: Fieldwork 2004

Table 6 is derived from the Ghana Census 2000. It shows that the Brong Ahafo Region is by far the most important destination region of Dagara migrants. About half the Dagara who settle in Southern Ghana choose the Brong Ahafo Region as their destination. Ashanti Region and Western Region are also important destination regions. Few Dagara have settled in the Central Region and the Volta Region. Unfortunately, the census reports do not provide information about ethnic grouping by type of locality (urban/rural) or occupation. Therefore I use a sample of 519 migrant relatives of households in Nandom, Upper West Region to give an indication of the proportion of rural and urban settlers (Table 7) and the proportion of farmers and people with non-farm occupations (Table 8). Table 7 shows that the majority (63 percent) of Dagara settlers in the Brong Ahafo Region live in rural localities. In most other regions, this is not the case. For Ghana as a whole, 58 percent of the migrant relatives were living in towns and cities. Table 8 shows that the majority (69 percent) of Dagara settlers in the Brong Ahafo Region have farming as their principal occupation. Again, the figures are different for other destination regions. Only thirty percent of the migrant relatives in other destination regions in Southern Ghana had farming as their prime occupation. In sum, it seems that the Brong Ahafo Region is especially attractive to Dagara *farmers*. For this group, environmental causes of migration are stronger than for other types of migrants. This is important information to keep

in mind. The generalizability of the findings that I present here is limited to Dagara settler farmers in the Brong Ahafo Region. On the other hand, as we have seen in Table 6, 7 and 8, this type of migrant is indeed very common. If fifty percent of the Dagara migrants settle in the Brong Ahafo Region, and about seventy percent are farmers, then the local discourse on migration causes that I discuss here should pertain to about thirty-five percent of Dagara people that settle in Southern Ghana.

5.3. Slow and sudden onset

In the discussion about environmental refugees and environmentally induced migration, an important distinction is made between 'slow-onset' and 'sudden-onset' environmental causes of migration (Gemenne & Dun 2008). In the case of sudden-onset environmental disruption, such as floods, the causality of migration is relatively clear. In the case of slow-onset environmental deterioration, such as land degradation, there is usually a set of overlapping causes at play (multi-causality). Political and socioeconomic factors combine with environmental degradation to undermine the resource base of affected people. On the other hand, sudden-onset disruptions tend to be temporary while more gradual deteriorations tend to be more permanent or at least hard to reverse.

The figures in Table 5 show that Dagara settlers did not mention sudden-onset environmental disruptions *at all*. This would not be the case for all migrants from Northern Ghana. Especially those hailing from the catchment area of the White Volta in the Northeast would certainly have mentioned the floods that have caused havoc to houses and harvest in the past few years. But in the case of the Dagara one can safely state that except for isolated cases, their migration was not a sudden flee. About seventy-five percent of the settlers knew the Brong Ahafo Region from previous experiences as seasonal farm labourers (not in table). It seems that for most Dagara migrants, the decision to move to the Brong Ahafo Region is based on good information on better agro-ecological conditions and prospects for increased food and livelihood security. The decision to migrate may be part of a wider family strategy to reduce pressure on farmland at home, to spread risk of crop failure and to send remittances to those who stayed behind. I will test this assumption below, in the section on 'migration, remittances and food security'.

5.4. Push and pull forced and voluntary migration

From the findings presented above, it is clear that environmental factors play a major role in causing migration from the Upper West Region to the Brong Ahafo Region, and that slow-onset environmental disruption are much more important than sudden-onset disruptions. It is usually assumed that sudden environmental triggers tend to result in *forced* displacement while those suffering from gradual environmental degradation tend to have more of a choice whether or not to move. This is not necessarily true, however. A clear example of slow-onset change that can *force* people to relocate is sea level rise affecting small island states. In the case of West Africa, it is easy to

imagine that people living at the desert edges would be forced to relocate if the desert expands and farming or herding could no longer sustain their livelihoods. But usually there is a continuum between forced and voluntary migration with increasing freedom and choice of movement when one moves from forced to voluntary on the continuum (Hugo 1996; Faist 2000; Bates 2002). Even in the most precarious situations, people usually have a degree of choice, for example *where* to go or *when* to go. Similarly, it could be argued that someone who decides to migrate for economic reasons may be forced by the circumstances, e.g. poor agro-ecological conditions in the case of farmers. If the person stays put, and the situation gets worse, he or she may really be forced to migrate because he or she may be lacking the ability to sustain a livelihood. Those who decide to migrate earlier try to avoid reaching this point. Their migration is a pro-active way to adapt to changing conditions (be they ecological, socioeconomic or political). For those who wait until the situation gets worse, migration becomes a reactive survival strategy (McDowell and De Haan 1997).

