

Study into Resettlement at the Yali Falls Dam, Kontum Province



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Table of Contents

List of Tables And Figures	3
I. Introduction	4
II. Study Sites and Methodology	6
Study Sites	6
Methodology	7
III. Results and Discussion	8
1. Land Resources	8
Land Distribution	8
Land Use	10
Cassava	10
Wet Rice	12
Upland Rice	13
Corn Grown On Semi-Flooded Land	14
Home Gardens	15
2. Planning and Management	16
3. Impacts of Planning And Management	18
Economic Impacts	18
Social Impacts	18
Environmental Impacts	19
4. Housing Conditions	20
5. Sanitary Conditions	22
6. Water Sources	23
IV. Conclusions and Recommendations	25
V. References	26

List of Tables and Figures

Table 1: Study sites	6
Figure 1: Planned hydropower projects along the Sesan River	7
Table 2: Agricultural land use in high, medium, and low income households	8
Figure 2: Comparison of the usage of agricultural land (in hectares)	9
Picture 1: Cleared forest land used for cassava cultivation in Sa Binh Commune	11
Picture 2: A pumping station in Kroong	12
Picture 3: An unused reclaimed field designed for wet rice cultivation in Kroong	12
Picture 4: An upland rice field	14
Picture 5: Semi-flooded land used for growing corn	14
Pictures 6 and 7: Examples of the inefficient uses of home gardens	16
Table 3: Housing conditions in resettled villages – houses built on the ground	20
Table 4: Housing conditions in resettled villages – stilt houses	20
Pictures 8 and 9: Housing conditions in the resettled villages	21
Table 5: The condition of latrines in resettled villages	22
Picture 10: Latrines in a resettled village	23
Table 6: The condition of wells in resettled villages	23
Picture 11: A dry well	24

I. Introduction

According to Electricity of Vietnam's power masterplan, six projects will be developed on the Sesan River in Gia Lai and Kon Tum Provinces: Upper Kontum, Pleikrong, Yali, Sesan 3, Sesan 3A and Sesan 4 (figure 1). The Yali Falls Dam started operating fully in April 2002. Sesan 3, Pleikong and Sesan 3A are under construction. Upper Kontum and Sesan 4 are planned to be completed in 2010 and 2011, respectively. The total area that will be flooded by all the above-mentioned reservoirs is more than 207 km². About 3,200 families totaling 17,000 people will be displaced, of which resettlers from the Yali Falls Dam number 1,658 families (8,475 people). In order to make way for the Pleikrong Dam 1,292 families (6,239 people) will have to move. (Report of the Yali Falls Dam Management Board, June 2002, and of PECC 1, 2002).

Resettlers from the hydropower projects in Kontum are mainly ethnic groups, such as Bana, Ro Ngao, and Gia Rai. They account for 60-70% of the total number of displaced people. For generations these people have lived in forest lands and practiced upland cultivation. After the war ended in 1975 they started practicing wet rice cultivation along rivers and streams and since then wet rice has become important to their livelihood, in spite of its limited area, especially in conditions where slash and burn cultivation is strictly controlled and areas for cash crops such as coffee, rubber, pepper, and sugar-cane have expanded extensively.

The land used for wet rice is always the first to be flooded in order to make way for hydropower plants. This has impacted the livelihood of resettlers who depend on this land for crop cultivation. The agriculture makeup in resettled communities has changed remarkably with the development of hydropower. These changes can be seen in land use, forest use, water use and supply, housing and rural sanitation.

There are already some studies on resettled communities from the Yali Falls Dam such as the Study on Public Participation in Resettlement Planning related to the Yali Hydropower Project (by the Vietnam Environment and Sustainable Development Center-VNESDC, Hanoi, 2000), and the Study into Impact of Yali Falls Dam on Resettled and Downstream Communities (by CRES, 2001). The conclusions and recommendations of these studies are valuable and more attention needs to be paid to them, especially the issues concerning land allocation, and the organization of agricultural production (VNESDC, 2000), land and farming systems in resettled communities in order to create more jobs and to raise income (CRES, 2001).

This report presents the results of a study on agriculture, land use and the environment and their impacts on ethnic populations in resettled communities of the Yali Falls Dam. The study was conducted from April 18-30, 2004 by a group of researchers from the Institute of Ecology and Biological Resources (IEBR), the Center for Natural Resources and Environmental Studies, Vietnam National University (CRES), International Rivers Network, and the Department of Environment and Natural Resources, Kontum Province.

Objectives of the study are as follows:

- To assess the agricultural systems within resettled communities 5 years after moving and to identify problems that have arisen in crop production and livelihood, development trends, the advancement of farming systems and

raising the resettlers' income levels as recommended in the studies of VNESDC-2000 and CRES-2001.

- To investigate environmental and social issues surrounding water supply and agricultural production, as well as problems with the degradation of houses and latrines.
- To contribute to the stabilization of lives within resettled communities and to provide recommendations to resettlement planners of other projects within the country.

II. Study Sites and Methodology

Study Sites

The sites used in this survey are resettled villages in Kontum town and SaThay District, Kontum Province. The name of each village and the commune it belongs to, the ethnicity and the number of households from each village that participated in the survey are located in Table 1.

Table 1: Study sites

Commune	Villages	Ethnicity	Number of households interviewed
Ngoc Bay	Mang La	Bana	10
Kon Tum town	Konkngo Klah	Ro Ngao	9
Kroong	Kroong Ktu (village 3)	Ro Ngao	9
Kon Tum town	Kroong Klah (village 4)	Ro Ngao	11
Sa Binh	Ka Bay	Gia Rai	10
Sa Thay District	Binh Son	Kinh	2
Total			51

The people living in these resettlement sites are mainly ethnic groups such as Ro Ngao, Gia Rai, and Bana. Their old villages are now flooded or semi-flooded by the Yali Falls Dam and their new villages are located within 1-3 km of their old ones. These people's lives are still very closely connected to the reservoir area. Many of these families still cultivate one crop in semi-flooded land during the months of March through September. They also do their washing, fishing, and boating in the reservoir.

