A Framework for
Sustainable Development

District Vision
BADIN

District Government Badin
Government of Sindh

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Sustainable Development

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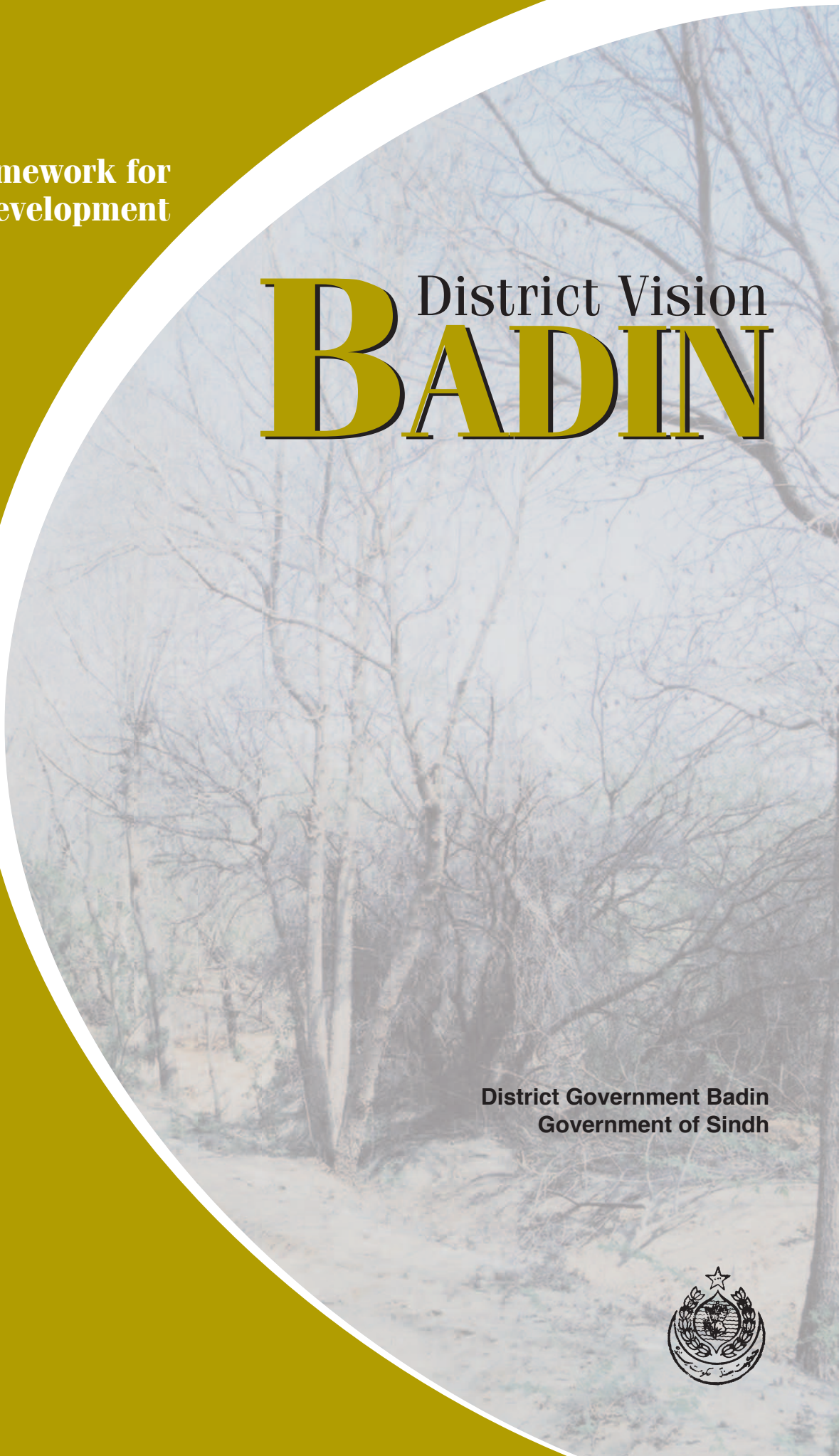

