

Rural Water Transport in the Southern Atlantic Region of Nicaragua (RAAS)

Draft report prepared by Henry Myers



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LIST OF ABBREVIATIONS

BICU	Bluefields Indian and Caribbean University
WB	World Bank
IDB	International Development Bank
URACCAN	University of the Autonomous Region of the Caribbean Coast of Nicaragua
DANIDA	Danish Authority for International Development
USD	United States of America Dollars
C\$	Nicaragua currency - Cordoba
DGTA	General Directorate of Aquatic Transport
EPN	National Port Authorities
RWT	Rural Water Transport
RAAS	Southern Autonomous Atlantic Region of Nicaragua
RAAN	Northern Autonomous Atlantic Region of Nicaragua
GNP	Gross National Product
GDP	Gross Domestic Product
IWT	Inland Water Transport
MTI	Ministry of Transport and Infrastructure
Hp	Horse power

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Executive Summary

The area of study, the Southern Atlantic Region (RAAS) of Nicaragua is sparsely populated, with 22% of the national land area but only about 4% of the national population i.e. about 250,000 out of a total 5.5 million. The average daily wages in RAAS is around 1.5 USD per day. Poverty is greater on the Atlantic regions compared to the rest of the country. Official government statistics show that though poverty reduced over the last five years in most of the rural areas of Nicaragua, in the Atlantic regions the incidence increased from 7.9% of the population to 17%. This situation is attributed to lack of public investment, dispersed population and accessibility problems. Six out of the twelve municipalities in the region are part of the list of the thirty most severely poor municipalities in the country.

RAAS also suffers from the twin problems of being physically isolated from the rest of Nicaragua, and being dependent for most of its general supplies on the west of the country. The absence of a proper transport network between the Pacific and the Atlantic Coast has been the main obstacle for a physical integration between the two halves of the country. The only transport link, apart from air transport, between the capital city, Managua and the Southern Atlantic Region's (RAAS) main town, Bluefields, is the Escondido River (91 km), that lies between Rama and Bluefields, and the main road from Managua to Rama (298 km). The problems are compounded by the need to pay for a combination of (i) road haulage which is expensive because of the poor state of the Managua – Rama road and (ii), for the water transport on the last part of the journey, which is more expensive than road transport because of high handling cost and the use of small vessels.

The Southern Atlantic Region of Nicaragua has only a small network of roads, linking individual towns and communities with their immediate surrounding area. The region is generally of very low lying nature with an annual rainfall of 4000 mm, and large rivers, lagoons, swamps etc., making road construction very costly. All transport between communities and from these to the main population centres such as Bluefields, Rama, Pearl Lagoon, Corn Island, etc. takes place by waterways.

The vast network of rivers and lagoons is used to transport goods, merchandise, agricultural produce and passengers to and from their destination. In spite of this, water transport presents some actual limitations such as: poor physical conditions of the boats, long distances for travelling, safety concerns especially with pangas, reliability and lack of attention to the sector by the authorities.

The Regional Government authorities are convinced that the improvement of water transportation between Bluefields and the other populated centres must be regarded as an essential activity for local development.

The people of the Atlantic Region have always travelled from village to village using different type and means of aquatic transport. For short distances averaging 5 km – 10 km between villages and farms, small dugout canoes (called dories) propelled with hand paddle are used to move from one place to another. For further distances the larger dories are equipped with a sail or outboard engine travelling distances of up to 100 km and above. This type of transport is not structured or organised in any way, there are no public boats offering services between the communities and villages, people either own their own boats or are transported by someone else that does.

Motorization of dugout canoes began during the first half of the 1950s with the introduction of small double stroke diesel engines 7.5 Hp. Later, around the mid 1960 came the pangas, which were constructed previously from marine plywood and fitted with a 40Hp Johnson or Evinrude outboard gasoline engine. Few years later came the 48 Hp Yamaha outboard engines. During the late 1970s, canoe type fibreglass *pangas* fitted with high power outboard engines ranging from 75 Hp up to 200 Hp became popular.

The oldest type of motor boats are the ones referred to as Slow Boats. These are wooden hull boats with inboard diesel engine. They are used to cover large distances and isolated routes, especially where its too costly for the pangas to operate. The locations cover by the boats are mainly La Cruz de Rio Grande, Tortuguero and Rio Grande Barr. These boats range from 30 to 50 feet in length, and make their trip in an average of 16 to 24 hours, travelling at an average speed of 12 km per hour. The boats are used for transport of cargo and passenger.

Boats are for all type of purposes, from work activity, to taking children to school, serving as ambulance and general transport services. Passengers that travel using the boats are merchants, students, and employees of all type, men, women and children. The means of transport mostly used to take out agricultural production from the fields to the communities and later for sale are the dories and small dugout canoes with stationary engines and small pangas. Very few communities in the region have regular transport and in those far away communities the boats arrive every 3 to 5 days, which becomes a limitation in the harvest time. The boat owners that operate in these areas combine transport and commerce, making exchange, buying and selling. Almost all of them are men and own their boats.

Passenger transport fee in *pangas*, is considered high, taking into account the economic condition of the country and the region, added to that, there is a growing concern about its safety. The operating cost for *pangas* and slow boats is made up of crew wages, fuel, dues and maintenance. Fuel represents between 40 and 50 percent of the operating cost. The price at the time of the study was USD 0.46/ litre.

Except for a few individuals who owned several boats, the socio-economic status of boat owners and operators is not high. Most boat owners are unorganised, with poor administrative practice and technical capacity and without any savings. It is a poor option for employment. Demand for boat services is considered low at the moment

because of the poor economic condition in the region and poor conditions of the boats especially those serving the communities north of Bluefields.

At present most if not all of the boat owner finance the purchase of their own boats. This is done either through his or her own savings or entering in partnership. The same goes for engines. Outboard engines are normally purchased new, however inboard diesel engines are imported second hand from the United States or the latest trend is using bus engines and adopting marine parts, such as clutch etc. The purchase of old engines and its rebuilding has seems to be a profitable business. Bank credit, this is not available for the boat sector

The local water transport authority, General Directorate of Aquatic Transport, Navy and the Port Authorities have very little capacity to carry out and fulfil their responsibility properly, due to budget constrains and lack of training. There was tension in the relationship with the local aquatic transport authorities at the time of the study due to several accidents that took place with fatal consequences, cause by overloaded boats and high-speed *pangas*.

For poor people in rural areas of the Atlantic Cost, especially in the RAAS, transport services provided by the informal inland water transport sector ('rural water transport') is the principal means of affordable mobility and access. This mode is particularly important and effective in the wet season, the very part of the year when other transport options (roads) are at their least reliable. There are locations where RWT is effective (notably in isolated rural areas). Though 90% of freight moves by water in RAAS (using the wharves), the sector receives very little attention (only from the Transport Programme). This neglect of national authorities and others that are not acquainted nor understand the importance of water transport in the livelihood of the poor areas, has a significant impact, particularly on isolated communities with fewer assets and limited access to goods, services and opportunities.