After resettling, villagers cleared the forest on Kroong Mountain in order to create more room for cultivating cassava, corn, and upland crops. They also reclaimed areas along streams in the Krong Poko watershed for rice cultivation. Unfortunately, this area is planned for use by the Pleikrong hydropower project. Preparations for the construction of the Pleikrong Dam started in mid 2003 and when it is completed most of these villagers will once again lose their land to make way for the new dam. They will be compensated this second time but only for their crops and trees. Land is quickly becoming scarce and these villagers are increasingly facing difficulties due to this shortage.

According to the Chairman of Kroong Commune, and the party secretary of Ngoc Bay Commune, villagers have only been living in resettled sites for a short time, and there are still many problems that need to be solved, and now, they will have to cope with another new and more challenging problem: land shortage.

Methodology

Rapid Rural Appraisal (RRA) was used to evaluate agricultural and environmental issues in resettled communities. The identification of problems was based on participation from local authorities at commune and village levels, village elders, women, small businesses, and villagers who completed questionnaires prepared by the research team.

The staff of Kontum's Department of Natural Resources and Environment (DORE) also participated in field visits and the interview process. Following instructions from the village headmen, researchers visited different families and interviewed the heads of these families about their living conditions, the status of production, and any other difficulties that they might be facing. Interpreters or village headmen went along to help researchers who did not speak Vietnamese very well. Interviews were conducted with representatives of high, medium, and low income groups. These representatives were selected by the village headman and in each village about 3-4 families from the different groups were interviewed.

Along with interviews, researchers surveyed the fields, gardens, and housing within villages. They also spoke with random villagers about their problems. The villagers were happy to talk about anything related to agricultural production such as young plants, land use, land quality, fertilizers, pests, disease, crop schedules, yields, agricultural products, and amount of consumption. They also actively participated in identifying their own problems. Other environmental issues including the management of forest, land, and water sources, as well as sanitary conditions were identified in a similar way.

Specific ecologic systems were described in the field for each village with the help of the village headman. These systems included rivers, streams, reservoirs, ponds, semi-flooded land, wet rice land, resettlement areas, houses, gardens, upland fields, forests and grazing areas. These descriptions were then used to help evaluate the day to day lives of people within these communities.

Figure 1: Planned hydropower projects along the Sesan River



III. Results and Discussion

1. Land Resources

Resources within resettled communities can be found along the reservoir, the forest, and within the farming system. Farming systems consist mainly of wet rice, cassava, subsidiary crops, and corn on semi-flooded land, home gardens, and livestock.

Land Distribution

A primary resource and the most important asset of a farmer is their agricultural land. In resettled villages, the shortage of land for cultivation has created concern amongst people including the authorities. Our survey's results on land distribution and land use in 2003 are shown in Table 2. From Table 2 we can see that:

- Within each resettled community the use of agricultural land varies depending upon the income of the household. One household in a high or medium income group uses about 12,000 m² of land for agricultural purposes on average, while one household in a low income groups only uses about 9,000 m² of land.
- After the initial three-year subsidy period, the immediate priority of families becomes food production. Land for growing rice, particularly wet rice is very important. Families who have enough food to feed themselves throughout the year, defined here as high-income families, have a stable area for growing wet rice.

Table 2: Agricultural land use in high, medium, and low income households

Classification	High income (11)		Medium income (21)		Low income (17)		Klau-klah * village	
	Per household (m2)	Per capita	Per household (m2)	Per capita	Per household (m2)	Per capita	Per household (m2)	Per capita
Wet rice	1,079	186	286	45	117	20	1,607	324
Upland rice	83	15	132	20	109	16		
Cassava or sugar- cane	5,950	940	5,010	820	3,920	580	8,671	
Corn (semi- flooded land)	3,660	560	3,930	620	3,400	580		
Garden	1,500		1,500		1,500		3,280	
<i>Total</i>	<i>12,212</i>	<i>1,938</i>	<i>10,858</i>	<i>1,670</i>	<i>9,046</i>	<i>1,350</i>	<i>15,346</i>	<i>2,153</i>

- Most resettled communities lost their agricultural land due to flooding from the dam's reservoir. They received compensation from the Vietnamese government for the value of their crops, but they were not given new land to cultivate. Resettled communities are divided into high, middle and low income groups for

