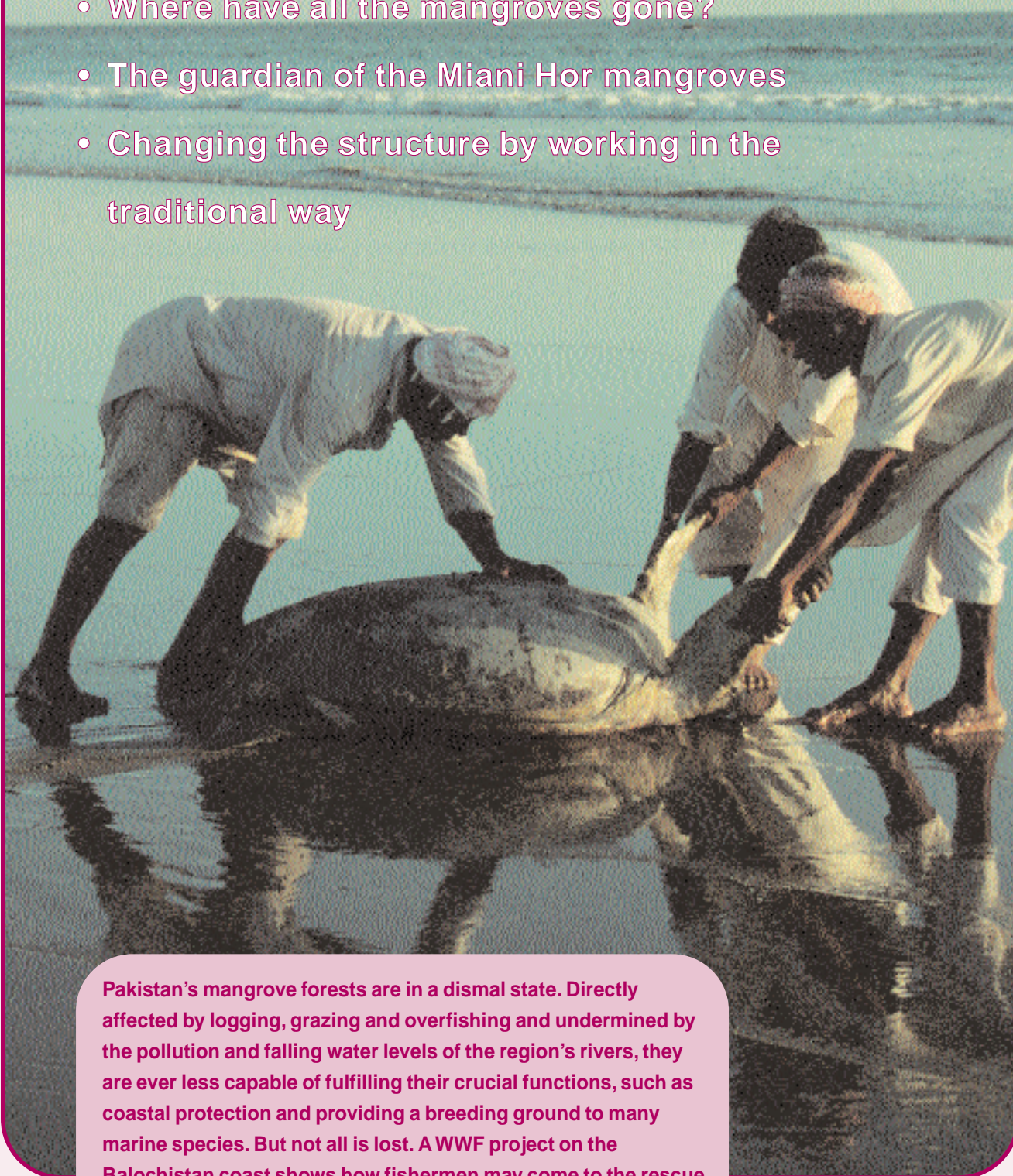




'Plant Mangroves, Get Prawns'

Conservation of Pakistan's Coastal Forests

- Dreaming of a yearly plantation festival
- Where have all the mangroves gone?
- The guardian of the Miani Hor mangroves
- Changing the structure by working in the traditional way



Pakistan's mangrove forests are in a dismal state. Directly affected by logging, grazing and overfishing and undermined by the pollution and falling water levels of the region's rivers, they are ever less capable of fulfilling their crucial functions, such as coastal protection and providing a breeding ground to many marine species. But not all is lost. A WWF project on the Balochistan coast shows how fishermen may come to the rescue of an ecosystem they depend on. And a Wetland Education Centre near Karachi now helps to wage the battle against the major threats the mangroves face.

Mosquito infected wastelands?

Less than five years ago, a WWF-delegation asked Pakistani forestry officers to show them the way to the threatened mangrove forests on the coast. 'Mangroves?', they replied. 'What are they?'

On another occasion, a long conversation with government officials on possibilities to protect the coastal wetlands ended in the question:

'Please tell us, are mangroves trees or shrubs?'

These anecdotes are reflections of an attitude which, until very recently, was common all over the world. Mangrove forests were generally considered as no more than mosquito infected wastelands without any particular value. Thus neglect, continuous over-exploitation and pollution meant mangrove forests all over the world were - and still are - disappearing at an alarming rate.

But the mood is changing. More and more, the value of mangroves and the ecological services they provide are being recognised. Studies have shown that no less than 60-80 per cent of the world's commercial fisheries' catch are mangrove dependant species. In addition, mangroves are homes for resident birds and a wintering ground for migratory birds. Their forests play a major role in protecting the coastline against erosion and flooding, providing firewood, timber, fodder, and medicinal needs to local communities.

The realisation that this valuable ecosystem is on the brink of collapse came as a shock to many; not least in Pakistan, which houses the world's 5th largest continuous mangrove area. With the help of the international community, a change in attitude at

governmental levels, as well as growing awareness in local communities, things are slowly changing.

Entering the fishing villages of Sonmiani and Damb on Balochistan Province's coast, one is confronted with the slogan 'Plant Mangroves, Get Prawns'. Logos of the WWF, the Forestry Department, as well as the local Community Based Organisation (CBO), make it clear that a concerted effort is underway to bring these threatened forests under sustainable management and rehabilitate severely degraded areas.

In Sandspit, a popular beach resort only 40 kilometres away from megalopolis Karachi, a Wetland Education Centre has been constructed. Through information dissemination and environmental education of the public at large, the Centre hopes to create wide-spread awareness of the

need to conserve the coastal forests.

So does the future of Pakistan's mangrove forests look rosy again? That would be far too optimistic a conclusion. The impact of widespread pollution, growing population pressure, as well as the reduction of the fresh water supply - to name just a few of the main threats - is

such that the complete disappearance of the mangrove forests in this part of the world is still a serious possibility. To prevent an ecological disaster of this magnitude, much more has to be done. The conservation initiatives in the coastal areas of Pakistan's Sindh and Balochistan provinces - as well as other projects in the Indus delta - are just first steps on the long road towards a healthy and sustainable mangroves ecosystem in South Asia.



Sonmiani

'When we first introduced the slogan "Timar lagain, jhinga pain" (Plant Mangroves, Get Prawns), this sparked off an interesting impact on the local population. "Will the shrimps grow on the trees we plant?", they asked in their innocence. This gave us the opportunity to explain that shrimps grow to adulthood under the mesh of mangrove trees and their roots. Only then did they realise how important it was to grow and sustain mangroves on the coast.' (Fayyaz Rasool, conservation officer at the Sonmiani field office)



Where have all the mangroves gone?