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Government of Sindh

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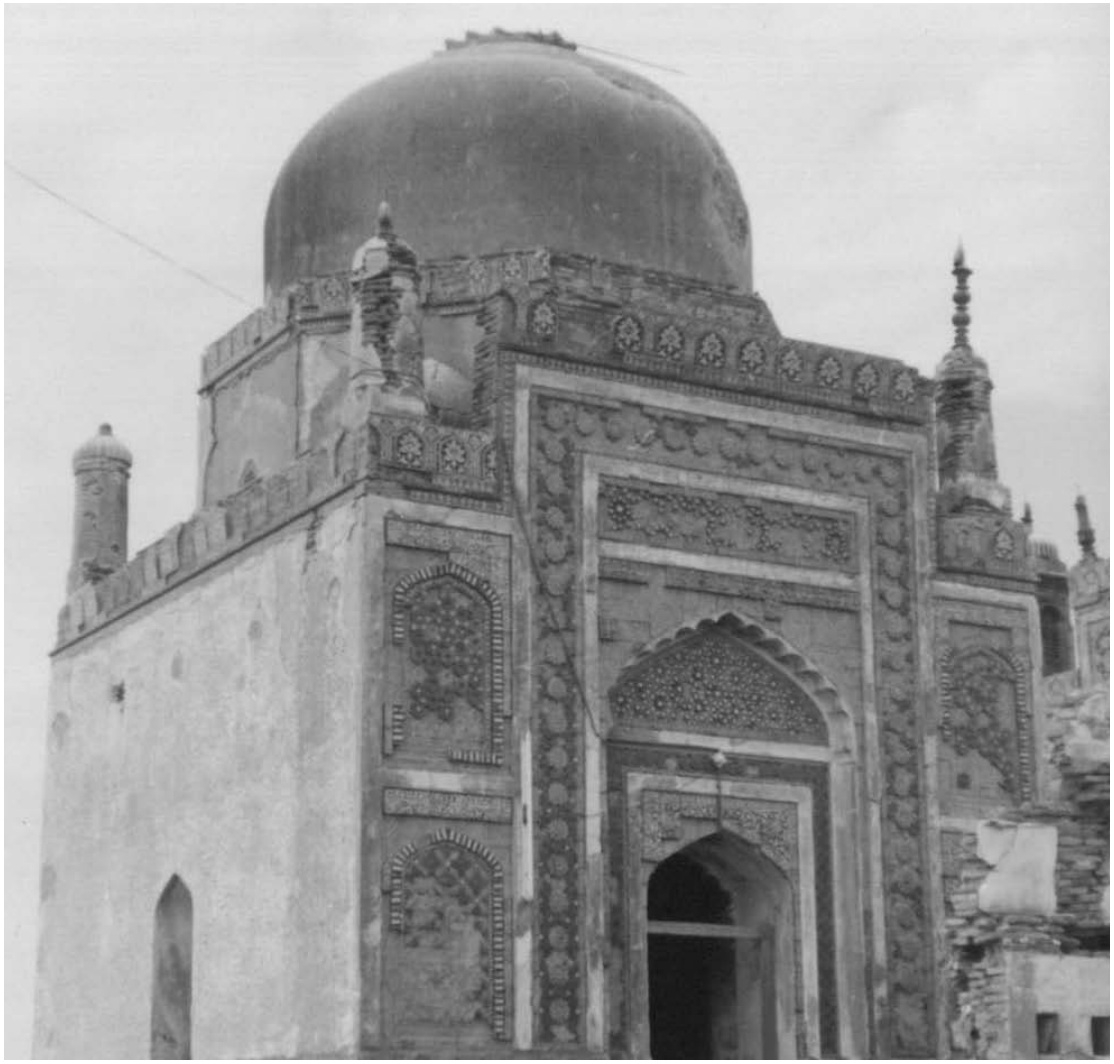


Acronyms and Abbreviations

ADP	Annual Development Plan
ARI	Acute Respiratory Infection
AWB	Area Water Board
BHU	Basic Health Unit
BP	British Petroleum
BRDO	Badin Development and Research Organization
BRDS	Badin Rural Development Society
CBO	Community-based Organization
CCB	Citizen Community Board
CNG	Compressed Natural Gas
CPR	Contraceptive Prevalence Rate
DVB	District Vision Badin
DPOD	Dhoro Puran Outfall Drain
DPT	Diphtheria Pertussis Tetanus