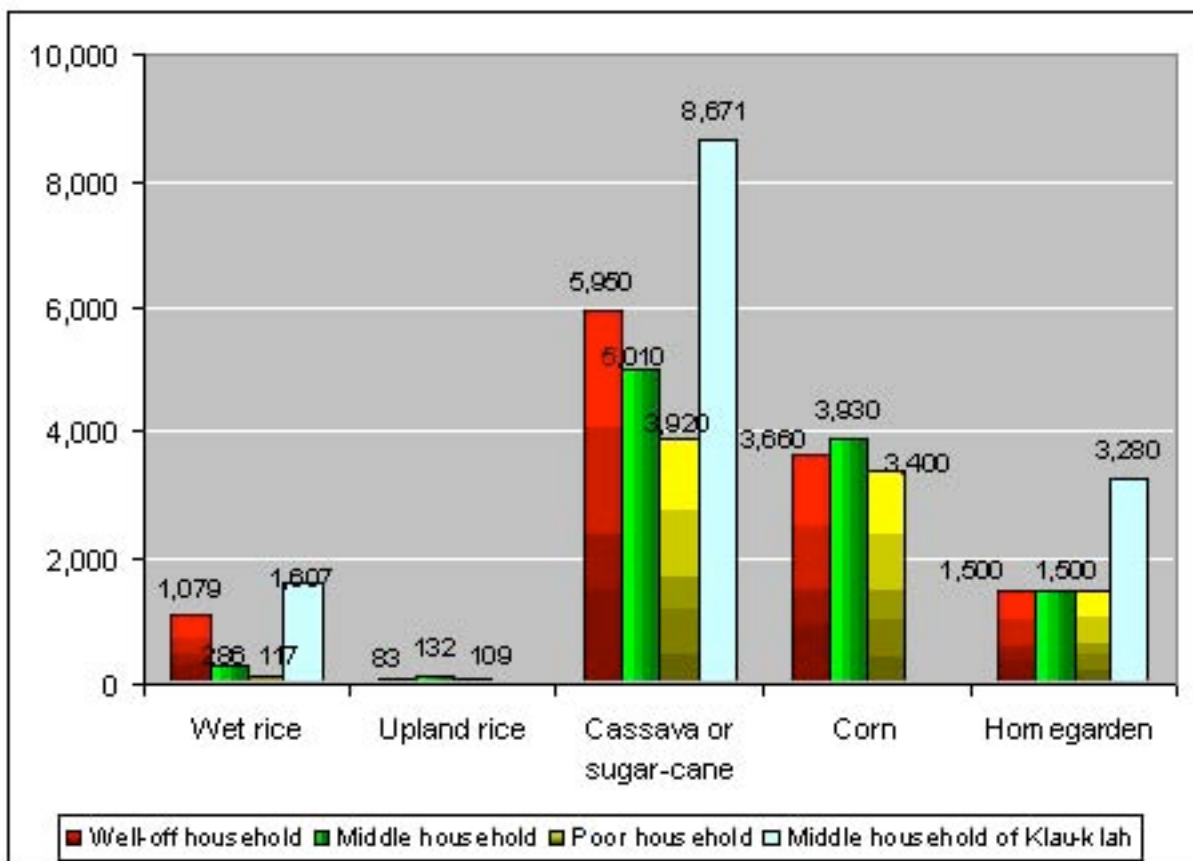
* CRES, 2002. Study into socio-economic development and environmental protection in Central Highland, Page 116-119.

two main reasons. One, some families reclaimed more land before and after resettlement. Two, some families used the compensation money given to them to buy or rent land immediately after resettling while others used the money to purchase other items such as motorbikes, televisions, radios, and couches.

Families argue that according to the policies of the project management board their lost land was supposed to be compensated and that is why they used their compensation to buy other things. They said that they followed other people's examples. One woman from Kroong Klah village said that "she saw her neighbors buying a motorbike, so we also bought a motorbike right after we were compensated. Then they bought a TV so we also had to buy a TV so we would not feel left out. My husband liked it and so did my children." A good question to ask here is: should planners help advise, discuss, or instruct ethnic people on how to best use the compensation given to them depending on each particular family's condition in their new place of residence?

- A medium-sized village in Ia Chim Commune on the other side of the reservoir where people have not been relocated is a good place for comparison. The agricultural land used by one family, including the land for wet rice, is 1.5 times larger than that of a resettled family in Kroong Klah. This was confirmed by villagers in Kroong Klah who work in Ia Chim.

Figure 2: Comparison of the usage of agricultural land (in hectares)



About 60% of resettled people from the Yali Falls Dam are now located in Ngoc Bay, Kroong and Sa Binh Communes. Within the next 4-5 years, these people will lose their newly acquired agricultural lands to make way for the Pleikrong hydropower project. Starting in the middle of 2003, land was taken away to make room for the construction site and in 2004 the total estimated area that will be lost in Kroong

Commune is about 400 hectares. These 400 hectares will be used to build the infrastructure for the Pleikrong project. When this reservoir is complete, it is estimated that Kroong Commune will lose a total of 800-1,000 hectares of its agricultural land including the complete displacement of one village, Hamon Ktol. This new reservoir will also flood the newly acquired agricultural lands of most resettled families from the Yali Falls Dam. As stated in a Report of the Commune's People Committee at the IX meeting, section VIII, December 2003, some families will lose all their agricultural land, except their home gardens. Ngoc Bay and Sa Binh Communes are currently measuring the area of agricultural land to be lost by the reservoir in order to compensate people for their cash crops and as of now we do not have an exact value for this loss. Thirty-nine of the forty-nine families interviewed in this study (80%) will have lost their land by the next crop. This is a very alarming issue for local authorities and most people in these communes.

Land Use

Agriculture provides the main source of income for resettled communities. The main products cultivated by these communities are cassava, wet and upland rice, and corn on semi-flooded land and home gardens.

Cassava

Cassava is the most important and most popular crop in the area. It is easy to grow, easy to take care of, and it is suited to the soil type found in the region. It is also very easy to sell the product even though the market price is low and not very stable. After moving, communities found that there was no longer any land available for rice cultivation, so in order to survive they had to clear away forests in order to grow cassava. In their old villages, families grew cassava to produce alcohol, and to feed livestock. Only a small amount was sold. The current area used by villagers for cassava cultivation is at least 3-4 times and in some areas as much as 10-20 times larger than that of their old villages. The head of Kroong Klah village said "the main product of our village is cassava. Each household's economy and the village's economy is based on cassava. Without it half of our village would starve." In 2003, cassava occupied 34% of the total annual cropland in Ngoc Bay Commune, 45% in Sa Binh Commune and 66% in Kroong Commune. All of the interviewed families from the five resettled villages in this survey grow cassava. The largest area cultivated was 50,000m², and the smallest was 2,500m². These figures do not include the cassava grown in home gardens. Cassava is the main source of income for families in medium and low income groups. Twenty-nine of the forty-nine (59%) families interviewed live only on cassava.