'When I was a child,' muses Dr. Muhammad Farooq Ahmad, 'we always went for holiday and relaxation to this island in the Indus delta. I remember us throwing coins into the water and diving for them. The water was crystal clear. Nowadays it is muddy and black and you cannot look into it any more. The condition of the water in the delta, as well as in the sea near Karachi, has deteriorated tremendously in the past decades.'

Dr. Ahmad knows what he is talking about through more than personal memories. Head of the Sindh government's Zoological Survey Department for over 25 years, he has no problem in giving hard scientific evidence of the worsening ecological situation in the coastal area. Take, for instance, the extinction of the

lingula, a minuscule shellfish which only existed in Pakistan's coastal area.

'This was an animal which lived through millions of years of evolution without undergoing major changes,' says Dr. Ahmad, 'but mankind wiped it out in a couple of years. As a result of water pollution, the *lingula* is gone forever. And so are several other species of *crustacean*. For me, as a zoologist, but also as a human being, it is hard to believe that we are doing these kinds of things without giving it a moment's thought.'

The *lingula* is not the only victim of man's behaviour in this part of the world. In the neighbourhood of Karachi - estimated population: twelve million people - most mangroves have already disappeared and so have the once abundant oyster beds. As a result of large-scale land reclamation



Dr. Muhammad
Farooq Ahmad

projects, most migrant birds no longer frequent the area. At some distance from Karachi, other species face extinction. Even the famous mother crab is now in danger.

Ahmad: 'Years ago, you would see them everywhere. Now they are becoming rare. Indiscriminate catching, especially of females, is to blame. Traders have made high profits in exporting these crabs to Singapore, but the end of the trade is approaching rapidly.'

Population and pollution, the two p's, constitute, in Dr Ahmad's opinion, the major threats to the mangrove forests and their fragile ecological system. 'People in the mangrove areas are destroying flora and fauna by indiscriminately cutting the trees and catching all species of fish, including the premature ones. At the same time, enormous amounts of municipal waste, sewerage as well as toxic waste are dumped in the mangroves.' According to Ahmad, there can not be the slightest doubt that 'if present degradation goes on, Pakistan's mangroves cannot be saved.'

In the 25 years he has headed the Zoological department, Ahmad has experienced much ignorance and indifference. 'We have advised the government to take action many times, but most people still do not realise the gravity of the situation.'

Lately there have been signs of improvement. Partly based on the results of the Zoological Department's mangrove resource inventories, management plans have been developed for priority sites in the Indus delta Region. Improved legislation,

and management policies designed to protect the mangroves, have been introduced by the government. 'Sadly enough,' says Ahmad, 'there is no enforcement of the law yet. Implementation as well as monitoring are lacking.'

Education of the population at all levels is another prerequisite. Ahmad: 'Especially the local population has to be taught the value of the ecosystem they depend on. At the same time incentives should be provided for ecologically-sound behaviour. I appreciate the WWF-project in the area so much because it combines both sustainable management and environmental education.'

When we leave his old office in the centre of Karachi, Dr. Ahmad says with a sad smile: 'For me, less than a year from my retirement, it is too late. But I pray that, *inshallah*, my successor will see a real change for the better. Because if we do not find a way



River pollution near Karachi

to live in harmony with nature, we will destroy everything, including ourselves.'

Infernal touch

With the farewell words of Dr. Ahmad still echoing in our ears, we take a ride to Hawkes Bay, one of the locations of the WWF mangroves project. Sandspit is only forty kilometres west from Karachi. However, with Karachi's lunatic traffic and the often terrible road conditions, the trip takes more than two hours. Halfway, we stop at a bridge across one of the rivers that pass Karachi and flow into the ocean. The scenery has the infernal touch Dr. Ahmad already described. The

scanty water has an ominous black colour and heavy smell. We see several animal cadavers. From the high river banks, lorries dump their loads into the water.

The pollution of fresh water is seen by many as the main reason for the degradation of the approximately three hundred ha. mangrove forests in Hawkes Bay, the last patch of mangroves extending from the Indus Delta. In fact, from the Sandspit coast, no mangroves can be seen at all. There is a sandy beach some hundred meters wide. There is a large number of so-called 'beach huts' along the high water line, mostly owned by the rich from Karachi. To the rear is a huge arid area, totally denuded of trees. Beyond that the muddy backwater begins, with its mangrove forests. Most of the foremost trees are no more than shrubs; inwards, the avicennia trees - the only species found here - are not very tall. Behind the mangrove forests, extensive marshlands constitute an excellent habitat for hundreds of thousands of migratory birds.

Apart from the effects of pollution, harvesting by local and foreign visitors resulted in the changes in the characteristics of the forest here, explains Jahangir Durrane, WWF's local conservation officer. Firewood and fodder are collected extensively in the forests, usually by the women. Also, the uncontrolled grazing of camels and goats contributes to the degradation of the area.

In the village, we meet Haji Muhammed Siddiq



Haji Muhammed Siddiq Panjwani

Panjwani, President of the Kakapir Fishermen's Welfare Association at Sandspit. Fishing is the main source of livelihood for the approximately 1,500 inhabitants of this area. So how is business these days, we ask this strong-looking man with an impressive snow-white beard. Not very good, he tells us.

'We have experienced a strong decrease of catches here recently,' Haji Muhammed says. 'Ten years ago the situation in this area was very good but things have deteriorated rapidly.'

The head of the Fisheries Community sees two main reasons. The first is the

introduction some years ago of nets with very small mesh, which soon resulted in the reduction of the numbers of small fish in the coastal area. As a result of that, bigger fish no longer approach the coast. Further out, in the ocean, big trawlers catch everything, leaving no space for local fishermen.

'People do realise that the use of small-mesh nets should stop, but because of the decrease in income they've experienced, they go on catching everything there is,' Haji Muhammed explains.

The other factor is the pollution of the backwaters and the channels. These are the waters where the local fishermen used to go in the period when no sea-fishing was allowed, or when bad weather conditions prevented boats from sailing out. Haji Muhammed: 'The problem is the heavy siltation of the water. There is so much rubbish coming down here with these rivers. Dredging of the channels is badly needed, but who is going to take care of that?'

As a result of the bad water condition, but also over-exploitation, the export-oriented crab as well as king prawn fisheries almost totally collapsed. Fishermen now concentrate on other species which are popular in other Asian countries. How long these will be available remains an open question.

Root causes

Mangroves being one of the most complicated and



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Damb,
Sonmiani Bay

vulnerable ecosystems in the world, it is obvious that a range of factors have a direct or indirect impact on them. But what are the main ones, the root causes of the loss of biodiversity in Pakistan's mangroves? Back in Karachi, we put this question to Dr. Akhtar A. Hai, economics professor, and consultant to the WWF-project. It comes as no surprise that scientist Hai concludes that much more research is needed before it will be possible to answer this 'very complicated question'. However preliminary findings point to the most important factors.

Surprisingly enough, these indicate that the pressure on Balochistan's mangrove forests has not increased much in recent years, and, in some ways, has even decreased. Camel keeping in the area, for instance, has largely declined recently as a result of a loss of commercial value. The damage to the mangroves through indiscriminate grazing of large herds has consequently diminished.

Another positive factor is the relative well-being of the population. Hai: 'Thanks to the fisheries' activities, the incomes of most people in Balochistan's coastal areas are 3-4 times higher than in other rural areas. That takes away a lot of the pressure on the forests. People are able to buy goods in the market.'

