RURAL-URBAN TRANSITIONS IN TANZANIA'S NORTHWEST MINING FRONTIER

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The recent discovery of minerals and precious stones, particularly gold and diamonds, has catalyzed extraordinary growth spurts in previously unpopulated or sparsely populated rural areas of Tanzania. Small-scale miners have migrated in large numbers to the mineral strike sites to try their luck. Their early makeshift settlements have expanded into jumbled concentrations of rural and urban modes of livelihood, metamorphosing from remote 'deep rural' to pulsating urban centres of goods and service provisioning. In many cases, these population growth spurts, however dramatic, have been short-lived and have dissipated as the extractable ores become less accessible to the small-scale miners. This inevitably leads to the question of how sustainable mining-led urbanization is over time.

Tanzania, which has for decades been seen as an impoverished agrarian country, is metamorphosing into a significant diamond and gold producer on the African continent over the last two decades. Small-scale miners have played a central role in this transformation (Chachage 1995, Mwaipopo *et al.* 2004, Fisher 2007). This chapter traces mining as a 'frontier livelihood' and 'mining-led urbanization' in two northwestern Tanzanian settlements: Maganzo, a long-established diamond mining settlement in Shinyanga region and Nyarugusu, a gold-mining site in Mwanza region which experienced its first significant rush in the 1980s. Our interest focuses on the unfolding phases of livelihood and settlement transformation following the original population surge connected with mineral discovery.

The first section of this chapter briefly reviews Tanzania's post-independence urbanization trends prior to the influence of mining, before focussing on the background history of mining and the character of the study sites. After outlining the growth and migration patterns of the two settlements, the agricultural foundations of the settlements, the demographic and economic trends associated with mine-led urbanization and the sustainability of urban settlements subject to mineral booms and busts are considered in turn.

TANZANIAN URBANIZATION TRENDS

Colonial and post-colonial government policies during the 20th century officially discouraged urban growth for the most part. The rigid colonial racial three-tiered pyramid, in which Africans were farmers, Asians were traders and Europeans were administrators was dismantled after independence. Thereafter the country's formal employment structure expanded to absorb educated and skilled Africans as well as many uneducated migrants. Most of these jobs were concentrated in the national capital, Dar es Salaam.

In 1971, the Tanzanian government embarked on a decentralized government administration system, which entailed sending government staff 'to the regions', twenty in total. The transfer of trained staff and government funding for the expansion of regional service infrastructure headquartered in the small up-country towns designated as regional capitals triggered rapid secondary town growth which exceeded Dar es Salaam's rate of expansion.[1] During the economic crisis-ridden years of the 1980s, these towns continued to grow twice as fast as Dar es Salaam (Potts 2006).

* We wish to pay tribute to the intellectual contribution and inspiration of Professor Ndalawa Faustin Madulu. He coordinated the fieldwork upon which this paper is based and was involved in the data analysis up to his untimely death in May 2007.
[1] It should be noted that initial urban growth rates tend to be exceptionally high because they are starting from a low population base. See Potts (2006) for a discussion of this effect.

Their intermediate size between rural village and capital city offered the advantage of combining both rural and urban lifestyles (Bryceson 1993).

Meanwhile, mining-led settlements have sporadically appeared since the colonial period when artisanal and small-scale miners converged in the several mineral-rich parts of the country, such as Lupa in Chunya, despite mining being seen as an illegal activity. This trend continued after independence, even though small-scale mining was still prohibited by law. As the country's economic liberalization policies unfolded, the controls were eased. By the mid-1990s, mineral fever was in the air. Villagers adjacent to valuable mining deposits, who had engaged in mining for some time, were joined by sizeable numbers of migrants eager to get rich. Rising mobile phone usage in the new millennium accelerated the rate and numbers rushing to newly-discovered mineral-bearing sites. They arrived within days rather than weeks or months after the mineral's discovery. Small villages of a few thousand people could quickly balloon towards settlements of over 20,000 people. The northwestern part of the country, notably Mwanza and Shinyanga regions, led the nation in population movement of this nature.

TANZANIAN MINING AND SETTLEMENTS OF RAPID POPULATION GROWTH IN THE NORTHWEST MINING FRONTIER

In the RUD study, we deliberately chose urbanizing mining sites that are 'middle-aged' with respect to the timing of their migration rush in order to trace the course of the settlements as their mining potential declines. The following outlines their origins and population growth.