Cassava cultivation takes almost the whole year. Land preparation begins in March, planting in April, and harvesting starts in December and continues until the following January. There is a one month break and then it is time to start a new crop again in March. Families with higher incomes and landowners who rent out land as a business have started using fertilizers or manures when growing cassava in order to produce higher yields and nicer looking roots which in turn make the cassava easier to sell. Seventy-five percent of families grow cassava without fertilizers.

Harvesting and taking the skin off require the hardest work and people usually rent machines for land preparation in order to save time.

Picture 1: Cleared forest land used for cassava cultivation in Sa Binh Commune



Some families already owned upland fields and grew cassava on them before moving but others reclaimed these fields after resettling. Cassava yields are only high during the first 2-3 years. The average yield is 12-14 tons of fresh root/ha. After the third year the amount of product reduces significantly, to 7-10 tons/ha per year, or sometimes even to 4-5 tons/ha per year.

Most families grow local varieties of cassava although recently some high-yield varieties have been introduced. These varieties are only grown in a small percentage of areas since they require intensive farming and more manure and fertilizer. They are not suited to the local farming conditions in the area. In 2003, high-yield cassava was only grown on 12 hectares of land in Ngoc Bay Commune. This amount is not expected to expand since people don't have the capacity to invest more.

Resettled people normally sell cassava to grocery stores owned by Kinh people in the village. Each village has approximately 3-4 grocery stores. Store owners buy cassava from villagers, and then sell it to traders or a cassava processing mill. As of now, a cassava processing mill has been built in Pleikrong, the center of the cassava area in Kontum. Villagers are loaned money in advance for land preparation, fertilizers, and help in planting, weeding and harvesting. After harvesting, they then give the store owners most of their cassava. The store owners subtract the amount of money loaned plus interest from the value of the cassava and then the remainder is given to people to bring home.

In certain cases, people sell a whole field before harvesting and then the buyers hire people to harvest, skin off, chop down and dry to meet the mill's requirements. About 38 out of 49 (77.5%) families sell their young cassava before harvesting to grocery store owners in exchange for rice and other goods. Once cassava is sold for goods, then land can be purchased, leased, or rented. In these conditions, where land is scarce, and uncontrolled reclamation and uneven land distribution prevail, issues surrounding the use and management of agricultural land are increasingly becoming more complex.

Wet Rice

Wet rice accounts for a very small percentage of the total annual cropland in resettled villages. This percentage is highest in Mang La village, Ngoc Bay Commune at 0.76%, and lowest in Kroong Ktu village, Kroong Commune at 0.28%. In other studied villages, this percentage is not higher than 0.5%. Four out of 171 households (2.3%) in Kongkngo Klah village cultivate wet rice fields. Wet rice is a very important source of food for villagers - in the past they primarily lived off wet rice cultivation and now they have lost this source of food. They now use as much area as possible along slopes, streams, and narrow valleys in the Poko watershed to grow wet rice. However, only 13 out of 49 (26%) households interviewed cultivate enough land to produce one or two crops of wet rice, ranging from 100m² to 500m².

The areas now used for wet rice cultivation within resettled villages in Ngoc Bay, Kroong and Sa Binh Communes will be below the normal water level of the Pleikrong reservoir when that project is completed. This area has been measured for compensation purposes. In the coming years, land for wet rice will no longer exist. This is a very alarming issue for people in resettled communities.

As part of resettlement planning in Kontum, the Yali Falls Management Board has designed and built electrical pumping stations and constructed fields for wet rice in order to help compensate resettled people. This originally seemed like a good policy and people were informed about it before moving. However, until now it has failed in its implementation. Pumping stations have been built, and the canal systems exist, but the fields are not flat enough for cultivating wet rice and often the pumping stations do not work due to inconsistencies in design and construction. In Sa Binh and Kroong communes, broken pumps were taken away to be fixed. The local authorities and the villagers are very concerned. Obviously, during the resettlement process not enough attention was paid to short and long term land use. One example is the reclamation and design of wet rice fields.

Picture 2: A pumping station in Kroong



Picture 3: An unused reclaimed field designed for wet rice cultivation in Kroong



An average yield of wet rice is about 5 tons/ha. Wet rice cultivation can be problematic because it requires intensive farming, fertilizers, and pesticides and during the monsoon season, when the water in the reservoir is high, pests and diseases can cause serious damage to the crops.

The equivalent income from 10,000-15,000m² of cassava can be made from 1,000 m² of wet rice. Therefore, if more land for cultivating wet rice is made available the amount of forest cleared for cassava will be significantly reduced, even though this land is generally just unhealthy or regenerated forest, hillsides with bushes, or grazing lands.

Upland Rice

Upland rice is grown on hillsides, on semi-flooded land, and in home gardens. 39 out of 49 (80%) interviewed families cultivate upland rice. Initially, upland rice was cultivated on reclaimed land but then cassava replaced it. Since upland rice gives low yields around 1-1.2 tons/ha and only grows during the rainy season the area used for upland rice needs to be 4-5 times larger than that of wet rice. The estimated income from 1,500-2,000 m² of cassava is equal to that of 1,000 m² of upland rice. It is better for villagers to grow upland rice because in the long run they end up selling their cassava to buy rice and that process puts them further into debt. Cassava production also makes villagers dependent on buyers. However, there are still downsides to producing upland rice. First, it requires intensive farming and fertilizers. Second, the area, yield and quality of the upland rice are not stable and high yields are only achieved when growing in the fertile soils of old growth forests. Third, there are usually many problems with pests, diseases, rats, and birds. Fourth, planting upland rice in semi-flooded areas is unproductive due to the acid sulfate in the soil and the lack of potassium, lime, and manure. Fifth, the semi-flooded land is only temporarily available for planting and as soon as the rainy season begins that land becomes flooded again.