Still, local households in the coastal areas depend - to varying degrees - on mangroves as sources of timber, firewood, fodder, salt, drugs, fish and

household items. It is too early to say, Hai thinks, how far the degradation of the mangroves is due to harvesting practices of local people. It is, however, important to note that these products are harvested almost exclusively for domestic use and not for marketing.

A very negative contribution comes from overfishing and the use of small-mesh nets. 'Fish species in Balochistan's coastal areas disappear at an alarming rate,' Hai testifies. Another structural threat is rapid increase in population. Hai: 'More people use more fresh water. This human need is directly competing with the mangroves' need for a regular freshwater supply.'

Since the creation of Pakistan, there has been a continuous decrease in the Indus River discharge. The country's economy depends on agriculture, so a number of dams and barrages were constructed to use the Indus water for irrigation. Consequently, the amount of Indus discharge has decreased massively over the years, causing serious problems to the growth of the mangroves. Climate change also contributes to the drying up of fresh water supply.

'The mangroves forests in Balochistan province seem to have adapted to this new situation', says Hai. 'The result, however, is a serious loss of biodiversity. *Avicennia* - the most salt-resistant mangrove tree - is becoming more and more dominant, while trees are growing less big than they used to.'

Pakistan's mangrove forest ecosystem

Mangroves grow in the deltaic and estuarine regions of the coastline. They are salt tolerant plants, but thrive on water that is low in salinity. Their productivity increases proportionately with the availability of freshwater.

The mangrove forest ecosystem of Pakistan is the largest in arid climates. 97 per cent of it (about 160,000 ha.) is located in the Indus Delta in the Sindh province, while the remaining three per cent is found on the Makran coast in Balochistan. The project's area in Miani Hor is the only significant area in Balochistan that contains extensive mangrove stands.

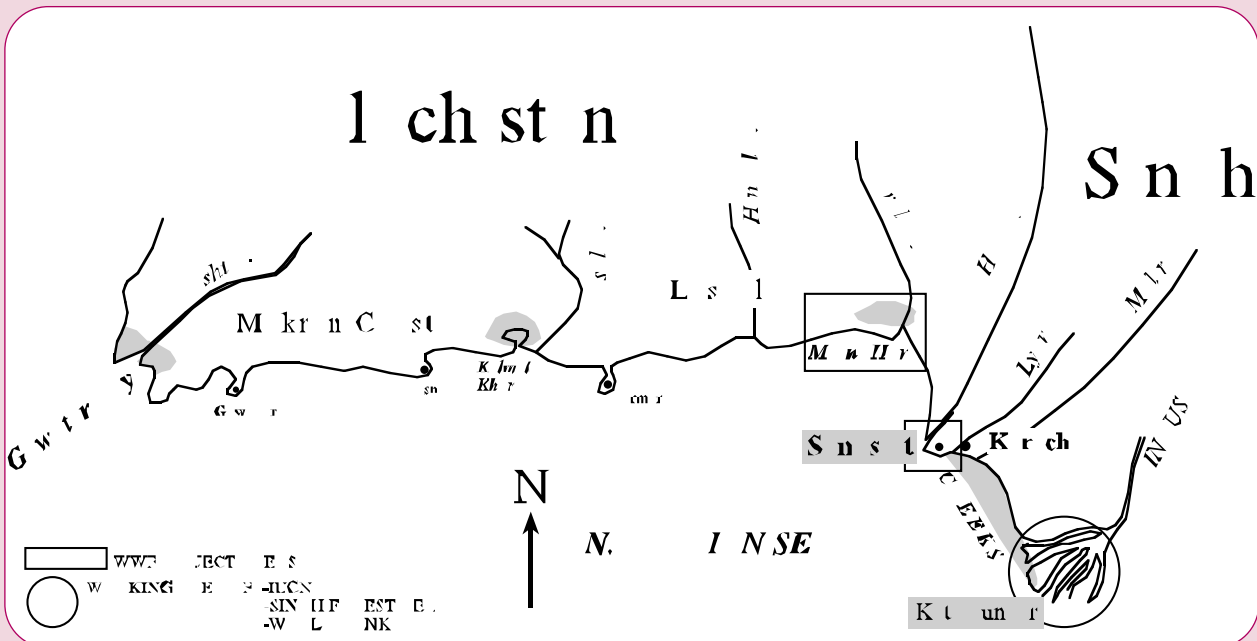
Historical records indicate that the distribution of mangroves in the Indus Delta has changed significantly in the past several hundred years, partly due to temporal and spatial changes in coastal and fluvial processes. But in recent times human activities have also had an increasing impact on this distribution. The result is a mosaic pattern of mangroves stands of varying quality, ranging from

practically intact forests to degraded and even denuded areas. Only sixteen per cent of Pakistan's mangroves are considered healthy. Eight mangrove tree species have reportedly existed in Pakistan, however only four can be found now. Of these, *Avicennia marina* occupies 95 per cent of the total mangrove areas. Environmentalists consider the Outer Indus Delta as a wetlands area of international importance. It is the main fish and shrimp nursery on which Pakistan's fishing industry depends. Hundreds of thousands of people are (in)directly dependant on the mangrove eco-system for their livelihood. Mangroves are used in Pakistan for firewood, timber, fodder, salt, drugs, household items, and fisheries. The nutritional value of the leaves as fodder is very high. In addition, mangrove forests stabilise shorelines and decrease erosion, reducing the energy of waves and currents by holding the bottom sediments in place. They also act as windbreaks and protection from coastal storms, forming a cost-

free, self-repairing barrier. When a cyclone hit the coastal districts of Sindh in 1999, the remaining mangrove forests protected the life, property and habitations in their vicinity, as opposed to the areas where there were no longer any mangroves.

The rate of degradation in the Indus delta has been estimated at six per cent in thirteen years. Others - like Dr. Shahid Amjad of the National Institute of Oceanography - see this as a gross underestimation. According to Dr. Amjad, more than half of the Indus Delta mangroves have disappeared since the early 1980s.

In spite of recent governmental efforts to improve legislation and management policies, actual policy implementation in the field is lagging behind and mangrove resources in Pakistan are still declining. Experts agree that, in view of their relatively small coverage, the Balochistan mangroves could easily disappear if no proper action is taken, while the pressure on Sindh's remaining coastal forests is described as 'severe'.



Mangrove forest project activities at the coastal region of Pakistan

What about pollution? The picture looks alarming. Irrigation water is used for crop lands and residues of pesticides and fertiliser seep through into coastal areas. Mangroves are used as dumping places for municipal wastes and sewerage produced by the expanding city of Karachi. Waterways in this area are extremely polluted, also by discharges of toxic wastes from some 1,500 industries and factories. Oil spills occur during the pumping of oil from ships to the shore, the cleaning out of ships' bilges, and offshore oil and gas exploration.

'The effect of pollution is dramatic for the forests in the Indus Delta,' says Hai, 'but so far its impact is much less in Balochistan. However, if no measures to implement environmental laws are taken, the pollution will spread throughout the coastal area and eventually reach the Balochistan forests.'

City of Gold

Further from the pollution of the big city is WWF's project's second location, Sonmiani Bay. Ninety kilometres west of Karachi in the Balochistan Province, we find the beautiful Miani Hor lagoon, a sixty kilometer long and seven wide tortuous and contorted body of water, connected to the sea by a four kilometer wide mouth. Two seasonal rivers enter into the bay. Perfect conditions for healthy mangrove forests. Hence there are 31 sq. km. of mangroves, representing 42 per cent of the total mangrove cover of Balochistan. Three species are still found here, the omnipresent *avicennia*, the *ceriops* and the *rhizophora*.