Nyarugusu: Gold Site

The history of Nyarugusu's gold wealth began when a pastoralist herding his cows saw gold flecks attached to the roots of a fallen tree uprooted by a strong wind. Mining was prohibited under President Nyerere's agrarian socialist policies. Nonetheless, some village men surreptitiously mined on a limited scale. During the economic crisis conditions that followed Tanzania's 1979 war with Idi Amin's troops in nearby Uganda, increasing numbers of artisanal miners began drifting towards Nyarugusu. The area was still relatively forested, and the migrant miners lived in a village, some three kilometres from the mining site where housing was available. As more miners gathered, relations with the villagers became tense. Local residents accused the miners of stealing food crops from their fields and endeavoured to expel them. Pushed closer towards their mining sites in Nyarugusu, the miners constructed temporary shelters in what is now Nyarugusu's core settlement area. Thereafter in 1983, the Tanzanian government became increasingly lenient towards small-scale mining.[2] Word spread about Nyarugusu's gold and young men flocked to the site from all over Tanzania and neighbouring Kenya. Pits were only three metres deep at the time and gold was relatively plentiful and pure. For security purposes, a local militia group *(sungusungu)* based on traditional age-grade segmentation was established with elected leaders.

By the mid 2000s, the number of claim owners was over 100. There is a division of labour in gold mining in which claim owners usually do not get directly involved in production. A wide range of capital and labour arrangements entwine the interaction between 'claim owners' who have obtained Primary Mining Licenses (PMLs)[3] and take roughly 30 per cent of the mined ore, the 'pit holders' who lease the site from the claim owner and organize production taking about 40 per cent of the mined ore after paying for the production costs like timber, explosives, food and medicine, and

[2] Chachage (2006) notes that the most significant policy change paving the way for small-scale mining appeared in the Mining Act of 1979 which vested ownership of all mineral rights in the state but gave local miners the scope to peg claims without direct state involvement. This was followed by the Small Scale Mining Policy Paper of 1983, which encouraged Tanzanians to engage in small-scale mining alongside other income-earning activities. Surprisingly, this policy preceded government economic liberalization measures by several years. Chachage interprets it as the government's timely reaction to the rising price of gold in the world market.
[3] Under the Mining Act of 1998, a PML gives the claim owner the right to mine an area for five years, which can be renewed or transferred to another named holder.

the manual labourers who dig the gold and receive the remaining 30 per cent of the mined ore to divide amongst themselves.

Gold mining is generally considered work of young men (*kazi ya vijana wa kiume)* because it requires the exertion of a great deal of physical strength. By the early to mid-1990s Nyarugusu's surface deposits were gone. Miners had to build shafts with wooden supports increasingly more deeply (40-60 metres).[4] It is at this stage that the small-scale artisanal miners began facing considerable technological difficulties. Ordinary agricultural irrigation pumps are not up to the task of pumping out the water that is found at these depths. The necessary equipment for deep shaft mining is beyond the financial means of most small-scale miners, preventing further safe exploitation of the mine.

During the past decade, Nyarugusu's dwindling accessible gold deposits prompted many miners to move on to gold sites in neighbouring regions and beyond. Small-scale mining however continues at Nyarugusu and occasionally there are localized gold strikes, which reward the efforts of shaft-digging miners. Nyarugusu's present population is estimated by the settlement leadership to number 3625 households comprising about 20,000 people. There is no way to know how many people were resident in Nyarugusu at its peak in the early 1990s. Informants claimed that Nyarugusu's population rocketed to 35,000 whereas the 1988 population census registers only 5,968. Mwaipopo *et al.* (2004) estimated the current population of Nyarugusu ward at 27,000 people. Given the magnetic force of gold, the ethnic composition of Nyarugusu's population is now very diverse representing over 25 different ethnic groups. Throughout Nyarugusu's gold fever, a large segment of the population has farmed, producing staple foodstuffs for local consumption.

Maganzo: Small-scale Diamond Prospecting in the Shadow of a Large-scale Mine

Maganzo[5] began as a camp for people looking for employment in the large-scale foreign-owned[6] Williamson Diamond Mine at Mwadui which started operation in 1940. For two decades people were forced to shift their settlement here and there around the perimeter of the large mine because of the suspicion that their proximity to the mine facilitated diamond smuggling. Eventually in the late 1950s, a permanent settlement at Maganzo was established under the leadership of the local chief. In effect, Maganzo functioned as a labour market for those seeking work in the Williamson diamond mine and as a service centre for the African mine employees.