All these reasons make upland rice an unsustainable source of food for resettled people. It is extremely difficult for ethnic people to grow upland rice especially in the current conditions and therefore, for most resettled families in Kontum upland rice is not a stable source of food and there are not many families willing to invest in it.

There are 280 families in Kroong Commune and about 70 ha of the now semi-flooded areas belonged to them before the construction of the dam. The Commune's People's Committee requested cash compensation from the government for this land according to the *Report of the Kroong Commune's People Committee*, but never received it. Similar situations have happened to other communes regarding semi-flooded land around the Yali reservoir.

Mixed crop cultivation is practiced on forested hillsides in Kroong. On cassava and rice fields people grow squash, pumpkins, beans, bananas, pineapples, coffee, and other vegetables. However, this area will be cleared for the Pleikrong Dam. Some families have already received compensation. Banana farms are also appearing everywhere in Kroong village, Ngoc Bay Commune because villagers are compensated if the land has bananas on it. As a result forests and hills are turning into banana farms. One villager said that "it doesn't matter what the land quality is, if it's forest or barren land, as long as we grow bananas on it, we can get compensated, whereas if we reclaimed it and left it idle, we would get nothing."

Picture 4: An upland rice field



Corn Grown on Semi-Flooded Land

Corn grown on semi-flooded land is considered to be the second most important source of income for resettled communities. 40 out of the 49 (82%) families interviewed grow corn on semi-flooded land, on areas ranging from 2,000m² to 20,000 m². In 2003, Ngoc Bay, Kroong and Sa Binh Communes used 350ha, 140ha and 150ha of land for corn, respectively.

A corn crop begins with planting in April and ends with harvesting in September. One of the most difficult things about growing corn is that harvesting needs to be done before September 15 when the dam gates close and the land floods. Seeding early does not work because there is no rain in the dry season. In general, villagers need to take into account two important factors - rain and flooding from the Yali Falls Dam - when growing corn and subsidiary crops on semi-flooded land.

Picture 5: Semi-flooded land used for growing corn



Only a few families buy corn seeds themselves. The hybrid corn seed variety CP-989 as well as fertilizer is sold in village grocery stores. Villagers have two options, they can either borrow money to buy fertilizers or they can just borrow fertilizers. After harvesting they then pay their loans off in corn.

Corn cobs left to dry on the stems are skinned and put into bags and then taken to village grocery stores. Villagers average about 15-20 bags per 1,000 m² of land or about 600-800kg/1,000 m². The income from 1,000 m² of corn is equivalent to 1,000 m² of rice and 1,500-2,000 m² of cassava. Only 5-10% of families grow corn using fertilizers. Most families just prepare the land, and then weed it 2-3 times throughout the harvest.

The two most important crops for resettled communities are corn and cassava. Corn is harvested in September and the harvest goes directly to grocery stores in order to help pay the debts incurred from the purchases of rice, salt, other foods, and fertilizers. People then take out new loans and wait until the cassava harvest to clear off those loans again. If there is any extra money it will be spent on Tet. This is a yearly cycle that medium and low-income families will never get out of. Only families with higher incomes, usually from wet rice or good livestock, can afford to spend money on other expenses. They can be called “rich” when compared to other villagers.

In short, cassava, maize and rice are the main cash crops cultivated in these areas. Only 8 out of 49 (16%) interviewed families produce enough food to feed themselves throughout the year. They are families who can produce enough rice themselves to meet 40-60% of their staple food requirements. The other 84% of families face food shortages throughout the year. Half of these people only have enough food to feed themselves for 4 months out of the year and some of these families only have enough food for 2 months out of the year.

One major factor contributing to this situation is a shortage of agricultural land, especially land for wet rice. And now, in order to make room for the Pleikrong hydropower plant, land for cassava is at risk of being taken away.

Home Gardens

Each resettled family was assigned 1500m² of land after the first move in 1998 and 1000m² after the second move in 1999 for their home gardens. At first, they received agricultural support in the form of young perennial trees. Each family was provided seedlings consisting of 100 litsea, 5 mango, 5 orange or 5 grapefruit, 5-7 durian or 5-7 cashew. All of these young trees have the same value either equaling 1,200VND per litsea, or 25,000VND for each of other fruit trees.

As of now, the litsea tree is the only one that is producing benefits for the villagers. As for the other trees, the orange and grapefruit have all died and most of the mango and durian have problems with diseases and bugs. There are only a few left. Most longan and cashew have not produced any fruit. In short, according to the resettled families, agricultural supports in the form of perennial fruit trees to be planted in home gardens are not productive. The reason that these supports fail is that the number of seedlings provided are too little, the number of those that survive are even less, and the number of trees which then produce fruit are even less than that. Villagers say it's as if these trees are planted just for fun because the quality of the seedlings to begin with is not good. But a local authority said that “these seedlings were given to us by the Compensation Board, so we should use them. Shouldn't we?” According to a local authority's opinion, there is a lesson to be learned from these findings and applied to future resettlement projects.

Pictures 6 and 7: Examples of the inefficient uses of home gardens



Some families have behaved more practically than others. They have replaced the trees given to them by the support program with cassava. Families who already had small upland fields used all of the area provided to them for their home gardens to grow cassava. Other families have also planted vegetables, subsidiary crops, bananas, and pineapples in their home gardens as well as cassava.