One way to determine to what extent migrants from Northwest Ghana are forced to relocate due to environmental pressure, is to differentiate between environmental push and environmental pull. Environmental push suggests that people are forced out of their home region; environmental pull suggests that people can opt to relocate to a region with a more benign environment. Another way to determine the degree of force is to carefully analyse people's motivation to migrate and differentiate levels of urgency. A migrant who indicates that he or she has travelled 'to see the world', experienced less force than someone who migrated because he or she could not feed the children due to a prolonged drought and subsequent crop failures.

In the migration reasons mentioned by Dagara settlers (see Table 5), environmental pull factors seem to be stronger than environmental push factors. Land scarcity and soil infertility in the home area are mentioned by a substantial number of Dagara migrants (62), but the abundance and fertility of land in the Brong Ahafo Region is mentioned by more than twice as many (132). The same applies to the poor rainfall pattern in the North (6) and the more attractive rainfall pattern in the Brong Ahafo Region (17).

Looking at the level of urgency in the migration reasons mentioned by Dagara settlers, a substantial group of migrants (48) indicated that they moved because of food insecurity or even hunger. This indicates a high level of urgency and force. This is not surprising because from earlier studies (Van der Geest 2004) it was estimated that about a third of the farm households in Northwest Ghana experience chronic food insecurity because their harvest is below subsistence levels and they do not have enough non-farm income to supplement their own food production. Since the late 1970s and early 1980s there have not been any widespread famines in Northwest Ghana, but each year, a substantial part of the population experiences a 'food gap' in the months prior to the first harvests. Migration to the Brong Ahafo Region is a well-established strategy for the migrants to increase their own food security

and indirectly contribute to the diet of their relatives at home. This strategy is relatively successful as will be shown in the next session.

For a large group of migrants, the level of urgency is clearly lower. Their migration is not one of distress, but an attempt to structurally improve their livelihood by making use of better agro-ecological conditions in a region that is already familiar to them because of past experiences as seasonal migrants and because they have other relatives who settled there before them. In many villages in the Brong Ahafo Region, the Dagara now outnumber the original inhabitants. These migrants emphasize that they moved to the Brong Ahafo Region to make money by farming on a larger scale.

5.5. Migration, remittances and food security

As indicated above, migration is a strategy for Dagara people to improve food and livelihood security, both for the migrants themselves and for the relatives that stay behind. In this section, I will analyse to what extent this strategy is successful. I will discuss survey findings on food security and remittances from two ends of the migration system. The findings are based on a survey among 203 migrants in the Brong Ahafo Region and a survey among 204 rural households in the Upper West Region (Nandom). From the latter sample, 172 household heads (84.3 percent) turned out to have at least one first-line relative (brother, sister, son, daughter, father or mother) living in Southern Ghana or another African country. Not even one of the respondents had direct relatives who had migrated out of Africa. The figures below give a good indication of how widespread migration to southern Ghana is:

The 204 household heads in the Nandom Survey had a total of 473 direct brothers. Of these direct brothers, 253 (53 percent) had migrated out of the Nandom Area, of whom 201 had migrated to Southern Ghana; 49 had migrated to a destination within Northern Ghana; and 3 were living in another African country.

When asked how their life had changed since they migrated, the vast majority (81%) of Dagara settlers in the Brong Ahafo Region replied that their life had improved (see below). This question was followed by an open question in which the respondent was asked to explain what made the situation better or worse. A typical answer was: “I harvest enough to feed my household, sell some produce and support my people in Dagao[16].” The major explanation for the improvement is that they always have enough food to eat and furthermore, they can sell a substantial surplus, which is very rare in their home areas. Many respondents also emphasized that things are better after migrating because they can even send food or money to their relatives at home. Some respondents replied plainly that things were better because they get enough food to eat, which was not the case back at home. This confirms that for the poorest section of the migrants, there was indeed an important

[16] For Dagara people, Dagao is the name of their area of origin in the Upper West Region.

degree of force in the decision to migrate; that their migration was a matter of survival.