Developing waterways provides an opportunity for a more ecologically sound and sustainable system of transportation than roads. In conclusion if the Southern Atlantic Regions economy is going to be develop, it requires that the principal arteries of this body be taken care of, in this case it refers to its rivers, lagoons or its general transport system. Water transport require far less maintenance than road transport, therefore policies and incentive are needed to make it possible for local people to invest in improving their boats and give a better, cheaper and reliable service to the population of the Southern Atlantic Region of Nicaragua

Rural Water Transport in the Southern Atlantic Region of Nicaragua (RAAS)



1. General Background and Objectives

From May to July 2002 a Rural Water Transport study of the Southern Atlantic Region of Nicaragua (RAAS) was carried out, which included field trip to various communities, interviews with the inhabitants of the villages, boat owners and government officials.

This study was part of a wider programme of research that aimed to compare the characteristics of rural water transport operations in different natural environments and socio-economic conditions and use the results to identify the critical success factors associated with low cost rural water transport.

The outputs of the study will provide information for integrating rural water transport (RWT) into rural access planning. The information can then be used to improve the viability of RWT operations and reduce the isolation of poor rural communities in Nicaragua by determining the importance of RWT for the livelihood of the isolated communities in the Atlantic Coast of Nicaragua.

The report describes the role of RWT in the past, how it is at present and possible future trends. What boats are actually use for, type, capacity etc., how owners and crew manage the boats and what are the main restrictions they face actually. From the passenger's point of view, how is the service provided by boat owner's cost of water transport, reliability and safety factors etc.

2. Methodology

The fieldwork was carried in two phases and fallowed up with monitoring trips and interviews. The first period covered one month (May 15 – June 15). During this time a total of 6 communities were visited with the following timing: Karawala from the 15 to 18 of May; Tortuguero 20 to 22 of May; La Cruz de Rio Grande 27 to 30 of May, Tasbapounie 4 to 5 of June, Bluff 9 of June and Rama 11 to 13 of June.

The second phase field work was carried mainly in Bluefields. Boat owners and operators, crew and passengers were interviewed at Bluefields Municipal wharf, the local market landing and other minor landing facilities used for passengers and small farmers. This was done from June 15 until July 15. After this period a constant monitoring, gathering and updating of information accompanied by follow up trips to the various communities was carried out.

During the fieldwork, four students from the local university (BICU and URACCAN) accompanied by the consultant visited the communities. They carried out small participatory workshops with the inhabitants to find out how important Rural Water Transport was for their livelihoods. Twenty two direct interviews were carried out

with boat owners and crew members, and with two female fishing groups, five fishermen's groups, four farmers' groups, national government officials belonging to the General Directorate of Aquatic Transport (DGTA) and with all those who are directly related to the water transport sector.

The consultant would like to express his thanks to Mr. Wesley Lampson Daniels and all the officials from the Nicaragua Water Authorities and DANIDA Transport Programme for their support and cooperation during the execution of this study.

3. Brief Description of the National Economy

Until the late 1970's the Nicaraguan economy had been expanding steadily, with an average growth rate of 5.2% per annum. in the period of 1964 – 1977. But after takeover of the government by the Frente Sandinista and the subsequent nationalisation of much of the economy the GNP fell sharply. Later, the state of the economy worsened with the increasing civil disorder and the trade embargo imposed by the US, which had accounted for over one third of Nicaragua's foreign trade in the 1960s. By 1990 the GDP had fallen to only 59% of the peak level in 1977, and per capita GDP (just under USD 500) was only 39% of that in 1977. Furthermore, foreign debt had risen to USD 10 billion, equivalent to five times annual GDP and 33 times export revenues by 1989. This was the worst debt ratio in Latin America; inflation in the same year was over 4000%. Since 1990, a few years of fragile democracy have produced a measure of peace, but as yet no measure of prosperity. At present, both national and regional economies are very depressed, this situation is seriously compounded by high international debt. Nicaragua owes at present 6,400 million to the world's bankers. Think of this in terms of the individual. There are 5.5 million Nicaraguans to share the burden of that debt, which works out at over USD 1,160 per Nicaraguan man, woman and child. The Gross National Product in per capita terms is USD 2,400 million per annum. So the average Nicaraguan enjoys an income of USD 229 a year with which to repay a dept of USD 6,400 million. The annual export revenue amounts to some 800 million USD. Unless something

extraordinary is arranged by her creditors the country will remain poor for years to come. In spite of all this, there are some signs of recovery in the national economy, but there are still large obstacles to a sustained revival. The main problems at the time of the study were: a high internal, fragile banking system, transparency and governability. Inflation has been put under control and the exchange rate is close to the market rate, but economic recovery has yet to come. Nicaragua needs to increase its production. It is a poor country, a country in need.

4. Brief Description of the Regional Economy

The regional economy served by the port of Bluefields is that of the RAAS. It is sparsely populated, with 22% of the national land area but only about 4% of the national population i.e. about 250,000 out of a total 5.5 million. The average daily wages in RAAS is around 1.5 USD per day, despite having a higher cost of living. RAAS also suffers from the twin problems of being physically isolated from the rest of Nicaragua, and being dependent for most of its general supplies on the west of the country. The problems are compounded by having to pay for a combination of (i) road haulage which is more expensive than average because of the poor state of the Managua – Rama road and (ii), for the last part of the journey, water transport, which in this particular case is much more expensive than road transport because of high handling costs and the use of small vessels.

The main economic activities of the region in recent years have been fishing, some forestry and small-scale agricultural production. There is no manufacturing industry in the region with the exception of three fish processing plants.

Production in the three most important productive sectors of the region, has declined sharply. Shrimp/lobster exports have fallen from USD 60 million to 32 million in the year 2000; timber production has collapsed to negligible levels since 1988 after hurricane Joan and agricultural production has reportedly fallen by 60% in the main surplus area (La Cruz de Rio Grande), as farmers moved out of the countryside into

Bluefields during the civil war. The RAAS, which was previously self-sufficient in agriculture, is now importing about 13000 tons per annum from the west.

The key constraints to the performance of the economy over the last 15 years has



been political influence and lack of investment in the region. A review of the RAAS economy concluded that in terms of physical production there is a large potential for increased production. There are no development plans for the RAAS , or even broad targets, to provide any guidance.

In Nicaragua, poverty is greater on the Atlantic regions compare to the rest of the country. According to official estimates of the Nicaraguan Government between 1993 – 1998 there was a reduction of poverty levels in the rural areas of Nicaragua, except for the Atlantic regions where it increase from 7.9% of the population to 17%. This situation is attributed to lack of public investment, dispersed population and accessibility problems. Six out of the twelve municipalities in the region are part of the thirty most severely poor municipalities in the country. Some comparative indicators are given below.

Comparative Indicators. Southern Atlantic Region and Nicaragua

Indicators	RAAS (%)	Rest of Country (%)
Population	5.5	94.5
Rural population	67.4	33.6
Forestry area	70	30
Urban poverty (1988)	44.4	30.5
Rural poverty (1988)	79.3	68.5
Municipalities in Severe poverty	6	24
Access to drinking water	32.9	65.9
Access to electricity	36.8	71
Formally employed	28.5	44.5
Food basket	+26	100

5. Geography of the Atlantic Coast of Nicaragua



Panga wharf at
Bluefields port.

The Atlantic Regions of Nicaragua, especially the southern part (RAAS), with an average population of 250,000 inhabitants and territorial extension of 15,677 square km in which Bluefields is the main city, is low lying. There are large rivers, lagoons, swamps etc., making road construction very costly to serve the vast, sparsely populated, isolated areas with an annual rain fall of 4000 mm. Actually only short local roads exist around populated centres and all communication traffic takes place via rivers, lagoons or the sea.