Home gardens are also getting smaller as a result of population growth. Growing families need new housing and since there is a shortage of land, these new homes end up being built on land that was previously used as a garden. Program 132 only gave 400m² of housing to each family who did not already have land in resettlement sites.

Home gardens have been used to grow cassava or as mixed gardens with very little efficiency. Small gardens that are optimized for growing cassava are often lacking in other necessities such as wells, drying yards, storage spaces, stables, sheds, bathrooms and kitchens. This often makes houses untidy, dirty and very inconvenient.

2. Planning and Management

There are severe shortcomings in land planning and management as evidenced by the current conditions in resettled villages which are not sufficient to meet the needs of resettled people, especially for agricultural production. The investigation of current use of different sections of land was conducted subjectively by the project management board, the project planners and the resettlement teams, without the participation of villagers. There is a principle of resettlement planning which states that “the resettlement of farmers should be based on land, with the solution of ‘land for land’, meaning that there should be enough land for production in every resettlement area and that the land should be sufficient in quantity and quality. This land can be reclaimed, improved or purchased from local people” (PECCI, *Feasibility*

study, Sesan 3A, Volume 2, Part III, Section I: Some basic principles when formulating resettlement plan, page 23). It seems that in this case this principle has not been seriously followed.

One such example of poor planning involves reclamation and field construction for wet rice production in Kroong and Sa Binh Communes. Wet rice production in these communes is inefficient. The pumping stations still do not work at all, even 3 years after their construction and, as a consequence, people don't have land for growing wet rice. There are many different opinions as to why these failures have occurred, ranging from flawed design, wrong positioning, bad implementation, and the use of low quality pumps, to problems with construction management and the transferring of management between the Yali Management Board and Kontum Irrigation Company and no consultation with local authorities and villagers on the location and no monitoring during construction. It is obvious that, whatever the cause of this problem, it needs to be fixed as soon as possible. "We need to be sure that we don't waste money on these works"; noted the Chairman of Kroong's People's Committee. This is another lesson to take away from this project and applied to other resettlement projects.

Another example is the poor planning and management of upland fields. These fields were not planned and managed based on location and area and as a consequence the reclamation and deforestation by villagers was uncontrolled. The patches of land used are normally far from villager's houses and as a result of monoculture, sloping land, low coverage, and farming without fertilizers the land was degraded rapidly.

Another failure of the planning process is that it has not addressed future projects and the effects of those projects on newly relocated peoples. For example, while planning where resettled communities from the Yali Falls Dam were to be placed it seems as though planners did not consider the possibility that the construction of the Pleikrong Hydropower Project would affect newly resettled sites. Because of this lack of foresight resettled people in Kroong, Ngoc Bay and Sa Binh Communes will lose most of their agricultural land to the Pleikrong Hydropower Project. They will however be able to remain in their homes. According to a discussion with the local authorities, this is one of the most concerning issues for villagers as well as the local authorities.

Other problems have also arisen because of the mismanagement of the reclamation process where land was reclaimed freely and no certificates of land ownership or lease were given to people. All these factors have led to uncontrolled land purchase and rent. The problems surrounding land ownership and the lease and transfer of agricultural land to restaurants, stores and other services in the area surrounding the Pleikrong project's construction site are unsolvable because people in those areas don't have legal status on their land. The renters located on this land received compensation for their crops, while the land owners are still waiting to receive compensation, in land, because of the principle of "land for land". This has caused trouble for local authorities who are dealing with land management, as well as placing a strain on social relationships within the community. The heads of the studied villages and communes' People's Committees have said that as a consequence, people don't believe in the government's policies. A Report from the Kroong Commune's People's Committee in 2003 clearly stated that "stabilizing lives, production and giving agricultural land to people are extremely urgent issues."

3. Impacts of Planning and Management

The absence of planning and management surrounding land use has created negative economic, social and environmental impacts for resettled people in Kontum Province.

Economic Impacts

Resettled people suffer economically because of land shortages and the mismanagement of the agricultural land that is available. As a result of this shortage of land families face long-term food shortages. This is a problem that prevails in most resettled communities in Kontum where 80% of the families interviewed currently face food shortages for more than 4 months a year and others face shortages for up to 10 months a year.

Food shortages force families who don't have enough food to borrow from grocery stores in the village. According to the data from one grocery store in Kroong Klah Village, Kroong Commune, most families in the village are in debt, including the so-called "high income" families. Out of 58 families in the debt book from February 1 to April 20, 2004, 47% (27) borrowed rice, 10% (6) borrowed money, 36% (21) borrowed salt, fish sauce, and soap, 22% (13) borrowed corn seeds, 7% (4) borrowed NPK, and mosquito spray, and 14% (8) borrowed noodles and alcohol. There are two main harvests each year: corn in September and cassava in December and January. Harvest time is when families pay their debts. Paying debts at harvest time has become very popular in the resettled communities and ultimately this has led to a situation in which some families are continuously in debt and have been so for the last 5 years.

A system of monoculture farming without fertilizers reduces the amount of production of main crops such as cassava, corn and upland rice. If this current situation continues as is and no new land for cultivation becomes available, the shortages of food will become even worse.

Things will become even more difficult as land is cleared for the Pleikrong hydropower project, especially for families who will lose their agricultural land to this project. Without land for farming, these families will not be able to clear their debts nor continue to borrow, which is the only way they can support themselves. This is very worrisome for these families.

Social Impacts

Resettled people do not have enough land to produce a stable yield of crops. They live in one place but have to practice shifting cultivation. There is a great demand for land.