How do you compare your life in the Brong Ahafo Region to your life in the Upper West Region? (N=194)

Better: 157 ..... (81 %)
Worse: 19 ..... (10%)
Not better or worse: 18 ..... (9%)

The minority who replied that their situation had worsened, lamented, the land tenure system or mentioned social reasons, like loneliness, missing one's relatives and friends and discrimination. Some also said that their expectations had not materialised. Even though their situation had improved materially, they were not satisfied, which made them evaluate their migration negatively. Those who complained about the tenure system were disappointed that they had to give a large part of the harvest[17] to the land owners or pay them a fixed amount per year. Some Dagara complain that they only get the impoverished lands and it is quite common that problems arise between land owners and tenants.

The migrants were also asked whether their food security had increased. Not surprisingly, almost all respondents (93%) confirmed (see below). For some recent settlers, the situation had not improved much yet. This was because they had not yet started cultivating their own farms. They were working on other people's farms to gather enough money to rent a piece of land for themselves.

Has your food situation improved since you migrated to the Brong Ahafo Region? (N=191)

Yes: 177 ..... (93 %)
No: 14 ..... (7 %)

A comparison of harvest sales between migrant farmers and those living in the Nandom Area in Northwest Ghana further confirms the substantial improvement in food production. The average annual crop sales of Dagara farmers in the Brong Ahafo Region were almost ten times higher than the crop sales of farmers in Nandom (see below). Obviously, some migrant farmers harvested much more than others, but ninety-three percent of the migrant farmers sold more than the average farmer in Nandom. This does not mean that farmers in the Nandom Area are ten times poorer. Less than ten percent of their cash income is derived from crop sales (see table 10 below). They use the dry season to engage in non-farm income generating activities while their counterparts in the Brong Ahafo Region work on the land throughout the year. Farmers in Nandom also have more livestock to sell. Moreover, migrant

[17] In the local sharecropping system (abusa), one third of the harvest goes to the land owner.

farmers in the Brong Ahafo Region have to pay part of the profit to the land owners (in the case of fixed rent; not in the case of sharecropping) and they often use part of the revenue to hire labourers in the next agricultural cycle. Also, many migrants are expected to send remittances while those in the North receive remittances.

Average annual crop sales (2004): a comparison of Nandom (N=201) and Brong Ahafo (N=192)

Nandom: ..... ¢ 370,000[18]
Brong Ahafo: ..... ¢ 3,432,000

It seems that in the Nandom Area there is a process of de-agrarianization going on. In the Nandom survey, the respondents were asked to describe some agricultural trends, focusing on their own situation (see Table 9). They compared the present to a period in their life history of ten to twenty years ago. It appeared that most farmers now spend less time on smaller farms. The vast majority indicates that the fertility of the soil has decreased and despite land scarcity, fifty four percent now leaves more land to fallow than in the past.

Table 9: *Agricultural trends in the Nandom Area* (N=204)

	Decreased	No change	Increased	N
Soil fertility	148 (74%)	17 (9%)	35 (18%)	200
Farm size	122 (61%)	12 (6%)	65 (33%)	199
Fallow land	69 (37%)	16 (9%)	100 (54%)	185
Labour input	111 (56%)	31 (16%)	56 (28%)	198

Source: Fieldwork 2004

Looking at the sources of cash income of households in the Nandom Area (table 10), it becomes clear that crop cultivation plays a minor role in generating cash. The revenue from crop sales equals the revenue from remittances. This does not mean that farming does not play a major role in their livelihood. People in the Nandom Area farm to feed themselves and they try to generate cash from other sources. They earn most cash from local non-farm activities like beer brewing, processing of shea nuts and dawadawa, gathering firewood and food preparation in the case of women and construction labour, tailoring, bicycle repair, fishing and hunting in the case of men. Other sources of income (in order of importance) are livestock sales, income from seasonal migration and dry season gardening (horticulture).

[18] Crop sales in Nandom include revenues from dry season gardening (¢ 177,000). The average revenues from rainfed agriculture in Nandom amounted to ¢ 193,000 per household. Only seventeen percent of the surveyed households had income from a dry season garden (horticulture).

Table 10: *Rural households' sources of cash income in Nandom, UWR* (N=204).