During the national villagization campaign of 1974, Maganzo residents faced renewed pressures to move from their settlement. Rumours about diamond smuggling abounded. Blame was focussed on '*wabeshi*', stealthy intruders linked to the disappearance of Williamson's sand tailings. These charges were used as justification for evicting people from their homes. Residents sent an appeal to President Nyerere who came to their rescue and ordered that Maganzo could remain intact as a settlement.

Maganzo continues to exist in the shadow of Mwadui mine. At the time of the last census in 2002, Maganzo had 2,256 households and a population of 12,180 people, which is likely to have been a gross undercount in view of the miners' attempt to maintain a low profile given the suspicion with which they are regarded by the authorities. In fact, Maganzo is the most outwardly urban of the two settlements. There is a central market surrounded by a cluster of shops. In 2005 the trunk road to Shinyanga town bordering the settlement was completed. A petrol station is strategically sited on the main road. Furthermore, Maganzo is on the national electricity grid enabling wealthier residents to have access to relatively cheap electricity. The settlement's core has four well laid out streets and several long-established houses. There are clear signs of wealth differentiation reflected in the housing. Located in a semi-arid area, the acute shortage of water in Maganzo causes residents to harbour resentment against Mwadui mine's piped water supply, which they have been requesting permission to tap into without success.

Previously, Maganzo's commercial role in the shadow of Mwadui attracted some Tanzanian Arab settlement. With the government's privatization policies from 2000 onwards, some of the land that residents had been using for diamond mining was allocated to large-scale Tanzanian commercial mining interests, significantly reducing the area in which local people could mine. Residents of the settlement have diversified occupations spanning trade, diamond mining and agriculture. The latter two now incompatibly co-exist amidst a growing shortage of land. People are torn between using their land for farming to provision their household's basic food needs as opposed to digging for diamonds on their land.

Small-scale diamond mining entails digging a pit about two to three metres in diameter and from one to two metres deep during the dry season. The potentially diamond-bearing sand from the hole is placed to one side of the hole until the rainy season comes when the hole fills with water. The miner can then 'wash the sand' with a sieve pan which sifts the worthless grains of sand away from the diamonds that are caught in the sieve's mesh. Not only does diamond mining interfere with the time a miner might otherwise be engaged in planting, cultivating and weeding crops, but also the pit digging destroys the fertile topsoil needed for agriculture. In many areas, people have dug holes only two to three metres apart. This creates a landscape with a peculiarly barren moon surface appearance that requires careful circumnavigation to traverse. In this way Maganzo has increasingly lost its agricultural potential forcing residents to become progressively more reliant on food purchase.

MIGRANT HOUSEHOLDS AND LIVELIHOOD CHANGE

In both surveyed settlements, the overwhelming majority of household heads were migrants. Table 1 summarizes the demographic characteristics of our survey households showing that 26 percent of Maganzo's household heads (HHH) were native-born whereas in Nyarugusu the number was only 7 percent. Figure 1 shows the year of arrival of household heads in the settlements.

Table 1

Figure 1

The motivation for moving was overwhelmingly economic. Mining in Nyarugusu (46 percent) figured prominently but the 'search for better opportunities' held sway in Maganzo (34 percent). Significantly mining ranked only fourth in Maganzo preceded by trade. In this locality, the pursuit of diamond mining does not have the same stampede pattern as gold strikes.

The average household size was 6.9 members, which is above the national and regional averages (Tanzania 2002). A surplus of males was reported as numerous male sons compared with daughters, especially in Maganzo. While it is not impossible that households attracted to mining are fortuitously better-endowed with male offspring, it is more likely that survey respondents reporting household composition tended to exaggerate familial ties of dependency with the term 'sons' for young males in the family. Traditionally, as well as during the socialist period of the country's development, the hiring of wage labour by households was not sanctioned, so the unusual number of male sons is likely to be masking types of tied labour relationships other than that of offspring.