Upland fields are far from villagers homes in Kontum. This impacts the social activities of resettled families in a number of ways. For instance, many families do not let their children go to school because they are needed in the fields where they either work or take care of their siblings. Parents who only have young children end up taking their small children to work with them. The whole family stays temporarily in the field during the week and they only come back to their villages on Sunday for church. Villagers need to be informed a week in advance whenever community activities such as village meetings, elections, and weddings take place. If something unplanned occurs such as a funeral or sickness someone needs to travel to the fields to inform them. These conditions have changed the way of life of these people. Most traditional customs such as the new rice festival, and the water festival or water buffalo killing festival have faded away. The Common House now serves as a classroom and it is used for village meetings. Other activities from the Women's

Union, the Youth, or the Veterans are difficult to organize (Party's secretary of Ngoc Bay and Kroong Communes).

One way that resettled families earn a living is by working for other people. This is an option for people who do not own enough land to survive off of it. Borrowing becomes an option for families whose land is of lower quality and who do not have enough money to improve that land. These people take out loans for everything, including all the tools necessary for land preparation such as fertilizers and seedlings. After the harvest all the products are then delivered directly to the store owners or traders in order to clear debts. When and if there is money left over after the debts are cleared it is used for the upcoming planting season but otherwise the same cycle continues again. It is also very common to find poor people who transfer their land rights to other better-off families who grow a lot of cassava, corn and sugar-cane. These poorer people then come back and work on the land that used to be theirs. This contributes to the miserable state of people's lives, especially ethnic people. Instability in production and daily life stimulates negative social impacts. This is also mentioned in other studies on the Central Highlands (Dang Nghiem Van, 1988; Le Trong Cuc, Dao Trong Hung, Chu Huu Quy, 2001, Vu Dinh Loi, Bui Minh Dao, Vu Thi Hong, 2000).

Environmental Impacts

Land shortage has significant impacts on the environment. Resettled communities often clear forested land in order to widen their existing fields. Villagers freely looked for land and as a result old forest, unhealthy forest, hilly bushes, young regenerated forest, and grazing land have been cleared to make more room for their fields. The more fertile patches of cleared land are used for rice and the poorer quality patches are used for cassava or corn.

Once forest land is cleared resettled communities no longer benefit from it. One downside of this includes less access to firewood. Forest clearing makes firewood collection more difficult. All the families interviewed use dried cassava stems or rubber branches as firewood because it has become too far of a journey from the field to the forest. It has also become difficult to find many non-timber forest products like bamboo shoots, mushrooms, honey, and medical herbs. Thousands of hectares of forest land were flattened to make way for infrastructure, housing, roads, restaurants and other services for the hydropower plants. Thousands of hectares more were also used for resettlement sites. And, thousands more have become agricultural land replacing the areas flooded by the reservoir. This has had huge impacts on local communities now, and in the long term it will affect soil erosion and reservoir sedimentation along the Sesan River.

Clearing forests and low coverage, farming on sloped land, and cassava cultivation without fertilizer and manure are all factors that lead to serious soil erosion and land degradation. Crop yields have reduced rapidly from year to year. Once this land becomes unhealthy, communities will have to clear more forest. This has created short-term instability in the region, and if effective measures are not put in place to mitigate it this instability will become a long-term problem.

A decrease in forested and barren land also means a loss in grazing land. Only families with large fields can raise cattle. The main grazing areas are semi-flooded lands in the dry season. However, this land is mainly used for rice and corn and there is not much

grass there to feed livestock. The primary food for cattle is cassava and corn stems. Livestock development in the resettled villages faces many difficulties.

Forests as well as natural water sources close to the villages of Mang La, Ka Bay, and Kroong Klah have been lost. Ground water in these villages also dries out very fast. Each year, villagers suffer from shortages in drinking water for 3-4 months. It is particularly difficult for families who live on sloped land. The water quality in public wells is also very poor. It is turbid and smelly. During the dry season, people go to the fields to get water from Kroong stream. Water shortages are one of the reasons why growing common vegetables such as morning glory, sweet potato, and squash in home gardens has become impossible. These vegetables are very essential for people and livestock.

4. Housing Conditions

Serious degradation of houses in resettled communities is still a problem even 5 years after moving. Some houses are unlivable without repairs and upgrades where the floors, walls, doors, windows and the roof are all broken.

The result of our survey on housing conditions is shown in Tables 3 and 4. The houses surveyed were picked randomly. If the houses were locked researchers just observed from the outside, and in the cases where somebody was home the researchers were able to observe inside. It was discovered that the village headman had also reported on the housing issue to commune and higher authorities. However, no detailed investigation was conducted.

Table 3: Housing conditions in resettled villages – houses built on the ground

Villages	Number of houses surveyed	Number of houses with broken parts				
		Floor	Wall	Roof	Door	Window
Kroong Klah	21	11	11	15	7	10
Kroong Ktu	17	13	7	9	5	9
Ka Bay	15	8	7	7	7	5
Total	53	32 (60%)	30 (47%)	31 (58%)	19 (35.8%)	24 (45.2%)

Table 4: Housing conditions in resettled villages – stilt houses

Villages	Number of houses surveyed	Number of houses with broken parts				
		Floor	Wall	Roof	Door	Wooden stair
Mang La	17	5	6	11	3	7
Konkngo Klah	21	9	8	10	5	10
Total	38	14 (36.8%)	14 (36.8%)	21 (55.2%)	8 (21%)	17 (44.7%)

The results of the housing survey show that:

- Houses built on the ground break more than houses built on stilts. Cracked walls, curved roofs, broken tiles, leaks, broken doors and windows are all very common problems with houses built on the ground. The walls and doors of stilt houses were the least damaged. Stilt houses mostly have problems with their roofs and wooden stairs.
- According to villagers, the reasons for the degradation of houses built on the ground are the low quality of the foundations, and the lack of cement. People can only see sand grains through the broken parts of the floor, not cement.
- Broken roofs, doors and windows occur because of low quality wood, woodworms and termites.
- The wooden stairs leading up to stilt houses are broken because they are outside. Many families have replaced these wooden stairs with cement and brick ones. However, poorer families still use wooden stairs. They have tried to fix them using bamboo or wood but even so these stairs are not safe.
- There are many reasons why new stilt houses are inconvenient for daily life. These houses have no separate kitchens, the stairs are not easy to walk up and down, and they are not stable. Also, low ceilings make these houses hot and stuffy, especially when cooking. The villagers often use the first floor for storage or in the rainy season they sleep there. The ground floor is used as a kitchen, a place to keep animals and a place to do other daily activities. Some families have built brick or wooden/bamboo walls around the ground floor to make it more like a room. However, the low ceiling on the ground floor creates a humid space where air cannot circulate freely.
- In Kroong Ktu and Kroong Klah, the number of houses with broken roofs is greater than in other areas, especially those houses built on hillsides which suffer even more because of the stress from wind and storms. Villagers often use the roof tiles from their latrines to replace the broken roof tiles on their houses. As a result of this practice most of the latrines in lines 3 and 4 of Kroong Klah village have no roofs.
- In general, many houses are broken, some of which are so degraded that they have become unlivable. It is very dangerous to live in these houses during the rainy season and villagers cannot fix the houses themselves, because they don't have enough money to buy needed materials. Thinking about where their food will come from is their first priority (The headman of Kroong Klah village)

Pictures 8 and 9: Housing conditions in the resettled villages





5. Sanitary Conditions

Along with land and housing issues, other things like sanitation, water supply and firewood are also worrisome for villagers.

Latrines are important for the public health within resettled villages especially where there is a limited amount of area allotted for home gardens and where villages are located far from the forest. However, the majority of latrines are unusable (Table 5). They are unusable for several reasons including full tanks, broken roofs, roof tiles that were taken away for houses, and broken doors.

Table 5: The condition of latrines in resettled villages

Village	Number of families surveyed	Latrine conditions			
		Under use	No use	Broken roof	No door
Kroong Klah	21	7	13	15	11
Konkngo Klah	21	9	11	11	9
	42	16 (38 %)	24 (57%)	26 (62%)	20 (47%)

Latrine tanks are often unusable because of design flaws. The tanks are built on the ground at a height of 40cm and there is only one hole at the top and no back door for the solid waste to exit like most other regular latrines. Therefore, once the tank is full the latrine is rendered unusable unless the solid waste is taken out. Villagers have not taken the solid waste out. Using human manure for planting is not a traditional custom of the ethnic people. Some villagers have said that they normally only use latrines during holidays or leisure time since they spend most of their days in the field. However, with the limited amount of land available to these villagers, a clean, useable latrine is an important part of maintaining good health, especially for children. If more care was taken in design, construction, and instruction on use, latrines would greatly improve the general health of villagers (*Chairman of Ngoc Bay Commune*).

Picture 10: Latrines in a resettled village



6. Water Sources

Most families prefer water from wells to stream water, because it is more convenient for them. However, our survey shows that common wells do not provide enough water throughout the year because they dry out from January to March. Alternatively, some families dig their own wells and the water from these private wells is cleaner.

Table 6: The condition of wells in resettled villages

Villages	Number of wells surveyed	Wells with water	Wells without water	Wells with dirty water
Kroong Klah	11	8	3	4
Ka Bay	9	7	2	3
Konkngo Klah	13	9	4	4
Total	33	24 (72%)	9 (27%)	11 (33%)

The rainy season begins by the end of April, but 27% of wells still have no water. Most people usually collect water between 3-5AM because there is more water in the wells, the water is cleaner and they don't have to wait.

The wells provided by the Yali Falls Management Board are dirty. There are several reasons for this, including that children play near and throw trash into these wells, people use the walls of the wells for drying things, and that the cement layer around the wells are broken, causing dirty water to flow back into the wells. This makes the water smelly. In certain places people only use the water for washing their clothes, not for drinking.

Picture 11: A dry well



The well's location is dependant upon the position of the houses that surround it. Normally 6 to 8 families share one well. Some houses in hilly areas are not on any aquifer and therefore their wells only have water in the rainy season.

IV. Conclusions and Recommendations

1. The most problematic issue in resettled villages in Kontum is a shortage of land for agricultural production, specifically land for wet rice. So far the efforts to replace lost wet rice land by irrigation and land reclamation have been ineffective. More attention needs to be paid to the requests of local authorities and of villages by the higher levels.
2. The management and planning of land in the resettled villages should be reviewed. The location and area of land should be transparently assigned to families and the amount of cleared forested land should be monitored in order to ensure ecological sustainability.
3. With a limited amount of land, it is necessary to have effective agricultural supports in order to help people establish sustainable, high yielding farming systems, and to create more jobs based on reasonable uses of uplands, semi-flooded lands, home gardens and wet rice lands.
4. The design and area of houses varies not only by culture but also per individual family. Housing developments in resettled villages should be designed with the needs of different groups of people in mind. The government needs to consult with people carefully before building. Villagers, elders and headmen should be able to publicly monitor construction projects in a transparent way.
5. The planning and construction of resettlement sites is a serious issue and the implementation of this process needs to ultimately help resettled people create a better life for themselves in their new homes and on their new lands. This process should help them develop a sustainable livelihood and add stability to their lives. For this to happen local people need to participate in the planning process and issues such as the location and size of villages, water sources, and forest resources need to be evaluated with their input. This participation will help ensure a successful resettlement process and in the long run create fewer problems with the economy, society and the environment.

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