One Euro = ¢ 9,800	Cash income	Share of total cash income
Non-farm income	¢ 2,280,000	66%
Livestock sales	¢ 311,000	9%
Seasonal migration	¢ 285,000	8%
Crop sales	¢ 193,000	6%
Monetary remittances	¢ 193,000	6%
Dry season garden	¢ 177,000	5%

Source: Fieldwork 2004

An important insight from the New Economics of Labour Migration is that migration is a household or family affair, rather than a matter of individual choice. I assumed that this was also true in the case of Dagara mobility. The assumption is that migration is a deliberate family strategy to reduce pressure on farmlands, to spread the risk of crop failure and to generate remittances for those who stay behind to guard the ancestral land. The migrants we interviewed were asked who made the decision to migrate, and to my surprise the vast majority (76%) replied that it was their own decision. For those who did not decide about their own migration, it was usually the father who decided.

Who decided that you should migrate to down south?

It was my own decision: 141	(76%)
A relative decided: 29	(16%)
It was a joint decision: 15	(8%)

If migration is indeed a strategy to reduce pressure on farmlands, one can expect that in families with more sons[19], a higher proportion of the sons needs to move away from the land. I tested this hypothesis by comparing the migration behaviour of the brothers of the household heads that I interviewed. Contrary to expectations, the percentage of migrant brothers is rather higher in cases where a household head had only one brother (see table 11). Apparently, it is more important to have a migrant brother – and hopefully remittances to supplement meagre farm incomes – than to reduce the pressure on available land. An additional explanation is that despite land scarcity, it is relatively easy to borrow land to cultivate from other families. Traditionally, such arrangements do not involve cash payment.

[19] In the virilocal marriage system of the Dagara, women move to house and the land of the husband's lineage.

Table 11: *Migratory behaviour of brothers by number of brothers*

Number of brothers	% Migrated	N
1	71.4	42
2	56.5	46
3	55.6	36
4	56.7	15
5	52.7	11
6	38.3	10
7+	45.4	6

Source: Fieldwork 2004

Earlier studies on Northern Ghana found that remittances from migrant relatives in Southern Ghana were quite negligible (Abdul-Korah 2004; Cleveland 1991; Whitehead 2005). Far from being a joint family strategy, they posit that many fathers would not give permission to their sons to migrate. They needed their sons' labour on the farm. In Nandom, this is not unheard of, but my experience is that having supportive migrant relatives has become an important wealth indicator in the area. The survey findings from Brong Ahafo show that the remittances sent by Dagara settlers are not negligible. Determining the proportion of remittances as percentage of total income is a very complicated exercise. First, one has to decide whether to include only monetary remittances or also remittances in kind. And if in kind remittances are included one has to estimate the monetary value. Second, which time period does one choose that gives a good trade-off between people's memory and enough coverage? Third, sending remittances is considered 'good behaviour', and this could result in a social desirability bias. Fourth, should the proportion of remittances be calculated over the total cash income or should the value of subsistence production be included? Fifth, determining income is a complex exercise in itself. Sixth, remittances may vary greatly from year to year. In a bad agricultural year, people in the North will send more requests to their migrant relatives. And seventh, are we interested in the average proportion of remittances for the whole population (i.e. the total amount of remittances as a percentage of total income)? Or is it more meaningful to first calculate all the individual percentages and then take an average? And then again, are we really interested in the average percentage or the median? In the case of remittances, the median is usually lower than the mean because the distribution is skewed towards higher remittances. In table 12, the proportion of remittances has been calculated over the cash income. Separate figures are included for monetary remittances and total remittances. And proportions are expressed as the average of the total sample and the mean and median of individual percentages.

Table 12: *Average annual remittances of Dagara settlers in the Brong Ahafo Region* (N=193)

¢ 8,050 = One Euro (2001-2003)[20]	Annual average[21]	% of total remittances	Median
Total remittances (2001-2003)	¢ 274,000	(100%)	
Monetary remittances (2001-2003)	¢ 142,000	(52%)	¢ 67,000
Food remittances (2001-2003)	¢ 103,000	(37%)	¢ 67,000
Goods remittances (2001-2003)	¢ 23,000	(8%)	0
Other remittances (2001-2003)	¢ 6,000	(2%)	0
Total cash income[22] (2003)	¢ 4,973,000		¢ 2,897,000
	Average of total sample	Mean	Median
Monetary remittances / total cash income	2.9 %	3.8 %	1.5 %
Total remittances / total cash income	5.5 %	8.4 %	4.8 %