Many of the communities, even quite big, well established villages with a considerable population, live without a road system. Vehicles, such as trucks and cars have never entered the location. The infrastructure between the houses and the surrounding agricultural area consists of narrow paths, suitable for people walking and transport on horseback or mules etc.

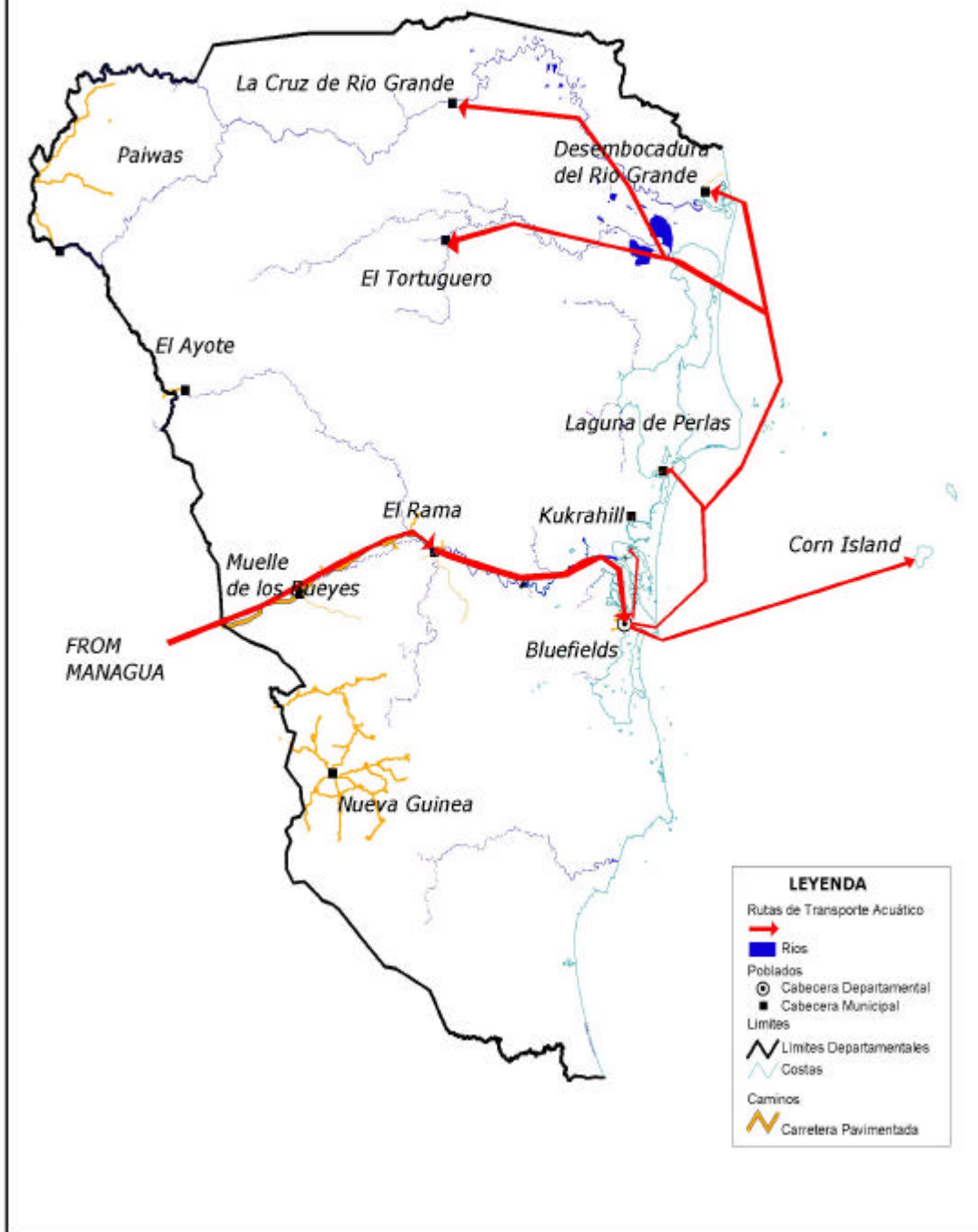
Most of the 64 communities belonging to the area of visit during the study (Tortuguero, La Cruz de Rio Grande and Desembocadura de Rio Grande) have less than 80 families. These communities are very dispersed and barely have a total

population of around 40000 persons, which is less than the population of Bluefields 60,000 inhabitants. The average population density is 6.3 inhabitants per km², in comparison with Bluefields, which is 10.2 inhabitants per km².

In the Pacific Regions of Nicaragua a well designed network of paved roads radiating out from Managua, generally in a reasonable state of maintenance, serves all major populated centres. However this road system only extends to Rama near the border of RAAS and from here further transport towards the South Atlantic Region is by river.

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6. Description of Transport System and Main Aquatic Routes.

The poor state of a road at the time of the study between the Pacific and the South Autonomous Region (RAAS), and the relatively great distances between the city of Bluefields, which is the main economic and administrative centre of the South Autonomous Region, and the other settlements in the region makes it difficult to have fluid communication between the two regions.

As a result of the actual situation, transport, in all its forms and aspects represents one of the major constrains for the development of the Atlantic Region of Nicaragua. The

Bluefields	El Bluff	7 kms
	El Rama	91 kms
	Kukra Hill	32 kms
	Pearl Lagoon	49 kms
	Orinoco	99 kms
	Tasbapounie	130 kms
	Rio Grande Barr	188 kms
	Tortuguero	294 kms
	Cruz de Rio Grande	325 kms
	Punta Gorda	81 kms
	Corn Island	91 kms

lack of adequate means and a coherent transport system is an important restriction for all the economic and social activities in the far away communities of the region, especially when the distances from regional headquarters, Bluefields, to a few population centres is considered.

Passenger and freight transport services within and out of the region traditionally is carried out through two main means: air and road-river. The latter has always and continues to be the most used and least costly, however the longest and slowest.

RAAS, has only small network of roads, linking individual towns and communities with their immediate surrounding area, whereas all transport between communities and from these to the main centre such as Bluefields, takes place by water.

7. Description of the Main Aquatic Routes



Traditional slow boat at Bluefields wharf

The Escondido River from Rama to Bluefields, with the Rama River and Siquia River connecting rivers upstream, form the main artery or route of the river transport system, linking Bluefields with western Nicaragua. It also provides an international route from the Atlantic Ocean to Rama.

The route Rama-Bluefields via Escondido River is the most important transport route of the region. Passenger transport is currently carried out by a motorised vessel belonging to the National Port Authorities (EPN), with a capacity of 100 passengers and a large fleet of fast fibre-glass canoe shaped boats with high power outboard engines (pangas), owned by private individuals transporting around 36,000 passengers per year. This accounts for approximately 65% of the passengers travelling in and out of the region.

Cargo on this route is carried out by small wooden launches, former fishing vessels and the flat top barges operated by tugboats. The quantity of cargo estimated to be transported between Rama and Bluefields is around 60,920 tons per annum. The cargo that flows down this river comes from the west of the country. The cargo is made up of agricultural produce, construction materials, all type of goods and merchandise. All supplies coming into the region either comes in via air freight, which is very little, but the vast majority use the road-river route.