Migration to Maganzo has been fairly steady. The presence of diamonds in the area has been known since the 1940s. Hence, diamond mining has been a livelihood activity there for a long time. Located in a semi-arid area,

[4] The small-scale mining process involves the blasting of the underground rock, which is then hauled up and first crushed by hand and then machine-crushed. Once the rocks are pulverized, the sand is washed and sieved to separate the gold particles from the sand. The tailings are piled to one side to be sieved again at a later date. Mercury is used to amalgamate the gold dust.

[5] Located in the Kishapu district of Shinyanga region.

[6] The Government of Tanzania now has a 25 percent share and De Beers 75 percent.

settlement in Maganzo for agricultural purposes has never been very attractive. Rather the trade and service nature of the settlement in the shadow of Williamson mine has been significant. Maganzo represents the intermediate case of mixed trade and mining that contrasts with the extreme of Nyarugusu's gold rush character. Furthermore, the data indicates that migration to Maganzo has levelled off during the 1990s as the shortage of land impinges on people's way of life. Certainly this was confirmed by open-ended discussions with Maganzo residents who expressed the view that a deepening land constraint was worsening their livelihood prospects.

Proliferating Divisions of Labour catalyzed by Mining Activities

Studies of livelihood in rural Africa to date have stressed the highly fluid and diversifying nature of work over the past two decades (Ellis 2000, Bryceson and Bank 2001). Processes of deagrarianization and depeasantization underline these tendencies (Bryceson 2002a & b). Tanzanian rural livelihood diversification has been widely documented (Bagachwa 1997, Madulu 1998, Bryceson 1999). However during the process of livelihood change, field researchers often encounter difficulties in gaining an accurate report of its occupational composition. This is because rural informants' definitions of their work are intricately related to their cultural identity and way of life rather than being simply income and subsistence-begetting activities.

In Tanzania, and especially in Sukumaland, rural people have traditionally seen their agro-pastoralist activities as fundamental to their ethnicity as Sukuma. Thus, answers to questions about one's occupation have to be treated with caution since the knee-jerk reaction of both rural men and women is to state that they are farmers. Therefore, it is meaningful when people report non-farming primary occupations. This indicates that not only are they spending a large segment of their time in non-agricultural activities but they are not feeling socially constrained to admit it. Table 2 shows that approximately 30 percent of the surveyed Tanzanian heads of households identified as non-farmers. Nyarugusu had the lowest incidence of non-farmers, most of whom were miners. Non-farming in Maganzo was mainly split between miners and traders, whereas in Maganzo trading was most prominent. Adding together those who state farming as a primary or secondary occupation accounts for 87 per cent of all household heads. In other words, only 12 per cent of household heads report being entirely distanced from farming.

Table 2

Agriculture remains the most important activity accounting for over 50 per cent of reported activities in Nyarugusu. In Maganzo, declining land availability restricts household heads' reliance on agriculture to less than 40 per cent, although it is nonetheless highly valued for its contribution to household food needs. Mining, however, is the strongest secondary activity in both sites indicating that the gains that can be had from mining are well appreciated. Figure 2 shows the weighting of household heads' work activities in terms of time spent. One sees that the mining settlements' occupational structure is relatively restricted, although Maganzo has some trade and skilled work given its more strategic location on a main road relative to Nyarugusu.

Figure 2

The unpredictability of mining returns dictates that miners generally actively engage in other livelihood activities, particularly agricultural production or rely on the cultivation of other family members be it their wives, children or extended family members. Even migrant miners who would have no prior claim on land try to devise ways and means of accessing land through mine pit holders or local villagers in order to obtain a reliable daily food supply regardless of the vagaries of their cash flow for food purchases. In Nyarugusu, roughly 50 percent of staple foods, usually maize, cassava and to a lesser extent rice are supplied by own farm production. Fruit and especially meat are mainly purchased. Maganzo, on the other hand, provisions less than a quarter of its staple food needs. As an old mining settlement hemmed in by large mining claims, almost half the residents are landless forcing them to become highly dependent on purchased food (Figure 3). Many have decided to dig up their farmland to search for diamonds. Environmentally, valuable topsoil is destroyed undermining the productive capacity of the land.