Source: Fieldwork 2004

The question whether these remittances are substantial or small is a subjective one. Considering the fact that the average per capita incomes of most Dagara settlers is still below the poverty line, one could say that it is a miracle that they are able to send remittances at all. Indeed, about 26 % had not sent any remittances in the previous three years. This can be because they are not (yet) able to send remittances or because they unwilling to support their relatives at home. A minority had not had contact with relatives for years, and some migrated after a conflict with their relatives. Wealthier migrant do send significantly more money to their relatives at home than poorer migrants (R=0.384, significance 0.000). From my interaction with Dagara migrants I know that many struggle and save to be able to support their relatives at home. On the other hand, many people in the North also criticize their migrant relatives. An often-heard complaint is: "they are enjoying Down South and they have forgotten about us."[23]

Dagara settlers send a substantial proportion (37%) of remittances in the form of foodstuff. So excluding this category – as is done in many remittances studies – significantly reduces the remittances figures. Migrants have several reasons for sending food (usually maize) rather than selling the grains and sending money, which seems easier. Firstly, maize prices are substantially higher in the Upper West than in the Brong Ahafo Region, and often the difference is larger than the transport costs. Secondly, they are afraid that if

[20] Source: www.oanda.com

[21] The remittances were recorded for a period of three years while income was measured for just a one year period. The total three-year remittances figures were divided by three to get annual averages.

[22] Total cash income was calculated as the sum of revenues from crop sales, livestock sales, farm labour revenues and non-farm income, corrected for expenditures on hired farm labour, land rent and farm inputs.

[23] See Van der Geest (2005) for a paper on local perceptions of the impact of migration from Northwest Ghana.

they send money, this would be 'wasted' on non-essential items and at the time of the hunger gap (May-July), their relatives would call on them again. Thirdly, a more cultural explanation would be that Dagara farmer migration can be seen as an expansion of farm activities into distant lands. Dessein (2002) explains that becoming an 'excellent farmer' is a process of gradually expanding one's farms further into the bush, the wild (as opposed to the domesticated environment). Sending food remittances thus can be seen as bringing in the harvest from far away fields.

The survey among rural households in the Nandom Area also included questions about received remittances. It turned out that it was easier for a migrant to remember what he or she had sent (see table 12) than for a relative at home to remember what he or she had received (see table 13). Therefore, the period over which we recorded received remittances was just one year.

Table 13: *Remittances received by rural households in the Nandom Area* (N= 202)

¢ 9,800 = One Euro (2003)[24]	Mean	% of total remittances	Median
Monetary remittances (2003)	¢ 193,000	(55%)	¢ 70,000
Food remittances (2003)	¢ 45,000	(13%)	0
Goods remittances (2003)	¢ 116,000	(33%)	¢ 10,000
Total remittances (2003)	¢ 354,000	(100%)	¢ 136,000
Total cash income[25] (2003)	¢ 3,484,000		¢ 2,545,000
	Average of total sample	Mean	Median
Monetary remittances / total cash income	5.5 %	7.1 %	2.9 %
Total remittances / total cash income	10.2 %	16.3 %	5.3 %

Source: Fieldwork 2004

Monetary remittances of migrant relatives account for 5.5 percent of the cash income of rural households in the Nandom Area. Besides cash migrant relatives also send foodstuff and other goods with a similar aggregate value. The total volume of remittances (including remittances in kind) is about ten percent of the cash income. Here again, the question whether this is little or much is subjective. For many households, it's a very welcome and necessary source of extra income. It will not lift them out of poverty, but it can certainly help to make ends meet. An important contribution of migrants is not included in the remittances figures: many migrants use their savings to build 'modern' rooms in their family houses. These rooms are often used by relatives when the migrants are not around. Not all rural households in the Nandom Area benefited from remittances. Ten percent of the households did not receive any

[24] Source: www.oanda.com

[25] Total cash income was calculated as the sum of crop sales, livestock sales, dry season garden income, seasonal migration income, remittances and non-farm income.

remittances; thirty percent received less than ¢ 100,000; eighty percent received less than ¢ 500,000 and 7.4 percent received more than one million cedis in the previous year.