Sonmiani Bay houses three main villages - Sonmiani, Damb and Bhira - where a total of about 7,000 people live. Almost every family here depends on fishery activities. Sonmiani houses a considerable Hindu community, which lived here for centuries peacefully with the majority Muslims. The Hindu families are not involved in the fishing itself; many of the men, however, are fish traders.

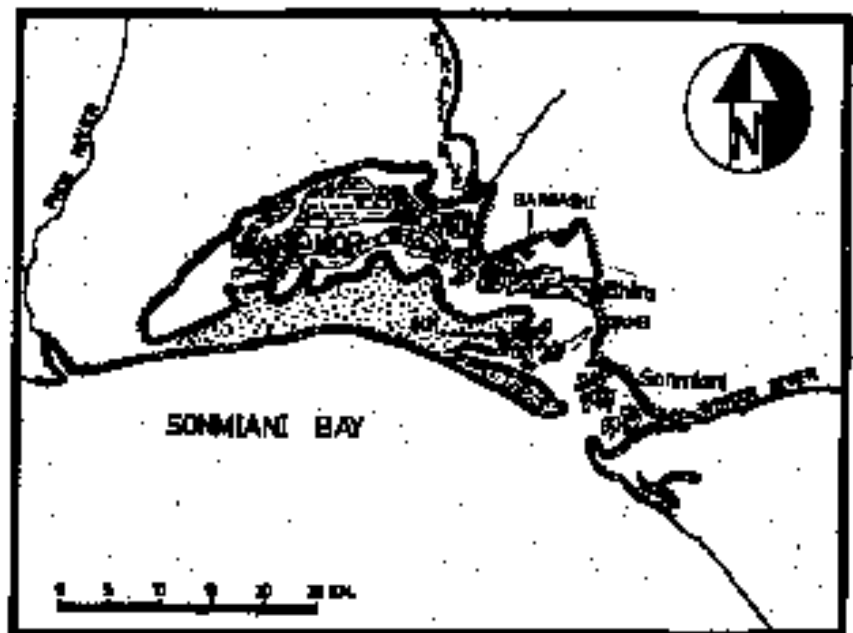
It is in Sonmiani that we meet Fayyaz Rasool, the young and passionate conservation officer of the WWF mangrove conservation project here. Next to his small office is a central meeting place, a few old benches under a shadowy roof, where the elderly men of the village spend many hours. It is

here, at this strategic spot, that Fayyaz - who is from Punjab, quite another part of the country - learns most about the village, its people and their history.

Sonmiani originally meant City of Gold, he explains. Once, people in this region were so rich they paid their taxes in gold. The prosperity stemmed largely from the abundant fish catches. Also, small amounts of gold were found in the region. What exactly the contribution was (and still is) of the lucrative smuggling business to the nearby Arab emirates, is one of those matters villagers do not discuss with foreigners.

'Most people do not know the exact date when things happened here,' says Fayyaz Rasool, 'but there certainly is a strong collective memory. People here inform me about historic earthquakes, as a result of which the course of rivers changed. This led to a degradation of the forests. With their own eyes they have seen the flooding becoming more serious year by year. Because of that, the villages have gradually shifted inland. The distance between harbours and villages has grown substantially. That is the Will of God, people say. But at the same time they observe: Of course, at that time there was much more forest here.'

'That is one of those moments,' the conservation officer says, 'I step in. "Can we go back, sir, I then say. What is the relation between these two? You said it yourself." It is not me telling them how things are related, they themselves know quite well. The elderly people can tell you exactly how things have developed, how they are related. The elderly have the knowledge. But if you want to do something about it, if you want to change things in these villages, than you need the young people, with their enthusiasm.'



The Guardian of the Miani Hor mangroves

One of the strongest supporters of the WWF project in Miani Hor is Muhammad Sadeeq, a fisherman who has lived all his life in the village of Damb. A few years ago, Sadeeq - who estimates his age at 'between sixty and seventy' - was the first to plant *avicennia* saplings in degraded areas, encouraged by a WWF pilot project.

On our way to the actual plantation areas, Sadeeq proudly points at areas which flourish because of his activities then.

Less satisfied is Sadeeq with the current activities of his fellow villagers in the mangroves. When we arrive at one of the plantation areas, within no time the old fisherman is engaged in a fierce argument with three men who are digging holes and planting small cuttings. They are 'too lazy, fight too much and, the worst of all, do not know how to do the job: the saplings are planted on too short distances'. The workmen undergo Sadeeq's tirade with resignation: obviously it is not the first time they've heard his complaints.

Afterwards, during lunch - rice with fermented shrimps - in Sadeeq's leaky old boat, in the shadow of large mangrove trees, there is a chance to chat with the old fisherman. What is his motivation, we ask. Why this enormous drive for the conservation of trees by someone who should be preoccupied by fishing?

'I know this environment since I was born', says Sadeeq. 'Long before WWF came here, I already realised that healthy mangroves are essential for our survival. I am sure that if we conserve the forest, we will be rewarded through large catches of shrimp'.

As far as Sadeeq is aware, all his ancestors lived in the village of Damb. From their stories, he knows that in ancient times the mangrove forests were much more widely distributed than now. 'These ancient forests were so dense that men could hardly enter them. Many species of animals lived there. That is why people called it the jungle. What remains of it is a loose collection of mangrove stands of



Muhammad Sadeeq with some of his children

varying quality.'

Sadeeq also remembers the former prosperity of the Damb-area. 'There was a time that trawlers came deep into the lagoon to load cargo. People were very rich at that time. Now, this has changed. Because of the siltation, large ships cannot enter the lagoon any more. The situation is so bad that many times our own ships cannot reach the sea

because the water in the mouth of the lagoon is only a few feet high even during high tide.'

One especially negative development was the sudden drive a few years ago to cut trees for selling straight stems at the market, says Sadeeq. 'These stems are used for rooftops. Because so many people tried to sell, prices steadily dropped. You would not get more than ten rupees for a tree. Some people came to the market with more than a thousand stems. Then I realised this could not go on. I warned people about the consequences but nobody cared to listen. And we never see foresters here in this region.'

Clearly, Sadeeq is very satisfied with the current conservation activities in the area. What worries him, however, is the lack of monitoring. 'There is an urgent need to patrol', he feels. 'There are many people who will be tempted to cut the trees once they are mature. But even more urgent is the question of how to deal with the people who are opposed to any conservation activity in this area.' What should be done? 'Give them the stick', Sadeeq replies. 'That's the only thing these people will listen to.'

Returning to Damb's small harbour again, two 8-year old boys grab our rope and enter the boat. The old fisherman welcomes them. His grandsons? 'My sons', he responds, slightly offended. Two of his 14 children. At his age? 'Fishing gives energy', responds Muhammad Sadeeq with a smile and a wink. 'When you return after a day's or a night's fishing, you are full of energy.'



Changing the structure by v



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Board of the Damb Society for Social Development and Conservation of Nature

Meetings do not have to be dull by definition. Look, for instance, at the video made of a workshop in the village of Damb. The meeting aimed to find out more about the way people use mangrove forests and what they see as their main problems. But rarely does one see so many men having uncomplicated fun at a semi-official occasion. The playful way the whole meeting is handled contributes a great deal.