E&P	Exploration and Production
EDO	Executive District Officer
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environment Protection Agency
EPI	Expanded Programme for Immunization
ESD	Education for Sustainable Development
FO	Farmers' Organizations
FPAP	Family Planning Association of Pakistan
FPCCI	Federation of Pakistan Chamber of Commerce and Industry
FWC	Family Health Centre
GEF	Global Environment Facility
ICT	Information and Communication Technology
IDP	Integrated Drainage Programme
IED	Institute for Education Development
IEE	Initial Environmental Examination
IIMI	International Irrigation Management Institute
IT	Information Technology
IUCN	The World Conservation Union
KPOD	Kadhan Pateji Outfall drain
LBCAWB	Left Bank Canals Area Water Board
LBOD	Left Bank Outfall Drain
LGO	Local Government Ordinance
LPG	Liquid Petroleum Gas
MCH	Mother Child Healthcare
NCHD	National Commission for Human Development
NCS-MTR	National Conservation Strategy-Mid Term Review
NDP	National Drainage Programme
NGOs	Non-government Organizations
NPIWC	National Programme for Improvement of Watercourses
NRM	Natural Resource Management
NRMP	Natural Resources Management Program
NRPP	Natural Resource Protection Programme

NRSP	National Rural Support Programme
PFFF	Pakistan Fisher folk Forum
PITE	Provincial Institute of Teachers Education
PRSP	Poverty Reduction Strategy of Pakistan
P&DD	Planning and Development Department
RAMSAR	Ramsar Convention on Wetlands
RBOD	Right Bank Outfall Drain
RD	Reduced Distance
RHC	Rural Health Centre
RHSC	Reproductive Health Services Centre
RMP	Registered Medical Practitioner
SAFWCO	Sindh Agriculture and Forestry Workers Coordinating Organization
SAP	Social Action Plan
SASO	Sindh Agricultural Supply Organisation
SFD	Sindh Forest Department
SIDA	Sindh Irrigation and Drainage Authority
SLGO	Sindh Local Government Ordinance
SMO	SCARP Monitoring Organization
SNE	Schedule for Non-Development Expenditure
SPO	Strengthening Participatory Organizations
TB	Tuberculosis
TMA	Taluka Municipal Administration
TRC	Teachers' Resource Centre
TRDP	Thar Rural Development Programme
TT	Tetanus Toxoid
UNEP	United Nations Environment Programme
WAPDA	Water and Power Development Authority
ZTBL	Zarai Taraqqiati Bank Limited (ZTBL)

Local Terms

Anjuman	association
Chakki	a small mill for grinding flour
Chikoo	sapodilla
Dargah	Sufi shrine
Deh	smallest division of land
Dhand	lake/wetland
Fakir	a (spiritual) devotee
Hakeem	a traditional doctor
Jati	Hindu minority
Jhugies	huts (wood, straw)
Katcha	uncemented/not lined
Kharif	summer crop/season
Mallah	boatman
Maund	traditional unit of weight = 37.32 kg
Musalihat	Mediation (for conflict resolution)
Mushavirat	consultation
Nazim	mayor
Nazimeen	mayors
Naib	deputy
Pir	a spiritual leader
Pucca	cemented/lined
Rabi	winter crop/season
Taluka	sub district
Tapa	Division of land larger than Deh
Warabandi	scheduled supply and closure
Zilla	district

ACKNOWLEDGMENTS

With the development of this District Vision, Badin has become the first district in Sindh Province to develop such a document as mandated by the Sindh Local Government Ordinance. This document serves as a planning tool for the district government.

This overarching document, developed through intensive consultative processes, prioritizes local issues and suggests viable solutions with a reflection of their needs. It was developed using wide stakeholder participation with both civil society and the local government together with IUCN, which was part of the whole process. We would like to extend our thanks to all contributors to the development of District Vision Badin.

The inputs of various stakeholders were instrumental in determining the needs and aspirations of the people of Badin. We are particularly grateful to the various departments of the district government, civil society organizations and the media who took the time to attend the consultative workshops and provide us with an in-depth analysis of the various issues and viable recommendations for the Vision. Without their contribution, it would not have been possible to complete this significant task.