The respondents in Nandom were also asked what they used the monetary remittances for (see table 14). The findings are indicative for the level of food and livelihood security in the area. Most remittances are used to buy foodstuff, to pay for daily cash needs and to cover hospital bills. Productive investments were less common although seventeen percent did invest remittances in their farm activities, mostly to organise labour parties. It should also be noted that even if remittances are not directly invested in productive activities, they may still release some pressure on the household economy which may enable future investments. A household has used remittances for example to buy a bag of maize to fill the food gap. Later on the household head sells a goat to hire labourers. Without the remittances, he would have had to sell the goat to buy a bag of maize and he could not have used the goat to hire labourers.

Table 14: *Remittances use of rural households in the Nandom Area* (N=194)

Cash Remittances used…	N	%
… to buy food	95	49
… for daily cash needs	80	41
… to pay hospital fees	56	29
… to invest in farming	33	17
… to pay school fees	30	15
… to buy clothes and other durables	9	5
… to invest in non-farm activities	7	4
… for other purposes	8	4
… to invest in housing	4	2

Source: Fieldwork 2004

The findings on remittances confirm that migration is an important adaptation to environmental scarcity and poor agro-ecological conditions. The remittances received from migrant relatives help to make ends meet. With the exception of a few elderly households, excessive dependence on remittances is uncommon in the area. Although the vast majority of migrants indicated that the decision to migrate was their own, in many cases migration can still be seen as a deliberate household strategy to release pressure on available resources, to spread risk and to get access to money from outside the area.

5.6. EACH-FOR Questionnaire findings

An additional questionnaire, developed by the EACH-FOR project was carried out in the period of January to March 2008. The questionnaire focused on migrants in the Brong-Ahafo Region (N=37) and allowed for some more depth into environmental factors influencing migration behaviour.

Table 15 lists a number of possible reasons for people to migrate. The respondents were asked to indicate whether each category applied to their situation. The reasons are listed in order of importance. From this table, it

seems that poverty, relative deprivation and dissatisfaction with one's livelihood were more important than specific environmental constraints, like scarcity and infertility of land and drought.

Table 15: *Reasons for Dagara settlers in the Brong Ahafo Region to migrate* (N=36)

Non-environmental reasons	***%***	***Environmental reasons***	***%***
Not enough income	32	Poor soil quality	23
My neighbours are better off than me	27	Environmental degradation	22
I was not satisfied with my livelihood	26	Unreliable harvest	20
Family reasons	21	Not enough land available for farming	19
Unemployment	10	Water shortage/drought	18
Work related to skills not available	10	Poor water quality	15
No relatives and friends	7	Sudden natural disaster	11
Insufficient health care services	5	Conflict over natural resources	6
No community life	5	Not enough land available for grazing	4
Conflict in family	4		
No school for my children available	3		
Conflict in community/crime	3		

Source: Fieldwork 2008 (EACH-FOR Questionnaire – destination area)

Six respondents said that conflicts over natural resources had influenced their decision to migrate. They mentioned conflicts over access to land and trees and conflicts over livestock. Conflicts over access to water were not mentioned. Overall, it can be said that conflicts over natural resources in the Upper West Region are not serious enough to result in displacement. In other parts of Northern Ghana, conflicts over natural resources do have the potential to cause displacement. In the Northeast of Ghana there have been a number of major clashes in the past two decades. Some were even small wars. The causes of these conflicts were more complex than competition over natural resources.

As is shown in this paper, the majority of Dagara settlers in the Brong Ahafo Region have migrated to escape poverty caused by low agricultural productivity, which is primarily related to poor agro-ecological conditions. When we asked the 36 respondents of the EACH-FOR questionnaire in the Brong Ahafo Region whether their crop yields had declined in the years prior to their migration, 22 respondents confirmed. In order to find out whether there were other causes of low productivity, we asked them whether certain potential causes of crop yield decline were applicable to their situation. The results are listed in Table 16.

Table 16: *Possible reasons for crop yield decline prior to migration* (N=22)

Environmental reasons		***Non-environmental reasons***	
Declining soil quality	20	Fertilizer too expensive	14
Erosion	18	Crops were stolen from the field	9
Changing climate	17	Not enough labour available	9
Problems with insects, pest and plagues	11	Seeds too expensive	4
Not enough water available	10	Not enough seeds available	2
Not enough manure available	8	Conflicts in the region	0
Too much water (flooding)	7		
Other kinds of natural disasters	6		

Source: Fieldwork 2008 (EACH-FOR Questionnaire – destination area)

These findings show that problems related to soil fertility are again the most important causes of low productivity. Some other factors, like high prices of inputs, problems with pests and plagues and labour constraints were also important.