First, all the men get the opportunity to write down what they see as the communities' main problems, needs and priorities. Those who are illiterate are helped by others. Then every problem that has been mentioned is written on a piece of paper, and all of these are spread out on the ground. Every man receives twelve matches and one by one they are asked to step forward and divide the matches among what they see as the most important problems. Each choice is loudly

commented on by their fellow-villagers, but no one seems to mind this lack of privacy. In the end, there can be no doubt about the men's main priority: a new harbour, more closely located to the mouth of the lagoon. Due to the siltation, the fishermen have growing problems in even reaching the sea. Other favourite wishes: a playground, a better transport road to Karachi, a proper sewerage system as well as a hospital.

'This is what we call the participatory learning and action method,' explains Noorun Nisa at WWF's Karachi office. 'It is not only amusing but also the most effective way of finding out essential data in relatively closed societies. While at the same time the process of interviewing has an effect of awareness-raising with the people themselves.'

Nisa is in the process of finalising a report on the socio-economic situation in the project area. 'Now we've conducted this study,' she says, 'we are much better informed about the use communities make of the mangroves. And we know now what is the best time to ask people to participate in plantation activities. Also, we've got a good picture of the

working in the traditional way

socio-economic changes which have occurred within these communities. Ten years ago complete families were engaged in the fishing business. Everybody had their own task. Now you see that some people gradually become involved in other jobs, and consequently adapt to other ways of living. This sort of data will help us to address the issues of all the villagers and to integrate environmental issues with their social life.'

Mini-cinema

Remarkably, one issue which caused a lot of problems in this community a few years ago is hardly mentioned during the interview sessions. This is because the problem has been taken care of already. It had to do with a mini-cinema, which started showing what the Damb-people call 'vulgar movies'. This caused a lot of unrest in this traditional society where Muslims adhere strongly to their religious duties. The elderly complained, but some of the younger villagers took the initiative: they formed a village committee which set out to initiate other, more meaningful, activities for the young inhabitants of Damb. The committee succeeded in 'controlling' the activities of the mini-cinema, and won the approval of the elderly people.

Three years later, we are warmly received by six representatives of the Damb Society for Social Development and Conservation of Nature. Proudly, they show us the newly designed logo of their Community Based Organisation, showing the three main fields of activities: social development, fisheries and conservation of the mangrove forests. 'First we mainly concentrated on social things,' explains Anwar, general secretary of the CBO. 'But after the WWF arrived here, we changed our name and included nature conservation as our priority. Through this, we also help to stimulate the fisheries.'

With the help of the WWF, workshops were organised for the board members of the organisation on record keeping and on the role of communities in conservation activities. Also a medical camp was organised for people from all three villages. For three days, doctors from the NGO Mutual Aid Society conducted operations and treated people for illnesses like leprosy. The Damb CBO also succeeded in resolving one of the other long-standing problems of the village: a fair distribution of drinking water. Other priorities for the nearby future are the improvement of the telephone system, the upgrading of schools, including the establishment of a

secondary school for girls, as well as relief for several drug addicts in the village.

'We are respected by the Damb community,' Anwar says. 'Now we want to evolve into a true people's organisation for all three villages.' The Damb CBO has 89 members, all men, who pay a small monthly contribution. Women are not allowed membership. There is, however, a special CBO women's committee which organises specific activities.

Vulnerable saplings

Not far outside the village of Sonmiani, along the road to Damb, the muddy, inaccessible banks of the Miani Hor lagoon suddenly show signs of human activity. Here we find the three nurseries of the conservation project, containing large rows of *avicennia*, *rhizophora*, and *ceriops* cuttings. Each nursery is surrounded by fences of thorny twigs to protect the vulnerable saplings against the gluttony of goats and camels. Next spring, the young trees will be ready for planting in some of the most degraded mangrove forest areas. Based on earlier experiences, WWF's local conservation manager, Fayyaz Rasool, explains that it can be expected that half of the planted saplings will actually survive and grow out into real mangrove trees.

Most of the work in the nurseries is done by women from the villages. Planting of the saplings is a man's job. In both cases, voluntary labour has been organised by the local CBO. 'This is in line,' says Rasool, 'with our objective of gradually involving the community in the conservation of the area. Finally we hope to bring the mangrove forests under full local sustainable management.'

But beware, he warns. This is a final goal which cannot be reached overnight. First of all, you have to realise that nature plays a decisive role here. 'People work when times are favourable for fishing. In the night, with full moon. So you have to visit them when they are relaxing, in the bazaar. Also, the main plantation activities have to be planned in June and July, when the fishing season is over and people have more time.

Another, perhaps even more decisive factor, is the way these isolated fisheries communities are organised. Rasool: 'If you try to push new developments here, you will not achieve your goals. You have to respect traditions. People have strict rules concerning the role of women, the place of religion, as well as the respect one has to show to

*Sandspit:
fodder
collection from
the mangroves*



BUREAU MBO

elderly people. The only way to bring changes here is to work in the traditional way.'

Women more adaptive

'You have to be a woman to be able to contact the women in the rural communities,' says Noorun Nisa, the WWF's community development officer, 'but even then it is not easy. When men in the villages meet an educated women, they think: this clever person is going to misguide our women. So they are hesitating. If there is a strong religious feeling in a community, then it's doubly hard. In that case the men will not allow their women to work with us at all. So it is hard. And it takes a lot of time. But it is not impossible. In the end, I'm sure we will succeed in motivating the men to allow their women to co-operate. There are enough positive signs already.'

Contacting the women in the end proved not too hard a job in the main villages within the project area. Nisa: 'In Sonmiani and Damb people have exposure to urban people, which means they are not rigid. It is the same in Sandspit. Men even invite me sometimes to work with the women. So when I met the women and told them why we were there, they said: oh yes, we are interested and we are also willing to work. We have a lot of extra time, being in the houses all the time. So we love to work with you. And when I'm talking about health issues and so on, the females get extra interested to know how these problems can be addressed.'

So, we ask Noorun Nisa, who is more open to the environmental message, men or women? 'Women,' she says immediately. 'They are not in the frontline, but they always respond positively. When we talked to the women in the villages, they told us: yes, we know the forest is degrading because of our cutting. But what can we do? And they also complained about the hard work of cutting in the forest. So they are very open to alternatives. And they say: the forest used to be near our village, now it is far away. And there were birds before. Men have their priority with their work. Women are adaptive to new things which could improve the quality of their lives. Men are still doubtful about it.'

Absence of education possibilities

Around noon we leave the village of Damb and set course to the beach. It is ebb-tide, the beach is wide enough now to reach the village of Bhira. It is not more than a short drive but this is the only possibility to reach the village. For most of the day Bhira is completely isolated.

We give a ride to two boys wearing school uniforms, who walk on the beach in the burning sun. Every morning and afternoon they have to make this 10 kilometre trip to the secondary school in Damb. If the tide is favourable. If not, they stay at home. Like most of their friends in the village, who stopped attending school after primary education. Bhira-girls stay at home anyhow, because for them there is a



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Sonmiani: conservation officer Fayyaz Rasool and project leader Ali Hasnain, standing in front of the tree nurseries

complete absence of education possibilities. In Bhira itself, primary education is only available for boys. And in Damb or Sonmiani school enrolment of girls is also very limited, estimated at some two per cent.

As a consequence of their isolation, Bhira people (the total population of the village is estimated at one thousand) depend heavily on the resources of the nearby forest, for fodder and firewood.