For the average 36000 passengers that travel this route, the journey begins in Managua at the bus station. The buses are US second hand yellow school buses in very poor condition. They depart at 10:00 pm travelling the 320 km journey in an average 8 to 10 hours arriving in Rama at 6:00 am, then joining a panga that takes them to Bluefields, along the Escondido River in 2 hours. The cost of this trip is (C\$ 180.00) i.e. USD 15.00. The buses that are used normally travel loaded, inside and on top, four passengers are forced to sit in a seat design for three, luggage is packed into the alleys, there are frequent engine or tyre breakdowns before arriving, and poor road conditions convert the trip into a very rough and hazardous journey.

Other important routes are the following:



The coastal canal (canal intercostero) from Escondido River northwards connects to Pearl Lagoon and further

on to Top – Lock lagoon and with a further northwards canal stretch linking to Rio Grande de Matagalpa. From Rio Grande a partly natural canal conducts further northwards as far as Sandy Bay Sirpi near the northern border of RAAS. In the long term possibly the canal could be extended further north to connect to Puerto Cabezas in RAAN via a series of lagoons and natural waterways.

The coastal canal / Pearl Lagoon area holds a series of quite important agricultural /fisheries communities such as Kukra Hill, Halouver, Pearl Lagoon, Orinoco, Marshall Point, Tasbapounie and others.

The above mentioned route connects to two important waterways:

(i) Rio Kurinwas connecting at Top-Lock and leading to the important settlement of Tortuguero where there is a combination of cattle and basic grain production. The wishes of the people of this area are that some day they will be able to have a road link with the Pacific Coast for commercial purposes. There are around 2100 families living in this area, who are dedicated to cattle raising. There are 3 small medium size wooden launches that cover the route twice per month. The boats are dedicated to taking freight to Bluefields and Rama loading indiscriminately passengers and all type of goods, including cattle. They do not have a fixed schedule. The boats cover the zone gathering or waiting for produce to take to Bluefields or transporting drinks, domestic goods, material etc., to the village. In Tortuguero there are 8 well-established shops, offering clothing, and other goods. A great part of produce is destined to self-consumption, except for the harvest season.

Traditional slow boats (launches), that cover the route to La Cruz de Rio Grande and Tortuguero.



(ii) The other important settlement connection is the Rio Grande de Matagalpa along which extensive agricultural and cattle areas lie, as well as communities such as La Cruz de Rio Grande, Kara, Karawala, Barra de Rio Grande. Prior to 1979 most of the commercial activity in the area was in the hands of Chinese merchants. In this area there are 34 communities and some 3500 families. The main produce are beans, maize, plantains and some cattle. Others also cultivate vegetables (tomatoes, cucumber, carrots), cassava and other roots for self consumption. Except for a few farms that are dedicated to cattle rising the remaining of the local economy is based on subsistence.

Due to the characteristics of the two settlements, its inhabitants are considered to be the most isolated people living in the country due to the lack of transport. Actually a fast panga covers the trip in 5 hours; meanwhile a slow boat with a stationary engine with a capacity to 10 to 15 tons makes the trip in an average to 30 hours. Some of the population commercialise their produce with merchants who travel with these boats due to the time and the cost they will pay if they travel themselves.

Southwards of Bluefields some smaller settlements lie around Bluefields Bay, but in order to reach the furthest communities the boats have to pass via the open sea, southwards via Monkey Point, 50 Km south, where a small community is located, and further on to Barra de Rio Punta Gorda and the coastal areas of southern RAAS all the way to Rio San Juan near the Costa Rican border.

All the above-mentioned communities and agricultural / fisheries areas have Bluefields as their main administrative, cultural and commercial centre and most of the transport needs are expressed as to/from Bluefields.



Boat loaded ready for departure to Tortuguero

The means of transport mostly used to take out agricultural production from the fields to the communities and later for commercialisation are the dories and small dugout canoes with stationary engines and small pangas. Very few communities in the region have a fluid transport and in those far away communities the boats arrive every 3 to 5 days, which becomes a limitation in the harvest time. The boat owners that operate in these areas combined transport and commerce, making exchange, buying and selling. Most of them are men and own their boats.

8. Improvements of the Road System in RAAS

At present 80 km of the 320 Km Managua – Rama road. is being reconstructed by the Danish Government (Danida). The remaining section of 208 km of this road is also under reconstruction financed by IDB and WB.

At km 223 on the Managua-Rama road a paved road branches south-east to Nueva Guinea, approximately 50 km down the road. MTI is working through its planning department on the pre-investment studies of a road from Nueva Guinea to Bluefields, at a distance of approximately 90 km. Sections at both ends were opened in 1985 as narrow earth/gravel tracks, but the central section (approx. 60 km) passing partly mountainous areas and partly swampy areas, has not yet been touched.

To complete this road to a reasonable standard is a very costly project and it is not likely to be found feasible for a considerable number of years. When financing eventually becomes available, the road could probably be completed in 3 – 5 years time. The government has obtained funding to carry out pre-investment study of the road from the World Bank. Preliminary estimates indicate that the cost of paved road in these areas is approximately USD 300,000 per kilometre equivalent to 27 million US dollars.

At present most goods come to Bluefields from Rama and part of it is distributed further to the communities. If, in the future, a road via Nueva Guinea is constructed to Bluefields, this port will serve as distribution centre for RAAS with ship connections to communities and road connection to Western Nicaragua.

Another possibility is the road Kukra Hill – Rama (50 km). There are no specific plans at the moment for this road, however it could be another possibility of linking part of the region to a national main road network.

Finally the road Tortuguero – El Ayote (60 km), which is long time demand from the population of these isolated areas. This road is actually a track that has been opened a couple of years back. This track is not in use due to the constant rains and water crossing required.

9. Air Transport

At the time of the study they were three airlines – Costeña and Atlantic and Aero Segovia that served the domestic flights to the Atlantic Regions (RAAN and RAAS). Bluefields, Corn Island and Puerto Cabezas have runways. The area is served by some 5 flights per day from/ to Managua. At least 3 daily flights link Bluefields, to Corn Island and 2 weekly flights link Bluefields to Puerto Cabezas in RAAN. The average cost of a round trip is 85 – 90 USD. The air connections constitute a high cost and low volume transport links with limited significance for the general goods movement in the region. For passengers needing to travel quickly to Managua (1 hour flight) it is a good alternative. About 50 passengers were found to fly daily to Managua during three days of monitoring. These were made up mainly of foreigners, tourist, government official and workers of international organizations.

10. Description of the History of IWT in RAAS.

Aquatic transport constitutes the principal form of transport for the inhabitants of the Atlantic Region of Nicaragua. The people of this low-lying region have always and continue to travel from village to village using different forms of aquatic transport.

Dories

One of the most common means of transport is the small dugout canoe known locally as *dories*. These dories normally travel short distances, between 5 km – 10 km, because paddling propels them in the majority of cases, but in some cases sails are used to help in the navigation for longer distances. Dories are used for work, pleasure and social activities. They can be observed on the crossing of rivers and lagoons, with children attending school from one side of the river bank to the other. They are used for carrying patients to health centres, and for social activities such as going to church. Farmers use the dories to move their produce from the farms to the markets. Local fishermen also use these dories for fishing and shrimp catching. Men mainly own dories and it's the basic means of transportation.

Dories are the oldest type of transport know by inhabitants of this region. The dories are constructed from large trunk trees that are dugout using basic hand tools and finally shaped to a canoe. Dories can range from a small 8 feet to 20 feet in length. The time take by a person to cut down a tree and make a dugout canoe is an average of 3 weeks depending on the size. Prices range from USD 350 to USD 800. After a devastating hurricane which struck the area in 1988, a large area of forest was destroyed reducing the practice and construction of dugout canoes.