5.7. Conclusions from surveys

Listening to the voices of Dagara migrants in the Brong Ahafo Region, it becomes clear that their migration was mostly a response to scarcity of fertile land in their home area, and the abundance of fertile land in the destination area. They do identify erratic rainfall and climate change as a problem, but not as the prime cause of low productivity and food insecurity. Environmental *pull* appeared to be at least as important as environmental push. Although unreliable rainfall certainly poses a problem to farmers in Northern Ghana, it was not often mentioned as a reason for them to migrate. Perhaps the timing of the survey did matter. In the past decade no disastrous droughts have occurred. If the survey would have been conducted in the late 1980s, after a period of prolonged droughts in the North, the response might have been different.

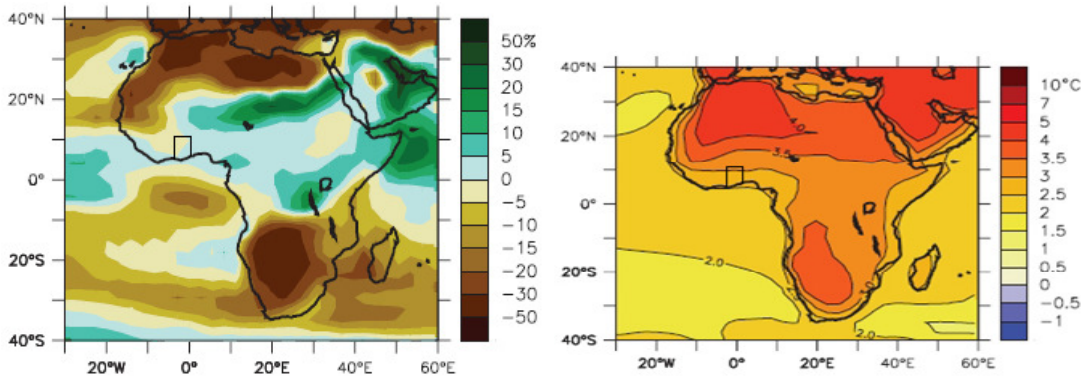
Migration or the geographic spread of family networks and livelihoods is an efficient way of increasing food and livelihood security and reducing vulnerability to drought and climate change. The remittances that were recorded in the two surveys that I discussed in this paper occurred in a period without major droughts and crop failures in the North. If such an adverse event would occur, most people in Northern Ghana now have direct relatives to call upon for support. This safety net has not yet been 'tested' on a very wide scale. At the time of the worst droughts in living memory, in the late 1970s and early 1980s, Southern Ghana was in crisis and many migrants even returned to the North. However, this geographically spread safety net is fully functional at a more localised and individual level. Most migrants try to send modest remittances on a regular basis, but in times of hardship and ill fortune, they are called upon for more extensive assistance. It comes as no surprise that payment of hospital bills was the third most mentioned category of remittances use.

6. Future migration scenarios

Ghana's economy has been growing steadily in the past decade and poverty has reduced substantially (Ghana Statistical Service 2000). Despite many problems, the national economic prospects for Ghana are quite good. However, regional disparities are very pronounced. Southern Ghana is developing fast and Northern Ghana is lagging behind. The gap between Northern Ghana and Southern Ghana is widening rather than shrinking. Poverty in Ghana is concentrated in the rural areas of Northern Ghana (ibid), and many Northerners try to escape poverty by migrating to the South. For Northern Ghana, the 1990s were an era of environmental recovery after the droughts of the 1970s and early 1980s. Despite this partial recovery, migration from Northern Ghana to Southern Ghana accelerated in the 1990s. While poverty obviously pushes people out of the North, it is also clear that migrants are attracted by the opportunities in the South. Whether North-South migration will continue to grow depends on a number of factors. It is very unlikely that Northern Ghana will experience any significant industrial development in the nearby future. The future for agriculture is unclear. If urbanisation continues and living standards in the Southern cities and towns increase, then the increased urban demand for food can have a positive impact on food production and marketing in Northern Ghana. This way, the North could benefit from development in the South in another way than through migration. Much will depend, however, on government policy. For Northern Ghana to feed the South, investments need to be made in infrastructure and agricultural development. Also, whether farmers in Northern Ghana will benefit from increased demand depends on Ghana's food import policy. Recently, substantial reserves of fossil fuels were discovered in Ghana. If Ghana would follow the example of Nigeria, the agricultural sector would be neglected and the country would become dependent on food imports. The future productivity of North Ghanaian farming systems also depends on changes in environmental conditions.