The moment we get a clear view of the village, at a distance of some five hundred metres, we also take a halt at an isolated house. It appears to belong to the chairman of the village committee. Part of the house serves as a gathering place. A few men play cards, others are involved in a kind of table football.

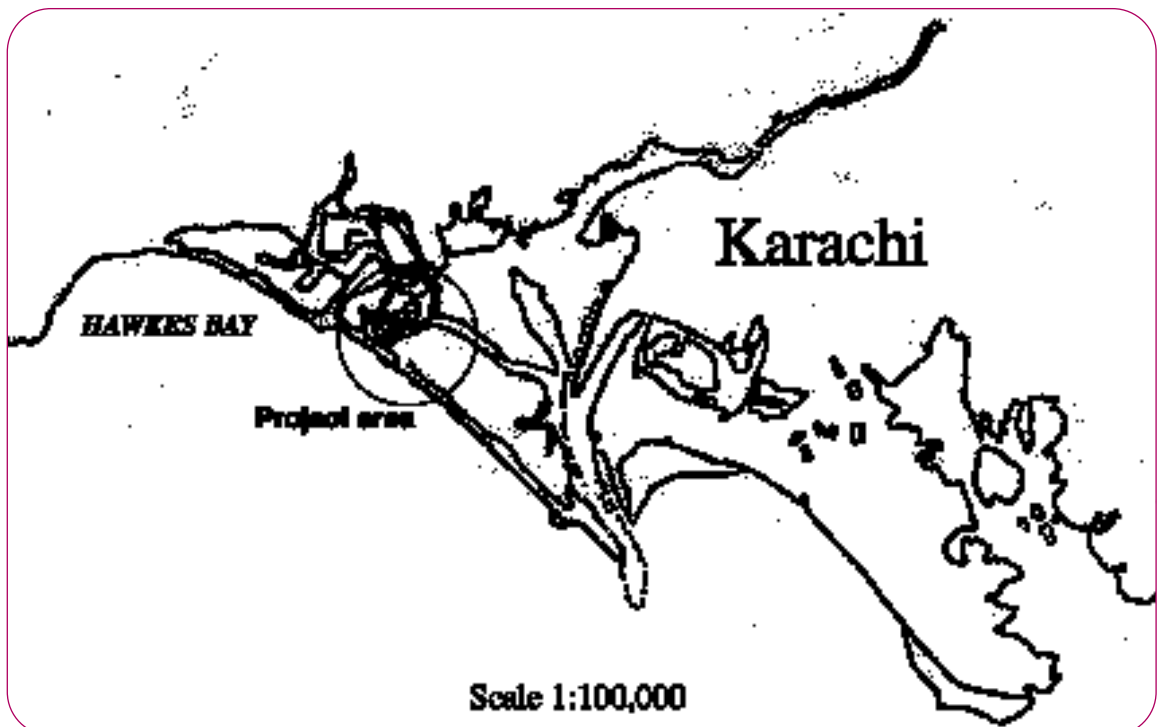
We shake hands and exchange courtesies. Then it is time to say goodbye again. The car turns around and we drive back to the beach. So this was it? That is all we get to see of the village of Bhira? Yes, is the answer. ‘There are still some tensions towards the WWF project over there. So it is better not to enter the village now and stick to greeting the leading people.’

The background of the resistance of the Bhira people towards any kind of conservation in ‘their’ mangrove forests seems to be a common, very unpleasant, memory. Ten years ago the Balochistan Forest Department suddenly banned mangrove cutting. The Bhira population fiercely resisted this decision and started protesting. The situation escalated and some of the leaders of the protest movement were sent to jail.

Low profile

WWF’s Noorun Nisa: ‘When we entered the area, and announced that we are co-operating with the Balochistan government, they said: “oh no, not again.” They were sure our involvement would lead to another ban. So they said: “we will never allow you people to come in our area.”’

Because of the obvious resistance, the project people decided to keep a low profile in Bhira and to concentrate primarily on the two other villages, Sonmiani and Damb. Nisa: ‘When we organised the PLA in Damb, we invited people from Bhira to attend. Then, after some time, we proposed an unofficial meeting and we were allowed to stay in the village for three days. But then they got frightened again. So we



Hawkes Bay/Sandspit Wildlife Sanctuary



WWF-CANON/MAURI RAUTKARI

Mangrove fodder for water buffalos

said: “OK, we will not come to you any more.””

Now, the mood is slowly changing. According to the WWF people, the results of their work in Sonmiani and Damb are gradually convincing people in Bhira that it would be good for them to co-operate. Especially the medical camp in Sonmiani to which the people of Bhira (where there is no public dispensary at all) were also invited - was a fruitful experience. Noorin Nisa: “They’ve started to respond now. As usual, first the young people. And they have communicated that they are willing to receive us. So

now we will go there again and talk with them. It is a matter of time. But I think the Bhira people now realise that we will not ban them from going to the forest and that in the future they will still have the right to use mangrove products.’

The proof of the change in mood comes when - a day after our distant view of Bhira - in a phone call to the WWF Karachi office it is confirmed that the village will be glad to receive a delegation from the conservation project, including the foreign journalist.





BUREAU M&O

Towards a yearly plantation festival

'In its efforts to attain sustainability of the mangrove forests along the coastal areas of Sindh and Balochistan, WWF-Pakistan has undertaken a Mangrove Conservation Project. To create awareness about the importance of the mangroves and the threats facing them, the communication/education team for the project took Beacon House Girls School, on a field trip to the Sandspit/Hawkes Bay area. The issues pertaining to the mangroves were highlighted, while the ecosystem was also explained. The children were encouraged to make observations through different activities. Written information was also handed out.'

Field trips of this nature - the quote comes from a WWF-Pakistan publication - will be undertaken in the future to create awareness of the importance of the mangroves, explains project leader Ali Hasnain. 'This was the first activity, in a series of such activities planned by our department, to create awareness among people. The students responded very positively to the activities and showed a lot of interest in the fauna and flora of the mangroves. Crabs and mudskipper were the most popular. Hand outs were given to the students to take back with them to share with their school mates and their families. In the more dense stands the students liked the heavy canopied effect which gave the 'feel' of a true forest. Bird watching, turtle watching and mangrove investigations are all parts of the awareness activities we have planned to attain our objectives.'

Pushing turtles back to the sea

Educating the people about the values of nature takes time. But amazing successes can be attained. 'Look at the turtles,' says Haji Muhammad in Sandspit. 'Twenty years ago nobody cared about them. We would just kill and eat them. Nowadays, thanks to all the protection efforts, they have become so brave that they sometimes march through our village. And what do we do: we softly push them back to the ocean. That is the way we will treat the mangroves in the future too.'

A roar of laughter follows these words of the head of the Sandspit CBO. The other members present - like the chairman respectable men who may call themselves haji too - see the humour of his words, but all agree no harm is being done to the turtles any more.

There has been a turtle project on the beaches of Sandspit since the early 1980s. The eggs of the endangered Green and Oliver Ridley turtles, which nest here on this coast, are protected and the young turtles are helped to find their way to the sea. Many of the thousands of visitors who annually frequent the area come to the Turtle Centre, or watch the nightly egg-laying, guided by employees of the centre.

The popularity of the Turtle Centre is one of the reasons why this area has been chosen as most suitable for establishment of a Wetland Centre. Other reasons are the conservation activities being undertaken in Sandspit. It is hoped that in the future the visitors of the Wetland Centre will be able to observe how the mangroves in the area are being managed in a sustainable manner by the local community. And that the marshlands behind the mangroves will attract birdwatchers because of the thousands of migratory birds in evidence.