Wooden dories use by farmers to transport their produce to markets in Bluefields

It wasn't until the early 1950's that motorization of the dories began in a relatively big way, with the introduction of small double stroke diesel and gasoline engines (7.5 Hp). These engines were installed in the larger dories and then they received the name of (Pok – pok), which makes reference to the sound of the engine stroke. These *pok – pok* were mainly owned by big farmers and the successful fishermen. The characteristic of these *pok-pok* were their noise and smoke. They were used to transport cargo, farm produce and fishing. It is considered that this was the first step of motorisation of the inland rural water transport.

Once these small engines were installed the boat increased its value by USD 800. These *pok pok* are similar to the long tails boats in Asia, but instead of the long tails,

the have a small manoeuvring keel and the engines and boats are smaller. The cost of a *pok pok* at that time was around 1300 to 1500 USD. They are no longer being used as a means of rural transport for passengers, only for the transport of heavy construction material, such sand, steel and lumber and stones. Also a major factor contributing to its abandonment was the trade embargo imposed during the civil unrest, which made it difficult to import diesel engine and spare parts from the United States of America. Gradually as the *pok pok* boats went out of use, outboard engines came into the scene, replacing the inboard engines.

The small outboard Yamaha engines (9.9 Hp to 25 Hp) are easier and more versatile to use. The owner of an outboard engine could hire, move his engine from one boat to another with ease. The price for a small outboard engine is USD 1200. The dories with outboard engines are the most common means of transport used by farmers and fishermen. They are mainly owned by men and used for the transport of cargo, goods and passengers. The owner of a dory with a 25 Hp outboard engine is considered to have certain status due to his capacity for mobility within the community. Besides taking his own produce to sell to the market in Bluefields, he purchases produce from the smaller farmers to sell at the market. He also brings along passengers who need to travel to Bluefields or back to their communities and farms.

Dories with outboard engines travel mainly within relatively short distances from the rivers and farms to the population centres. Most are located in and around the Bluefields area. Travelling distances varies in terms of time from 3 to 5 hours (15km to 75km).

Most if not all social services are located in Bluefields (Regional hospital, higher education, markets, government offices, etc.), which makes it the main attraction point of the region. Mostly it is men who travel to Bluefields to sell their produce, buy groceries and carry out administrative activities. Women travel to attend the health centres, carry their children to the hospital and register them in school and purchase groceries along with their husband to take back to their farms and

communities. Demand for transport services is relatively higher in the communities north and south of Bluefields.

Pangas

Panga wharf in Bluefields



Another type of water transport used by the inhabitants of the region, which became popular after the *pok pok*, during the early 1970s, are the pangas. Pangas were originally constructed for the transport of passenger between Bluefields and El Bluff, and for short distances. The first type of pangas were made from marine plywood and equipped with a 40 Hp or 48 Hp outboard engine, Johnson or Evinrude with a capacity of 8 passengers.

The Bluff is only 7 km distance from Bluefields (crossing Bluefields bay). The actual cost of a round trip is 40 Cordoba (USD 2.8). A child studying in Bluefields pays 800 Cordobas in transport per month (USD 55) to attend school.

Since 1990 and up to the present day, pangas have become the main means of transport of passengers between Bluefields and Rama, Bluefields and Pearl Lagoon and other distant communities. Also apart from a few fishing boats (50), pangas have also become the means for lobster fishing activities. During the course of this study

there wasn't a proper count of *pangas* in the fishing activity, it was estimated that more than 350 *pangas* are used in the fishing activity, mostly in Corn Island and the fishing quays, which is much more than the transport fleet.

The canoe type fiberglass *pangas* fitted with outboard engines ranging from 75Hp to 200Hp Yamaha are the most common. They are owned by individuals and public institutions. About 45 *pangas* operate in the public transport sector covering the principal routes. These *pangas* are responsible for the transporting around 85% of all public transport in RAAS, some 75,000 passengers per year in the different routes, especially between Rama and Pearl Lagoon..

Pangas are very fast and cover large distances in a short time. A 200 Hp engine travel at an average speed of more than 50 km/hour, consuming an average of 1.7 lt of gasoline per km at a cost of USD 0.54 per litre. They are responsible for transporting passengers between Bluefields, Rama and Pearl Lagoon and other communities in the area. To travel to Rama from Bluefields the *pangas* departure from the Municipal wharf at 6:00 am, arriving at 8:00 am. Their capacity varies between 16 to 20 passengers, which is considered to be overcrowded by most passengers. The travelling conditions are not adequate or safe, but it's the only option for a big majority of the population. The cost of a one way trip to Rama is 120 Cordoba and to Pearl Lagoon 70 Cordoba. These are the routes that traditionally are covered by the *pangas*.

They are other special routes to Tasbapounie, where the condition is that to be able to make the trip, the operator has to carry a minimum amount of passengers. If during the day, there is less than a certain amount the trip is cancelled until enough passengers are available to cover the cost. This has been one of the main complaints by the passenger, who have to spend more money for the extra day or two stay in Bluefields. The cost per passenger to Tasbapounie is 150 Cordoba, and to Karawala 220 Cordoba one way.

The high operating cost of these outboard engine has resulted in a high cost of transport, On the other hand, spare parts for these engines are costly. Maintenance of the engine is carried out every 8 months at a cost of USD 450.00.

The trend in the last 10 years has been the introduction of Japanese Outboard Engines (Yamaha), used by small-scale farmers and fishermen. Engines ranging from 9.9 Hp to 25 Hp, 75 Hp with an average cost of USD 5,500 are used in fishing (capture of lobster) and engines ranging form 175 Hp to 200 Hp with an average cost of USD 12,000 are used for public passenger transport.

The small engines are used to propel the dugout canoes and the bigger engines to propel the large fiber glass *pangas* boats 25 feet in length and 6 feet wide.

Fishing vessels use for transport of cargo between Rama and Bluefields and Corn Island.



Motorized launches

These are called the slow boats and they cover the various routes, reaching the far and isolated communities where it is expensive for *pangas* to operate. The locations cover by the boats are La Cruz de Rio Grande, Tortuguero and Desembocadura de Rio Grande. They are mainly wooden hull boats ranging from 30 to 50 feet in length. These slow boats, cover their route in 16 to 24 hours, travelling at an average speed of 10 km to 12 km per hour. In the dry season the trip is even longer. The boats are used for passengers, but mainly cargo. These boats transport cattle, pigs, chicken,

grains, material and people all under the same roof. Conditions are very unhealthy and safety is always of great concern for passengers using these boats. The services provided by these boats could be considered as Rural – Urban Transport.

The slow boats are equipped with inboard diesel marine engine ranging from 85 Hp to 300 Hp, consuming some 20 liters per hour. The fleet of these boats has been greatly reduced in the past decade. The reduction of the fleet is attributed to reduction in lumber availability for replacement of planks, engine spare parts (80% of the engines are General Motors Marine Diesel Engines), and the economic conditions of the country. The capacity of these boats range between 20 to 35 tons.