In a recent report by the International Panel on Climate Change (Boko et al 2007: 447) it is predicted that rainfall in the growing season in Northern Ghana will reduce with more than twenty percent by the year 2050. In another recent IPCC report (Christensen et al 2007), the prediction for Northern Ghana is less pessimistic. The average simulations of twenty-one different climate models predict for Northern Ghana that rainfall in the growing season will reduce by less than five percent (see figure 9) by the year 2080. It should be taken into account that temperatures are also predicted to rise, which further reduces the moisture available for plant growth.

Figure 9: *IPCC predicted precipitation (left) and temperature (right) changes over Africa between 1980 to 1999 and 2080 to 2099 averaged over 21 models*. Source: Christensen 2007: 869).



Recent studies on migration from Ghana to non-African destinations show that inter-continental migrants hail almost exclusively from Southern Ghana, especially the Ashanti, Eastern and Central Regions (Asiedu 2005). It seems that migrants from Northern Ghana do not have the means and the networks to make it to Europe or North-America. As indicated before, none of the rural households in Nandom that were interviewed had direct relatives[26] that had migrated to a non-African destination. The few 'Nandome'[27] I know of who migrated out of Africa are almost exclusively priests and professionals like medical doctors and academics. Contrary to many Southern Ghanaians, Northern Ghanaians do not have the means nor the contacts to migrate to Europe. The observation that Northern Ghanaians hardly migrate internationally is in line with recent insights in the so-called 'migration hump' (de Haas 2005): it's not the poorest people who migrate internationally, and the most deprived regions are not the main source areas of international migrants. If environmental conditions in Northern Ghana would deteriorate in the future, I consider it very unlikely that the people affected would migrate to non-African destinations, at least not in a 'legal' way. This is not to say that they wouldn't want to. In a study of 'images of the West', conducted in Ghana's Upper East Region, most of the people that were interviewed said that they would go if they had the chance (de Lange 2003). So far, very few North Ghanaians have tried to reach Europe through the Sahara or through Senegal and the Canary Islands. Even for such an endeavour most lack the means, the information and the contacts.

7. CONCLUSION

The data presented in this paper suggest that the environmental driver of migration from Northern Ghana is *structural* scarcity rather than *degradation*. Structural agro-ecological differences between Northern Ghana and Southern Ghana are an important incentive for people to move. In pre-colonial times, these differences did not result in widespread migration. In the course of the twentieth century, unequal development and increased cash needs were the necessary triggers for the North-South migration system to evolve. The cross-

[26] Direct relatives are father, mother, brother, sister, son, daughter. The figure of 707 migrant relatives includes relatives who migrated within Northern Ghana.

[27] Nandome are people from the Nandom Traditional Area in the Lawra District.

sectional analysis showed that migration propensities are higher in environmentally less-endowed districts. Of the three variables that I included in the analysis, rainfall was the strongest predictor of migration. It is telling that the less-endowed Upper Regions experience the largest flow of migration to Southern Ghana – as compared to the Northern Region – despite the longer distance. The more surprising finding from the longitudinal analysis is that out-migration reduced in the most pronounced era of environmental stress (the late 1970s and early 1980s). In the late 1980s and in the 1990s, a time of environmental recovery in Northern Ghana migration increased again. This indicates that factors other than environmental ones seem to play a more decisive role in determining migration flows. If environmental conditions in Northern Ghana would deteriorate, this may or may not result in increased out-migration. This largely depends on social economic changes, both in Northern Ghana and in the prime destination areas. The picture that emerges for Northern Ghana is not one of permanent distress migration in the face of environmental disaster. Rather, migration is a way of dealing with structural environmental scarcity and lack of alternative income opportunities. It has become an omnipresent part of the economy and culture of Northern Ghana. Policy to curb migration will be met with suspicion and may have very negative effects in terms of livelihood security and environmental management.

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