The following played a pivotal role in the development of the District Vision:

District *Nazim* Badin,
District *Naib Nazim*, Badin
District Coordination Officer, Badin
EDO, Finance & Planning, Badin
EDO, Revenue, Badin
District Information Officer, Badin

The District Government Badin appreciates and acknowledges Sindh Programme Office of IUCN Pakistan for extending support and collaboration with the district government; without their technical support throughout the process, this pioneering endeavour would not have been accomplished.

EXECUTIVE SUMMARY

Under the Sindh Local Government Ordinance 2001, the District Nazims are expected to provide the Vision for district-wide development along with strategies as to how it could be achieved. This initiative is likely to ensure that good governance and sustainable development are part of the Local Government Plan; and, that it would improve the capacity of district government to develop sustainable livelihoods through social and environmental development.

The District Vision Badin (DVB) is a prescriptive and future-oriented document, unencumbered by excessive detail and data; at the same time it is precise and explicit enough to promote greater action and implementation. The unambiguous document will enable users and stakeholders to arrive at unequivocal decisions without the need to examine an issue extensively, or become mired in complex detail and elaborate analysis. Thus, the target audience and owners of this document - i.e. the people and elected representatives of the district, as well as the administrative structure - will find it more comfortable to debate, evaluate and pursue recommendations as part of a concerted effort to achieve

the goal of the district's sustainable development.

The DVB aims at harnessing and improving skills and capacities coupled with creating an environment where synergy, integrated interventions and a combination of skills and motivation can ensure optimal use of resources. This will achieve the objective of mitigating poverty, improving access to basic services and enhancing the overall quality of life within a decentralized system of development planning and implementation.

As part of the initiative, a district website (www.badin.gov.pk) has been developed. It provides key information about the district in all important development areas and the organizations - both government and NGOs - working in the district. An attempt has also been made to provide latest news from the district through the website. New features planned for the website include databases, as well as the newsletter for the District Government.

The website is only one of the components of a District Development Information System (DDIS) that is being planned to introduce in the district. Development information pertaining to population, health, education etc. has already been collected from all the Union Councils and has been put into a database. This information would ultimately drive a Decision Support System (DSS), which would be used by the district administrators and planners for both planning and monitoring purposes. A large part of this information would also be available to the citizens through the website.

As a supplementary resource for the Vision, a documentary titled 'Awaiting the Cranes' Return' has been developed. The documentary portrays the issues being faced by the District Badin and suggests their remedies.

The Vision

Agriculture

Most of the population of Badin District is rural, with farming being the main occupation. Rice, sugarcane, cotton, wheat and sunflower are the major crops. Minor crops include onions, chilies, pulses, tomatoes and melons. Even the industry that exists depends on the agricultural sector. Over time Badin has established itself as a sugar estate in Sindh, housing six large sugar mills; however, the current scenario is changing rapidly.

Lately, however, crop yields in the district have been low. This is attributed to many factors including lack of research, low availability of quality crop seed and land degradation (waterlogging and salinity) caused by inappropriate farming practices. Agricultural productivity is affected by adequate supply of water as well as its timely release. Badin District is irrigated primarily through the Sukkur and Kotri barrages. Access to irrigation is limited because of the shortage of freshwater downstream from Kotri Barrage. Even in areas where irrigation water is available, there is poor implementation of the best techniques to prevent wastage of water. The issue of water governance is thus a pressing concern for the stakeholders in this sector.

Forests

The total forest cover in Badin is a mere 12000 hectares. There are no natural inland forests in the area. However there are two irrigated plantations known as the *Rari* and *Boharki* forests.

As there are scant energy resources in the rural area, the local population's dependence on wood necessitates significant imports, but this dependency also motivates theft and illicit felling. Forests are a vital part of the conservation component of the sustainable development triad. This crucial link has been ignored repeatedly

by the concerned authorities and forest resources have instead been allowed to become severely depleted.

Livestock and Poultry

Livestock contributes roughly one-third to the total share of agricultural production. Rearing of cattle is a secondary occupation in Badin District, as agriculture is the main activity. Most farmers traditionally keep some poultry for their eggs and meat. It has been estimated that a substantial number of animals are used in farm operations.