Maintenance work on the hull and engine, depending on the type and complexity is carried out in Bluefields and Pearl Lagoon. The boats should go into maintenance at least once per year, but this is not the practice, maintenance is only carried when the condition is so bad or the boat is about to sink. Although this is quite dangerous, maintenance is not very much on the agenda except for the emergency repairs. Facilities for boat repair are limited, and only three dry docks exist in Bluefields. 75% of the boats surveyed (12) were in poor physical conditions (rotten planks, engine failures). The average time a boat is in repair is 3 to 4 weeks with an average cost of USD 2000 excluding material cost.

Engine repair is done only in Bluefields. There is one machine shop servicing the boats and a hand full of mechanics that repair the engine. The mechanics have learnt the trade by experience, without any formal training. A day work for mechanics depending on the complexity begins at 10 USD up to 20 USD per day.

98% of these boats are owned by men. There is only one woman owner. Decisions regarding the boat operation are taken by the owner or by the captain of the boat. Crews are made up of between 3 and 4 members including the captain. Earnings are shared according to the profits. The traditional arrangement is 30% of the profits of a trip are shared between the crew; the remaining 70% is for the owner who is responsible for the maintenance and operation cost. Friendship and family members of captain or owner employ the crew.

Except for a few individuals who owned several boats, the socio-economic status of boat owners and operators is considered medium. Most boats owners are unorganised, with poor administrative practice and technical capacity and without



any savings. It is not an attractive option for employment. Demand for boat services is considered low at the moment and this is attributed to various factors such as poor economic condition in the region, poor conditions of the boats especially those

serving the communities north of Bluefields. The slow boats do not have a fixed schedule of departure and arrival, making it very difficult for passengers to rely on them.

Regional economic conditions contribute to the lengthy stay in harbour, due to lack of freight and passengers to return back to the community. The boats are tied up at the wharf 2 to 3 days before they returned to their place of origin waiting for enough cargo and passengers to return. The boats work only 40% of the time. Boat owners and crew could be very busy when looking for and storing freight.

It is difficult to determine, but it seem that speed has become an important aspect for passengers, in the sense that passengers are choosing to travel more often in pangas than slow boats even though the cost is more than double in some cases. Another important aspect that is contributing to this trend is the reliability of the slow boats. In some cases the long trip is not the main issue, in comparison with when the boat will depart and what are the conditions the physical conditions.

Seasonal variation is not relevant in most part of the region, except for two areas known as Top Lock lagoon, and the entrance to Pearl Lagoon where low tide affects the passing of the bigger boats (> 50 feet) especially those with deep draught when passing shallow waters.

The operating cost for these slow boats is made up of: crew wages, fuel, dues and maintenance. Fuel represents an average 40% of the operating cost. The price at the time of the study was USD 0.46/ litre.

The passengers who travel are merchants, students, men, and woman, in fact all the spectrum of society. From Bluefields to the communities passengers carry basic goods (medicine, batteries, flour, sugar, fuel, etc.), back to their homes. When coming to Bluefields they transport produce from their farms and minor cattle for sale. Major constrains for passengers is reliability, safety and proper conditions for travelling. The boats are not designed to take large amount of cargo and passengers at the same time, but due to the circumstances people are forced to travel in whatever conditions.

Fare levels are considered high in certain routes, but cheaper than *panga*. However some passengers according to the interview are willing to pay little more if a reliable, schedule and comfortable boat service is provided.

The boats carry all type of cargo, from basic grains to construction materials, vegetables, fruits, cattle, pigs, chicken etc. The cargo is normally owned by merchants or farmers who contract the boat for a chartered trip or the cargo can be placed in the boat for payment on a unit basis. Cargo flows in both directions, to and from Bluefields. Due to the decline of the regional economy in the region, demand for transport of cargo services is low, which is also the main reason for the long waiting time. The method of payment in many cases is via produce or the boat owner has to wait until the produce is sold at the market to receive his payment. The average cost for cargo transport is USD 28/ton at a distance of 250 km.

Cargo Flow

The municipal port in Bluefields handled 60,920 metric tons of cargo in 2001, according to statistics compiled by the municipal port authorities. The statistics are kept in a rough form. Of this total 85% goes to/from Bluefields. Most cargo is to/from Rama. In 2001 this route accounted for 85% of Bluefields cargo. In comparison the cargo distributed locally, to/from outlying areas to the north and south of Bluefields is relatively small. It accounts to only 8% if El Bluff and Corn Island are excluded.

The majority of cargo is inbound to Bluefields and outbound in the other routes. There are no discernible seasonal patterns in the cargo traffic. The main group of cargo are agricultural and food supplies, general cargo and construction materials. In fact the area is dependent on supplies from the west for most goods except for wood and fish.

Domestic Cargo handle at Bluefields in 2001.	
Food	
Basic Grains	6720 ton
Vegetables	6456 ton
Flour	1920 ton
Sugar and derivatives	1169 ton
Alcoholic Drinks	6383 ton
Edible oils	800 ton
Construction Materials	
Cement	10120 ton
Construction material	4500 ton
Metal Products	7206 ton
Chemical products	967 ton
Others / General Cargo	14679 ton
Total, inbound	60920 ton

Distribution of cargo per route

Route	(metric tons)	%
Bluefields	60,920	100
Others:		
Corn Island	3660	6
Kukra Hill	1828	3
Pearl Lagoon	1220	2
El Bluff	1218	2
Tortuguero	608	1
Orinoco	260	
Tasbapouni	240	
La Cruz de Rio Grande	223	
Karawala	184	
Barra de Rio Grande	74	
Cocal	56	
Punta Gorda	20	
Miscelaneos	15	
Total, others	9606	15%

Source: Bluefields port municipal administration

It must be noted that the statistics presented correspond only to the cargo handle at Bluefields quay, outbound to the other routes. In the case of Corn Island, Bluff, Pearl Lagoon etc., most of the cargo is loaded in Rama and transported directly to these communities. In these cases it was difficult to find out the amount of exact quantity of cargo travelling in these routes. However from a rough estimate of the trips made by the boats and their capacity it is estimated that apart from the 9606 tons outbound directly from Bluefields, there is another 12,000 tons transported that does not land in Bluefields.

Actually, there is a relatively well defined mode of operation between the two predominant mode of water transport. High-speed pangas cover the short distances and highly populated centres i.e. 100 km distance transporting mainly passengers. Slow boats travel longer distances, to further isolated areas covering from 200 km or more per trip, one way. The average freight transport cost is C\$ 3.3 ton/km.