Figure 3

***IN SITU* URBAN TRANSFORMATION**

Until recently, rural migrants moved to urban areas to gain the perceived advantages of urban livelihoods and lifestyles. Our case study sites represent settlements where rural residents have experienced *in situ* urban transformation. The frontier livelihood pursuits of mining and trade have triggered extremely rapid population growth and a transitional process in which the original and migrant residents have recourse to rural and urban livelihood activities as well as a spectrum of rural to urban styles of living and modes of consumption. As centres of rapid in-migration, these settlements have served as 'destinations of desire'. The vast majority of migrants anticipated enhancement of their material lives through migration to these localities and in the process their locational identity altered increasingly towards an urban outlook.

When asked in the survey whether they lived in a rural or urban settlement, 65 per cent saw themselves as urban dwellers. Interestingly Nyarugusu had the highest percentage (84 per cent). This may be because there is a strong desire on the part of the leadership and population to keep the momentum of urban development going despite the out-migration of gold miners. They are lobbying heavily for Nyarugusu's role as a service and business sector and are demanding official urban status and a good road. In Maganzo, 65 per cent of the population saw themselves as urban which is not surprising given its long standing as a centre of in-migration and its urban infrastructure and wealth differentiation.

In East Africa, it has been widely assumed that early stage urbanization is primarily characterized by male migration. This was no doubt the case in the first waves of migration to Nyarugusu and Maganzo. However after two decades both of these settlements' sex ratios became more balanced.

The 15-34 years of age cohort comprises those who are not only the most economically active but also the most likely to migrate and engage in new 'frontier' livelihoods, notably mining and trading. They are, in effect, the dynamo age group which reflects the economic viability or otherwise of the settlement. Quite different patterns emerge in our two settlements with respect to this age group (Figure 4). Nyarugusu has had higher proportions of its population in the 15-34 age group: 34 per cent in 1978, 40 per cent in 1988 but then as the mining fortunes of Nyarugusu have declined this age group has contracted to only 27 per cent. In all three periods, males have superseded females, inferring that mining remains the central livelihood strategies for the settlement.

Maganzo has had a more peculiar pattern, displaying a high degree of volatility and a reversal of gender dominance over time. In 1978 the percentage of population in the 15-34 cohort was 37, plunging to 24 in 1988 and rising to 54 in 2002. In 1978 women superseded men, which could tally with the settlement acting as a recreation and service sector in the shadow of the Mwadui mines. In 1988, the male and female population of 15-34 were balanced but had declined as a percentage of the total population whereas in 2002, females and especially males in this age group had risen as a proportion of the settlement's total population.

Figure 4

Although both settlements are expanding in size, only Nyarugusu is edging towards a balanced gender ratio in the dynamo age group. In the process, Nyarugusu is 'ageing'. Maganzo achieved a gender balance in 1988 as its dynamo generation shrank in size, then developments took a surprising twist. The dynamo age group rapidly expanded with a heavy male bias. Based on our survey results and interviews, this can be explained as a result of distress rather than urban take-off. Maganzo experienced increasingly acute land and water constraints, which led it to take on more of the character of a diamond-mine work camp rather than a residential location. Mining began encroaching on residents' land allocation for subsistence agriculture and housing. Male migrants were being recruited into residential households signalling the intensification of mining and a proportional decline in the female and child population normally expected in the composition of rural households. Maganzo had become more like a diamond mining labour camp than an urban settlement. The large number of landless households in our survey cannot be interpreted as a sign of proletarianization along the classic western model of industrialization and urbanization. Instead it indicates that Maganzo's depleting resource base, notably its lack of water, which is unlikely to allow it to follow an urban growth trajectory for much longer, in the absence of piped water supplies from De Beers or Shinyanga town.

Urban Momentum of Frontier Settlement Growth: Spark versus Sustainability

How durable are Nyarugusu and Maganzo's urban economies as small-scale mining reaches technological investment barriers? The answer to this question is difficult given the enormous volatility of population movement to and from the settlements and the lack of reliable inter-censal population data. We do not know what the two settlements' peak populations were. It is clear that both settlements are still growing at rates that supercede the Tanzanian national average,[7] even though residents report that the settlements are not as vibrant as before, and, in the case of Nyarugusu, heavy male out-migration to other 'fresher' mining settlements has become a salient tendency over the past decade. Nonetheless, both Maganzo and Nyarugusu continue to be centres of net in-migration. In view of the dwindling returns to mining, there are clearly other factors attracting migrants.