The land needed for the construction was provided in 1994 by the Karachi Port Authority. Due to myriad bureaucratic problems, the actual construction took some time but finally the building was completed in August 2000. Awareness raising activities have been initiated. 'Anticipating the establishment of the Centre,' says Fereeha Idrees, communication officer of the Mangrove Conservation project, 'we have started organising trips to the area already as well as developing all kinds of educational materials. This has been very successful.'

Idrees, who will be based at the Centre, is confident that it will be instrumental in information dissemination to the public at large about the importance of mangrove ecosystems. 'There is a gradually growing concern among the population about issues related to the conservation and improvement of the natural environment. Schools, colleges, voluntary organisations and government organisations and institutions are developing environmental educational activities. However, in and around Karachi, hardly any facility can be found to support and reinforce these activities. Also, in and around the mangrove forest areas, no environmental educational facilities exist yet. We conducted a survey among beach visitors in Sandspit and it showed that such facilities would be highly appreciated. So I am sure the Wetland Centre will be successful.'

Educating the people is one thing. Offering the local population alternatives for the exploitation of mangrove resources is undoubtedly as important. Substituting the use of the mangrove leaves for



Opening of the Wetlands Centre at Sandspit

fodder by something that could be cultivated by the villagers themselves, would be a big improvement.

'We have asked scientists from the University of Karachi to investigate this possibility,' says Jahangir Durraanee in Sandspit. 'The solution would be a salt-resistant plant with the same nutritional value as *avicennia* leaves.' The need for such an alternative once again became evident when the project's *avicennia* nursery in Sandspit was completely destroyed by grazing camels. In the meantime, a permanent watch is the only way to guarantee the maturing of the young seedlings.

Offering alternatives is part of the educational message, says Fayyaz Rasool in Sonmiani. 'We cannot stop people from using the mangrove resources in the near future. But what we can say is: plant more trees. That is the main solution for the degradation problem. For every tree that is cut, two others should be planted.' To minimise cutting pressure on the mangroves, energy-efficient cooking stoves have been introduced in two of the project villages, Sonmiani and Damb.

Finding alternatives for the over-exploitation of the mangrove flora and fauna during the off-fishing season is another challenge. The need for additional economic activities in the project areas was one of the main outcomes of the socio-economic surveys. As a direct result, the conservation project is stimulating the introduction of beekeeping as an alternative source of income. Training was provided to the community members. However, the introduction of the beekeeping encountered problems as the bees kept in the forest were attacked by predators.

Being a conservation project, explains community development officer, Noorin Nisa, 'we are not in the position of carrying out new economic activities ourselves. Our role is an instrumental one. We try to help the local CBOs to find NGOs which could support their initiatives. At the economic level, but



also with social activities. Helping to organise the medical camps was an example of this way of working.'

The socio-economic surveys have resulted in a flood of ideas. The Damb CBO, for instance, proposed initiating a mechanical workshop for the maintenance of outboard motors. A commonly run pharmacy was another proposal. The introduction of credit schemes could also be a possibility, given the relatively good earnings in the fishery business. Says Noorun Nisa: 'It is not easy to find NGOs for these socio-economic activities, because not many of them are active in this part of the country. So most of the time we use our own network to explore the potential. It is not our core business, but if we see possibilities to facilitate initiatives of the local people, we will do it.'

Who is the owner of the Pakistani mangrove forests? When the question is put to local people, they usually answer that this is the government,



either national or provincial. The suggestion that this could imply that people from all over the province, or even the country, can make use of this resource, is, however, firmly denied. 'We, the people living near the mangroves, are the only ones who are allowed to exploit them.'

Lack of monitoring

'The mangrove forests are perceived and used by the local population as a common good, apparently without rules and regulations,' says Najam Khurshid, who used to be conservation director of the WWF's Karachi office before he moved to the Ramsar Bureau overseeing the international wetlands treaty. 'This attitude is at the basis of present problems. People feel they can exploit this resource without justification. They are not aware of the fact that the mangroves are legally protected in Pakistan. Due to the absence of a governmental mangrove forests management plan and a complete lack of monitoring, this protected status is not very effective, to put it mildly.'

However, this feeling of ownership of the local population may offer the best guarantee for the future survival of the mangrove forests. The conservation project is based on this assumption. 'The ultimate goal of our activities in the region,' says Khurshid, 'is to establish a form of sustainable management of these resources by the local communities themselves. This supposes that the local people are aware of the environmental value of the mangroves. But it also implies that certain skills have been developed, that the organisational capacity of the local CBOs for planning, implementation and evaluation of management plans are strengthened. And the final condition is that the local people will benefit from their efforts.'

Najam Khurshid, who has been working on the conservation of the wetlands of Pakistan for over ten years, has a dream. In his view, the actual mangrove



Former project leader Najam Khurshid

BUREAU/WWF

conservation project in Sandspit and Sonmiani is only the beginning. When, in the foreseeable future, some form of sustainable mangrove management in the project areas has been established, it can be applied in other parts of the coastal area. Especially in the very isolated region between Sonmiani and the Iranian border, there is still a huge potential for conservation. 'If we succeed in our goals in the present project, Khurshid believes, 'this could serve as a model for the whole region.'

Khurshid's dream is based on an old, almost forgotten festival called *mela*. Once, the people in the rural areas in Balochistan used to celebrate this festival. 'People did enjoy these occasions. They cooked all kind of things, played games, etc. It was a moment of joy, of relaxation.' Why not try to re-establish this festival, the former director of the WWF Karachi's office suggests. To start with, Sonmiani would be the perfect place. The local CBO seems quite capable of organising a yearly *mela* at the beginning of the plantation season. The planting of newly grown saplings from the nurseries would become a joyful moment, combined with all kinds of festivities. 'This way,' Khurshid dreams, 'we could create a link with traditions in the region and integrate environmental activities into it. I am sure people would accept the environmental message much easier if it is presented in such a joyful manner.'

Maybe in five or ten years, Khurshid dreams on, people from all over Balochistan Province will come

to Sonmiani to attend the plantation *mela*. 'Or they will create their own version of it. This way it would spread all over the province.'

Self-sustaining

The dream of the plantation-*mela* is symbolic for the way the people of the mangrove conservation project see their own role. The several current activities - ranging from maintaining the nurseries and spreading the conservation message to initiating alternatives for mangroves exploitation - should be taken over by the local community organisations as soon as they are ready for it. The main parts of the project should become self-sustaining. The WWF Karachi office could then concentrate on spreading the environmental message on a broader scale - in which the Wetland Centre will be quite instrumental - as well as shifting attention towards other threatened mangrove areas.

Is this not too ambitious a goal for the five-year period the project is planned for, we ask. 'That may be so', says Khurshid, 'but I am convinced we need ambitious goals. That will bring out the best in us as well as in the people who do the actual work in the field. The initial progress in the project is slow, sometimes too slow for impatient environmentalists. But if you do not take your time with the local communities, they will refuse you. After you have won their confidence, things can be speeded up. We are still in the initial process but we have reached the point of entering this acceleration phase.' ▲

Pakistan Mangroves Project objectives

The overall objective of the project is 'to contribute to the conservation of mangrove forests in coastal areas of Sindh and Balochistan through the promotion of local sustainable management and information dissemination.'

At the end of the project the following specific objectives will have been achieved:

- 1 degraded mangrove forests restored, mangrove plantations established, and mangrove forest areas brought under local sustainable management;
- 2 a well known, self-sustaining Wetland Centre established at Sandspit.