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Input Data	Units				
Basic Data					
Boat Name		Panga	Fast Boat	Slow Boat	Big Boat
Boat Type (Engine/Non-Engine)		E	E	E	E
What is principally carried?		Passenger	Passenger	Cargo	Cargo
Average length of boat	metre	6.0	11.0	15.0	20.0
Average Life of the boat	year	5	10	10	15
Operating Characteristics Data					
Average Payload in rainy season	kg	1200	10000	22750	50000
Average payload in dry season	kg	1200	8000	20000	50000
Average km per month in rainy season	km/month	2000	2880	2880	1600
Average km per month in dry season	km/month	2200	2880	2880	1600
Average working hours per day in rainy season	hrs/day	4	12	12	12
Average working hours per day in dry season	hrs/day	5	12	12	12
Average Speed rainy Season	km/hr	50	20	14	15
Average Speed dry Season	km/hr	50	18	12	15
Average number of passenger rainy season	no	14	35	10	10
Average number of passenger dry season	no	15	30	15	10
Average number of crew in rainy season	no	1	3	3	4
Average number of crew in dry season	no	1	3	3	4
Cost Data					
Purchase Cost (Financial)	Cordoba	180000	500000	450000	800000
Average maintenance cost per month rainy season	Cordoba/m	1000	4500	3000	4500
Average maintenance cost per month dry season	Cordoba/m	1200	5000	4000	6500
Annual Overhead Cost	Cordoba/m	12000	30000	30000	45000
Crew Wage per crew per day rainy season	Cordoba/c	300	400	400	525
Crew Wage per crew per day dry season	Cordoba/c	300	400	400	525
Fuel Cost (in local currency)	Cordoba/lit	7.5	6.5	6.5	6.5
Lubricant Cost (in local currency)	Cordoba/lit	10	10	10	10
Other Data					
Annual Interest Rate	Per cent	18			
Length of rainy season (months)	no of month	8			
Length of dry season (months)	no of month	4			
Currency Unit		Cordoba			
Exchange rate to US\$ (local currency/US\$)	Cordoba/U	14.6			
Fuel Usage	km/litre	1.25	0.52	0.88	0.3
Lubricant usage	km/litre	12	9	14	7
Calculated Values					
Average payload	Tonne	1.20	9.33	21.83	50.00
Annual km	km/yr	24,800	34,560	34,560	19,200
Average working hours per day	hrs/day	4.3	12.0	12.0	12.0
Average speed	km/hr	50.0	19.3	13.3	15.0
Average no of passengers	no	14.3	33.3	11.7	10.0
Annual Maintenance Costs	Cordoba	12800	56000	40000	62000
Average number of crew for operation of boat	no	1.0	3.0	3.0	4.0
Crew costs per hour	Cordoba	69.2	100.0	100.0	175.0

Boat Operating Costs (Cordoba/km)

	Panga	Fast Boat	Slow Boat	Big Boat
Depreciation (Cordoba/km)	1.45	1.45	1.30	2.78
Interest (Cordoba/km)	0.65	1.30	1.17	0.00
Maintenance Cost (Cordoba/km)	0.52	1.62	1.16	3.23
Crew Wages (Cordoba/km)	1.38	5.17	7.50	11.67
Fuel Cost (Cordoba/km)	6.00	12.50	7.39	21.67
Lubricant Cost (Cordoba/km)	0.83	1.11	0.71	1.43
Overhead (Cordoba/km)	0.48	0.87	0.87	2.34
Total Operating Cost (Cordoba/km)	11.32	24.02	20.10	43.11
Total Operating Cost (US\$/km)	0.78	1.65	1.38	2.95

During the past two years, relationships with the authorities have become tense. There have been several accidents that have occurred caused by overloading boats and high speed pangas. This has put some pressure on the authorities and they are now trying to force regulations that either cannot be met by the boat owners due to investments to be made, but which threaten withdrawal of permit operation. The regulations include having life jackets for every passenger, to radio communication, running lights, extinguishers, life craft, first aid kit, etc. To fulfil all these requirements and investment in the order of USD 1,200 is needed.

11. Rural – Rural Water Transport

As you travel away from the main port of Bluefields, rural – rural water transport becomes more visible. Rural – rural water transport is predominant in the villages that are most distant for municipal headquarters. For this type of transport dories are used to travel from one village to another or from one farm to another, within the same area, covering distances of up to 5 km. This type of transport is not structured or organized in any way, there are no public boats offering services between the communities and villages, requiring the individual that needs to travel, to organize his/her own transport either by asking someone to transport him/her or if he owns a small dory he/she makes the trip.

12. Rural – Urban Water Transport

Farmers selling their produce at a local market wharf in Bluefields.



Rural – urban water transport on the

Southern Atlantic Region of Nicaragua, is the predominant mode of transport and it is mainly offered by private slow boats and panga owners covering the municipal headquarters from and toward Bluefields. The main trafficked routes are Rama - Bluefields, Bluefields – Pearl Lagoon and to a less extent Bluefields – Corn Island which is covered by bigger seagoing boats. Except for the route Bluefields – Rama where there is a state own vessel operating three times per week, all other routes are serviced by private boat and panga owners.

Until the 1970`s most boat operator would contract a boat builder to construct a wooden boat. This activity decreased during the civil unrest in country during the 1980`s. In 1988 a hurricane struck the area, which affected the supply of wood for boat construction and increasing the price of the wood. This was one of the factors contributing to the fast growing use of fibreglass material for boat construction. At present most operators get their boat by remodelling old fishing vessels or buying old scrap boats in the US and transporting them to Nicaragua for rebuilding. This is also the case for engine spare parts. Engines and spare parts are introduced from the US as rebuilt engines and sold to operators at prices ranging from 4500 USD to 6000 USD. These engines are mainly Detroit Diesel GM marine engines. There is a good

market for spare parts in the study area, however due to high taxes (32%) and capital investment associated with the import of spare parts, people are at the moment obtaining spares from Yellow School Bus engines where possible and from other old engines. The time operators take to recover their investment varies from 3 to 5 years.

Environmental issues in the Rural – Urban transport, especially the contamination activity cause by boats operating in the various routes is a problem well known to the authorities and local government officials. The waste disposed by boat users and operators without any treatment; cause the main form of contamination. These consist of throwing into the water all type of garbage, dumping burned oil, plastic containers and basically any thing that is not of use. This is commonly observed in the areas around the landing sites and main wharves.

When questioned about the issue, boat owners responded that they were aware of the consequences of their action, but that they had no other choice. The boats did not have facilities for storing garbage and there isn't any infrastructure setup for its treatment and disposal. The municipality has recently made up terms of reference to carry out an environmental impact study of the Bluefields Bay, and the handling of solid and fuel waste caused by the boats. Finances for this study is still being looked for.

Another environmental aspect is to do with sedimentation of the rivers and lagoons. The local university BICU recently concluded a study that states that sedimentation of the Escondido River and Bluefields bay is cause by deforestation in the higher areas of the basin. The sector is aware in some aspects about environmental issues however at the moment authorities are more focus on regulation and safety concerns.

13. Government policy toward water transport

The Ministry of Transport of Infrastructure (MTI), is the government body who owns and is responsible for the operation and maintenance of the road and water network in the country. Nicaragua does not have a transport policy, even less a water transport policy. Within MTI are the DGTA and the Navy. The Navy acts like a sort of water police. DGTA is responsible for the registry of vessels, and carries other regulatory functions. In general the water transport authorities have very little capacity to carry out and fulfil their responsibility properly and their activities are mainly focused on the international wharfs. At the moment there isn't enough supervision at the different departure and arrival posts. Neither does there seem to be a clear and well defined responsibility between the various authorities.

To give an idea of how important aquatic is to the national authorities, there are 3 inspectors, 1 secretary and 1 director to cover 15,000 km² and attend more than 500 boats. The Aquatic transport authorities budget, 1.8 million Cordoba, is less than 0.05% of Ministry of Transport budget which is 33 million Cordoba (Budget 2002).

The water transport sector needs attention, it has been totally neglected and abandoned, which is a serious problem for the Atlantic region inhabitants, because it's the only way of communication, there isn't any road alternative. Help is required in making the national authorities aware of the serious neglect and abandonment by the national authorities regarding aquatic transport.

Boat owners expressed that the main obstacle for the improvement of the sector is an incentive policy and facilities to purchase new inboard diesel engine without paying high import tax. Other areas that also need attention are the administration of small boats: boat owners need to be trained for to become more business oriented owners and technical studies and design improvement need to be made to make their boats more fuel-efficient.