The available evidence suggests that, in addition to better health and education services compared with rural villages, both of these settlements offer their populations other livelihood opportunities, notably trade in Maganzo and farming in Nyarugusu. The farming prospects of Nyarugusu might be seen as negating rather than maintaining an urban mode of existence, but this is debatable. Farming in Nyarugusu, not only offers a vital subsistence fallback and cash income from crop sale, it also represents speculative land investment. Large-scale international investors are interested in the gold deposits that may lie deeper than what is currently being worked by small-scale miners. Many Nyarugusu households stand to gain by staying put rather than pulling up stakes and moving on to new gold rush settlements, exercising shrewdness about property values. In so doing, they are exhibiting an urban commercial outlook rather than tribal attitudes towards land linked to ethnic identity and community solidarity. This would suggest that Nyarugusu residents are more urban than rural in their outlook. Generally, people in mining areas of the country are increasingly applying for claims in areas where there may be gold, even though they do not have funds to mine the area. They are speculatively waiting for a mining company to offer to buy their claim (or for pit holders to start mining), knowing that claim owners can sell their mining titles to large-scale commercial mining companies, whereas the legally stipulated compensation to farmers with land titles is very limited.[8]

Maganzo has the smallest population but is visually more urban with its prominent permanent housing, superior physical infrastructure, broad array of livelihood activities and residents' heavier reliance on purchased food and petrol, electricity, kerosene and charcoal as opposed to firewood. However, Maganzo has reached a critical population density vis-à-vis its land and water resources. It now experiences acute shortages of both which impinges on the livelihood viability of its residents, particularly that of the poor. Residents' reliance on purchased food is regretted rather than boasted about.

Even more than Nyarugusu, the continuation of Maganzo's urbanization process depends on positive external stimuli, namely the settlement's functional relationship to Williamson mine, and its access to services such as food supplies and water. Currently Maganzo lies along a water pipeline constructed from Mwanza to Shinyanga town, which is projected to serve the adjacent Williamson mine compound and Mwadui township. However, even if it gains access to this piped water, Maganzo still faces a shortage of land for its mining and agricultural activities. The diamond pit digging that has already taken place is very extensive and destructive to the topsoil. Some households are experiencing a livelihood crisis. Maganzo's female and child population is shrinking relative to the male adult population, as evidenced in the changing age-sex distribution of Maganzo's inter-censal population. Family units are finding it difficult to fulfil their basic needs for food.

The livelihood viability of the settlement revolves around its commercial trade potential if and when artisanal diamond mining in Maganzo becomes untenable. Its location on a major highway and proximity to Mwadui mines and Shinyanga town 16 kms away should stand it in good stead in terms of being close and readily accessible to a large consumer population. Shinyanga has a far larger urban population with superior services and shops, which may compromise Maganzo's commercial potential. Thus, although outwardly Maganzo is more urban in appearance than Nyarugusu, its urban foundations are similarly fragile.

CONCLUSION

Where does rapid mine-led urbanization lead? Clearly small-scale mine-led urbanization is not an urban developmental path that can be replicated everywhere nor does it have a very long-term trajectory where it does occur. Over time the issue of the exhaustible supply of this catalyzing resource arises. Its non-renewable nature causes slowdowns or even contraction of the resident population, but the process of urbanization that it has set in train can and often does continue. Small-scale mining populations have an erratic boom and bust character. They, however, catalyze internal growth processes based on service provisioning and trade and generally maintain the settlement's agrarian activities as long as they can. Small-scale mining generates a variant urbanization tendency - reliance on immediately accessible mineral wealth that is extracted, processed and exchanged for means of subsistence.

In summary, there are three main tendencies in mine-led urbanization that are decisive for a settlement's long-term urbanization. First, small-scale mining is generally dependent on local farming of staple food supplies nonetheless over the medium and longer term mining competes with agriculture for land, eroding the rural agrarian base and initiating urban purchased consumption patterns as demonstrated in Maganzo. Second, mining settlements generate multiplier effects in the economy through their purchasing power. Commercial trade and recreational services like bars and prostitution bolster local employment. Third, the population expansion related to mining catalyses public service provisioning of schools, health, post offices, churches, police, etc. Such services, which are generally superior to those in the surrounding rural countryside, attract migrants, even if mining activities are declining. By contrast, recreational

[7] The national annual inter-censal growth was 2.9 per cent with high regional rates: 3.3 per cent in Shinyanga and 3.2 per cent in Mwanza.