As for the first objective, the following project outputs are expected to have

been achieved after five years of project implementation:

- approximately 140 ha. area rehabilitated by mangrove plantations;
- some 700 ha. of mangrove forests, including 140 ha. of rehabilitated area, under sustainable management;
- four locally managed nurseries in operation with a production level according to the management plans;
- 40 ha. of established mangrove plantations;
- a validated technical menu for sustainable management of mangrove forests.

As for the second objective, the following outputs are expected to

have been realised upon completion of the project:

- a fully equipped Wetland Centre with an institutional network;
- approximately 10,000 individual visitors, 6,000 schoolchildren, 2,000 students have visited the Centre. In addition, 360 persons have participated in excursions and 125 in seminars;
- didactic/informative materials produced for different target groups; a regular programme of at least 24 excursions/field trips and 5 seminars;
- funds from alternative sources have been raised to maintain the Centre;
- staff has been trained to run the Centre.

Dealing with the decisive factors

People living in isolated areas like Sonmiani Bay in Balochistan are used to taking care of their own business. If a substantial part of these villagers, within a relatively short time period, is ready to cooperate with a conservation project that undoubtedly will influence their traditional way of living, something important has been achieved. As project leader Ali Hasnain put it: 'Two years ago, local people only were interested when we talked about their socio-economic needs. They stopped listening as soon as we raised the conservation subject. Now they really respond when we touch the subject of degradation of the forests and ways to change that situation.'

Involving the local communities in sustainable harvesting and managing the mangrove forests is the overall strategy of the project. Reaching a situation of full local management of the mangrove resources is a long-term process and cannot be reached overnight (or within a five-year project period). There is a need to work step-by-step in these conservative communities, as the WWF-staff has experienced. There is also the problem of local and provincial authorities which are sympathetic to the goal of conserving the mangroves but lack sufficient knowledge, manpower and funds to really support the process.

However, the project seems to be well on course. Gradually, field activities are supported by training and extension activities. After the participatory appraisal of the socio-economic needs of the population, first contacts with NGOs which could support new initiatives have been established. The construction of the Wetland Centre, completed in August 2000, really was a milestone. It is the first time in Pakistan that an institution exclusively oriented to the education of the public on the

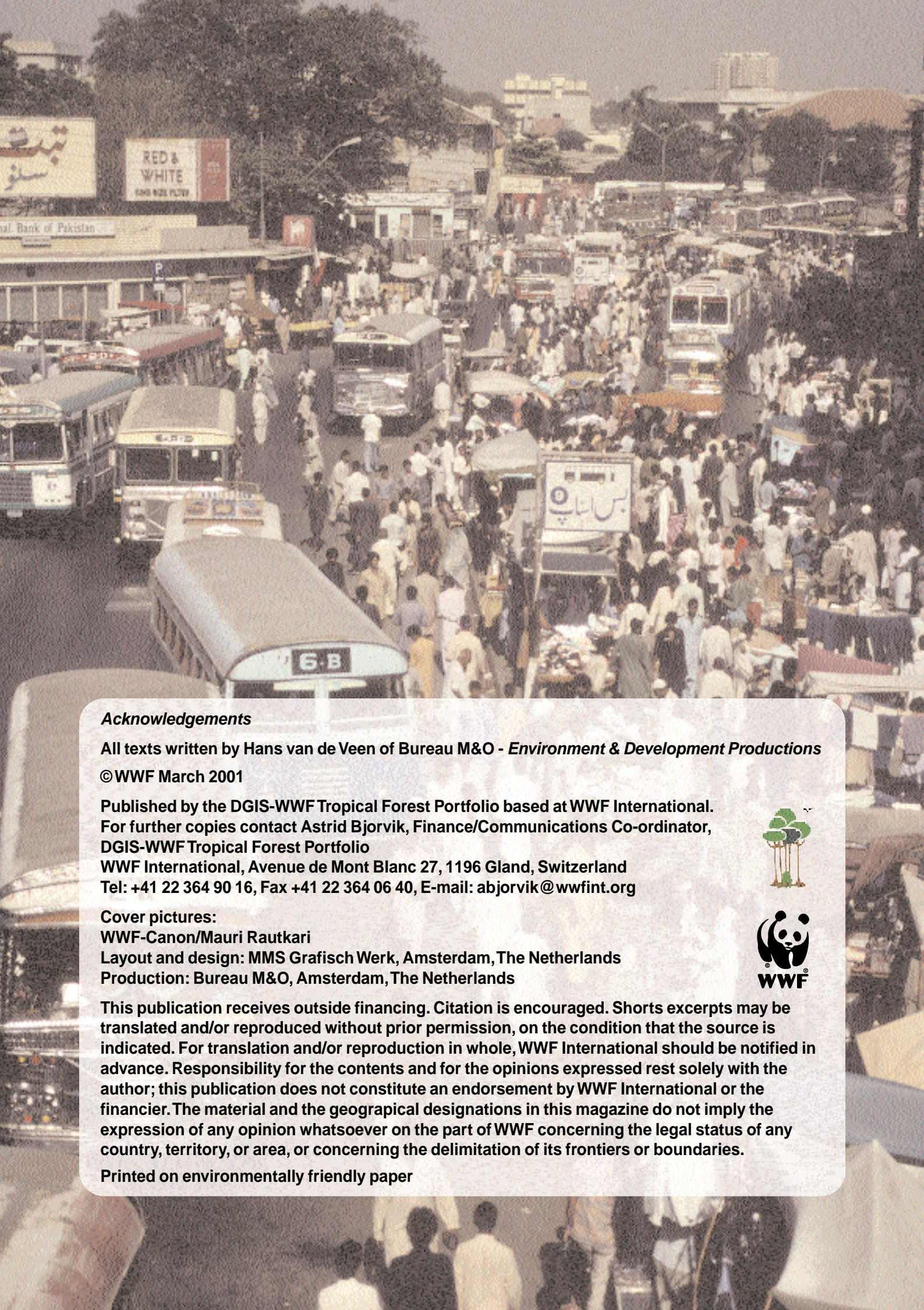
importance of the mangrove ecosystem has been created.

As far as there is a drive towards mangrove conservation in Pakistan, it is oriented towards the Indus Delta. This comes as no surprise since this Delta contains the bulk of the Pakistani mangrove forests. Not one single conservation effort existed in the Balochistan coastal area until the WWF project started. The ecological importance of this area lies in its rich biodiversity. Also, the degree of water pollution in this Province is still relatively low. And the fact that the area is small means it is easier to manage the conservation process. A well-functioning conservation project in Sonmiani, could indeed work as a model for the whole region, as is hoped by the WWF project management.

In the end, however, the success of efforts to conserve the mangrove forests in this region will be decided by trends which are grossly out of the control of the WWF project. Pollution, the diminishing of freshwater supply, the overexploitation of the fish stock: these are the really decisive factors relating to a sustainable future for the coastal areas. Here lies a big responsibility for local and national authorities. The intense pressure of utilisation of the mangrove resources beyond sustainable limits coupled with the lack of knowledge about them, calls for the development and the implementation of a proper National Mangrove Management Plan. Being the most influential environmental organisation in the country, WWF should lobby hard for the establishment of such a Management Plan.

The battle for the conservation of the Balochistan and Sandspit/Sindh mangroves may be won in the short run. But the final war to save the mangrove ecosystem in Pakistan could still be lost.





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