Boat owners are not organised. All of them are looking to survive in the environment of looking for passengers and freight, and do not see any advantage or reason for organising. Most boat owners believe it could be a good idea, though they are not sure who will fund such an organisation or what benefits they will get.

At present most if not all of the boat owner finance the purchase of their own boats. This is done either through his or her own savings or by entering in partnership. The same goes for engines. The only owners who have obtained pangas through their work place are the fishermen. At times there are schemes from which the fishermen get their boat and fishing gear from the fishing company and pay back with the fish product. In this way most of the fishermen have obtain panga and outboard engines. Outboard engines are normally purchased new, however inboard diesel engines are imported second hand from the United States. The latest trend is to use bus engines and adapt the marine parts, such as the clutch. The purchase of old engines and its rebuilding seems to be a profitable business.

There is little or no bank credit available for the boat sector. Regionally there are only 3 banks. Bank interest rate is at 18% per year and informal credit is 3% per month. Bank officials argue that in the past they have given loans to boat owners which resulted in bad credit. So far loans are very difficult to access and if obtained the guarantee required is in the order of three time the value of the loan.

14. Description of Aquatic Infrastructure

Access to formal facilities is not a major obstacle. A Transport Sector Programme financed by Danida has rehabilitated and constructed the principal wharf infrastructure in the region. The facilities are in good conditions except for the Bluefields municipal wharf which is heavily over crowded, and needs its perimeter defence system repaired and a new cargo wharf constructed.

. The municipalities and some larger well organised communities are responsible for the operation and maintenance of their landing facilities. The maintenance is funded from the fee charged for landing and for using the wharf. For landing C\$ 10 is paid per day and use of the wharf for cargo is C\$ 20 per ton.

Rama has excellent cargo wharf at Arlen Siu II with high capacity, and the passenger wharf near the centre of Rama is also in very good conditions.



At Bluefields the main port facility is the Municipal Pier, near the town centre, handling the majority of the cargo traffic and the public passenger movement. This facility is in a somewhat deteriorated state, but is found to be a sound main structure worthy of rehabilitation. Bluefields is serving at the commercial, administrative and cultural centre of RAAS and communication with this centre is regarded as absolutely essential to all the outlying communities, especially as it is the market place for selling products and purchasing items for daily needs.

Other communities such as Kukra Hill and Pearl Lagoon have recently reconstructed pier facilities with Danida`s assistance.

Wharf constructed
by Danida
Transport
Programme in Corn
Island



15. Development of motorised boats and its organisations in the region

For poor people in rural areas of the Atlantic Coast, especially in the RAAS, transport services provided by the informal inland water transport sector ('rural water transport') is the principal means of affordable mobility and access. This mode is particularly important and effective in the wet season, the very part of the year when other transport options (roads) are at their least reliable. There are locations where RWT is effective (notably in isolated rural areas).

For example, figures demonstrate that while almost 90% of freight moves by water in RAAS (using the wharves), the sector receives very little attention (only from the Transport Programme) devoted to transport infrastructure. This neglect of national authorities and others that are not acquainted nor understand the importance of water transport in the livelihood of the poor areas, has a significant impact, particularly on isolated communities with fewer assets and limited access to goods, services and opportunities.

Wharves also are also environmental sound infrastructure, because they have the potential to provide a more ecologically sound and sustainable system of transportation than roads. When it comes to maintenance, waterways need very little maintenance. Therefore the statement roads instead of wharfs in our context is far from being a realistic sound decision.



Large dories unloading sand for construction.

16. Summary of Findings and Conclusions

The transport problem for the Atlantic Region of Nicaragua is vast and old. The absence of a proper transport network between the Pacific and the Atlantic Coast has been the main obstacle for a physical integration between of the two halves of the country.

The only transport link, apart from air transport, between the capital city, Managua and the Southern Atlantic Region (RAAS) main town, Bluefields, is the Escondido River (91 km), that lies between Rama and Bluefields, and the main road from Managua to Rama (298 km).

The area of study, the Southern Atlantic Region of Nicaragua, has only a small network of roads, linking individual towns and communities with their immediate

surrounding area, whereas all transport between communities and from these to the main population centres such as Bluefields, Rama, Pearl Lagoon, Corn Island, etc. takes place by water ways.

The vast network of rivers and lagoons is used to transport goods, merchandise, agricultural produce and passengers to and from their destination. In spite of this, water transport presents some actual limitations such as: poor physical conditions of the boats, long distances for travelling, safety concerns especially with pangas, reliability and lack of attention to the sector by the authorities.

The Regional Government authorities are convinced that the improvement of water transportation between Bluefields and the other populated centres is an essential activity for local development.

The people of the Atlantic Region have always and continue to travel from village to village using different type and means of aquatic transport. For short distances averaging 5 km – 10 km, small dugout canoes (called dories) propelled with hand paddle are use to move from one place to another. For further distances the larger dories are equipped with a sail or outboard engine travelling distances of up to 100 km and above.

Motorization of dugout canoes began during the first half of the 1950s with the introduction of small double stroke diesel engines 7.5 Hp. Later, around the mid 1960 came the pangas, which were constructed previously from marine plywood and fitted with a 40Hp Johnson or Evinrude outboard gasoline engine. Few years later came the 48 Hp Yamaha outboard engines. During the late 1970s, canoe type fiberglass pangas fitted with high power outboard engines ranging from 75 Hp up to 200 Hp became popular.

The oldest type of motorization is the ones referred to as Slow Boats. These types of boats have been operating for a long time. These are wooden hull boats with inboard

diesel engine. The slow boats are used to cover large distances and isolated routes, especially where it is too costly for the pangas to operate. The locations covered by the boats are mainly La Cruz de Rio Grande, Tortuguero and Rio Grande Barr. These boats range from 30 to 50 feet in length, and make their trip in an average of 16 to 24 hours, travelling at an average speed of 12 km per hour. The boats are used for transport of cargo and passenger.

Boats are used for all types of purposes, from work activity, to taking children to school, serve as ambulance and the general transport services. Passengers that travel using the boats are merchants, students, and employees of all types, men, women and children. Passenger transport fees in pangas, is considered high, taking into account the economic condition of the country and the region, added to that, there is a growing concern about its safety. The operating cost for pangas and slow boats is made up of crew wages, fuel, dues and maintenance. Fuel represents between 40 and 50 percent of the operating cost. The price at the time of the study was USD 0.46/litre.

Relationship with the local aquatic transport authorities at the time of the study was tensioned due to several accidents that took place with fatal consequences, caused by overloaded boats and high-speed pangas. At present most if not all of the boat owners finance the purchase of their own boats. This is done either through his or her own savings or entering in partnership with family or a friend.

Finally, the local water transport authority, General Directorate of Aquatic Transport, Navy and the Port Authorities have very little capacity to carry out and fulfil their responsibility properly, due to budget constraints and lack of training.

In conclusion if the Southern Atlantic Region's economy is going to be developed, it requires that the principal arteries of this body be taken care of, in this case it refers to its rivers, lagoons or its general transport system. Water transport requires far less maintenance than road transport, therefore policies and incentives are needed to make

it possible for local people to invest in improving their boats and give a better, cheaper and reliable service to the population of the Southern Atlantic Region of Nicaragua.

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