[8] Personal communication from Jesper Bosse Jønsson, April 2007.

services may serve as population deterrents. Prostitution and high levels of drinking are associated with a higher incidence of HIV/AIDS or household instability that can subtract from rather than add to population totals.

The gold and diamond mining rushes of the past two decades mark a profound economic as well as cultural change for Tanzania's northwest region. Labour absorption is the motor force of livelihood diversification and urbanization. Despite its capricious nature, small-scale mining can ultimately lead towards sustainable urban settlement but time will tell if Nyarugusu and Maganzo specifically can get beyond the temporal delimitations of small-scale frontier mining.

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Table 1: Comparative Household Demographic Statistics by Settlement

Household Characteristics	Nyarugusu GOLD	Maganzo DIAMONDS
No. of households sampled	73	72
Average age of HHH	45.7	51.0
Mean year of migrant household head's move to settlement	1982	1983
% migrant households	93	74
% female-headed households	5.5	12.5
Household size	7.1	6.7
Household sex ratio	114	113

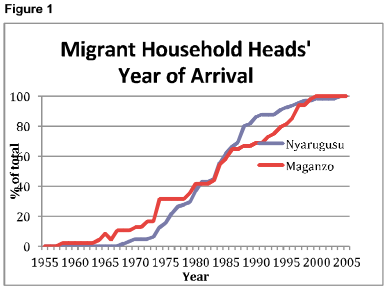
Source: Tanzania Frontier Survey, August 2005

Table 2: Stated Primary and Secondary Occupations of Household Heads (% of total HHH)

	Nyarugusu GOLD		Maganzo DIAMONDS		Both Settlements	
Occupation	First	Second	First	Second	First	Second
Farmer	76	16	64	17	70	17
Miner	17	41	9	34	13	38
Trader	1	14	10	10	6	12
Unskilled worker				1	0	1
Skilled worker	6	6	16	6	11	6
Formal employee					0	0
None		23	1	31	1	27
Total	100	100	100	100	100	100

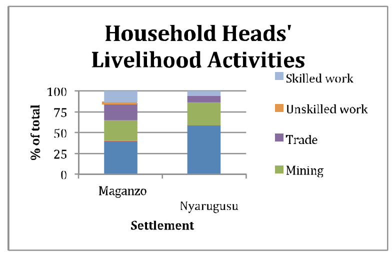
Source: Tanzania Frontier Survey, August 2005

Figure 1



Source: Tanzanian Frontier Survey, August 2005

Figure 2



Source: Tanzanian Frontier Survey, August 2005

Notes:

Agriculture/Livestock – plant and animal husbandry and cattle-keeping

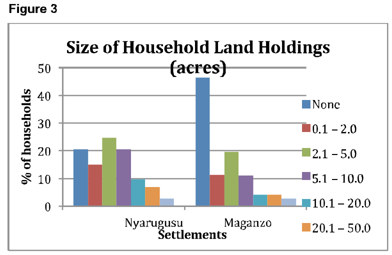
Mining – diggers using their manual labour to extract and process minerals and mine pit holders

Trade - small-scale traders dealing in commodities of an agricultural, mining or general nature or traders with premises.

Unskilled worker - self-employed involved in trades requiring no special training including security guards, brickmakers, n

Skilled worker - self-employed engage in activities that require some instruction or education notably drivers, mechanics,

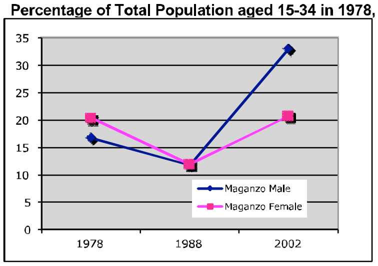
Figure 3

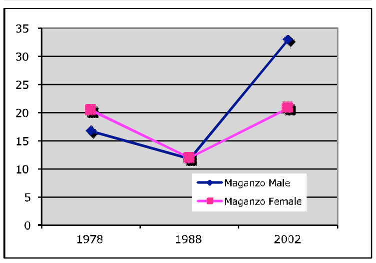


Source: Tanzanian Frontier Survey

Figure 4

Percentage of Total Population aged 15-34 in 1978, 1988. 2002





Source: Tanzania Population Census, 1978, 1988 and 2002