There is a need to increase the number of livestock to generate income. Production for the market, even at the expense of consumption at home, has become quite common in many areas in Sindh Province. In some areas of Badin, organized livestock farming is taking place. Cattle or livestock farms are located mainly in urban areas. Most other units are small in size and not very well kept.

Fisheries

Fisheries are an important activity in Badin. About 10 percent of the overall marine fish exports originate from Badin. The district is also considered to be among the most productive in Sindh for freshwater fisheries. Sindh inland fisheries statistics for 2002 revealed that out of the total fish production of 80 659 tonnes, some 14 152 tonnes or 17.5 percent was produced in Badin, which was second only to Thatta District in inland fish production.

There is a need for increased support of the current fishing industry with increased access to credit, improvement and development of landing facilities and the establishment of post-harvest facilities at appropriate sites. The private sector should be encouraged to invest in the development of fish harbour infrastructure facilities.

The lack of research and development activities in the field of fisheries makes informed and effective policy-making difficult. Current and reliable statistics on fish biomass are necessary for the analysis of loss of biodiversity in coastal and inland waters as well as environmental degradation in the surrounding areas.

Biodiversity

Most development activities have a direct impact on biodiversity. Demographic trends and socio-economic conditions in the district have far-reaching consequences on ecosystems. Population growth and poverty exert a heavy pressure on natural resources. Isolated interventions do not address the root causes of biodiversity loss. This understanding needs to be incorporated into all planned interventions.

In this connection, awareness raising on a massive scale is required to enlighten stakeholders, concerned agencies and local communities. At the administrative level, it will be necessary to ensure continuity in policy and long-term institutional support at all levels. At the same time, cross-sectoral partnerships and community involvement will need to be developed. These efforts should be backed by biodiversity-specific legislation and widespread reform.

Wetlands

Badin District is an important component of the coastal ecosystem of Sindh. A number of important wetlands are situated in the district and many have become degraded over the past few years.

Effective conservation activities must be undertaken to protect the natural properties of wetland ecosystems. These actions can range from the strict protection of an area to the inclusion of conservation activities in development projects, based on detailed action plans aimed at the protection of wetlands and wildlife habitats.

Irrigation and Drainage

The agricultural sector of Badin is completely dependent on canal irrigation, which requires a highly efficient network of tributaries, channels and water courses.

The entire district is irrigated by the Sukkur and Kotri barrages. The area fed by Kotri Barrage is divided into perennial and non-perennial systems of irrigation. The irrigation network mainly comprises the Guni, Phuleli, Akram Wah and Nasir canals. Combined with the irrigation water received from Sukkur Barrage, the total irrigation supply comes to 433 cu m/sec for the command area of 603 000 hectares.

Energy

Like any other rural district in Pakistan, Badin is predominantly dependent on wood as a primary source of fuel for cooking with electricity being a major source of lighting. 1998 national census statistics revealed that 76.29 percent of the housing units had electricity for lighting while 23.39 percent used kerosene for this purpose. The remaining 0.32 percent used other sources. In terms of fuel, 72.70 percent of the households used wood, 21.97 used gas, 3.92 percent used kerosene while the remaining 1.41 percent used other sources. There are no indications of planning and investment in alternative sources of fuel and energy.

Oil production in Badin accounts for approximately 44 percent of the total oil produced in Pakistan, whereas companies produce 8 percent of the country's gas. According to estimates, the average daily crude oil production from Badin District was recorded to be 20 931 barrels in 1995, 24 002 barrels in 1996 and 25 762 barrels per day in 1997. The highest ever recorded production of 30 000 barrels per day was achieved in 2001. Since then, a decrease in crude oil production has been reported.

Industry

Badin's economy is predominantly agricultural. The available industries are mostly agro-based. Sugar mills and rice mills form a large part of the district's economy, with only one cement pipe production factory. The district is known to be a sugar estate as it houses six large sugar mills. There are about 79 rice husking mills and about 100 flour mills.

Currently all cash crops (including fruits and vegetables), live animals, dairy products and fish catches are dispatched to the nearest market in *taluka* (sub-district) centres such as Badin, Talhar, Matli, Golarchi/Fazil Rahu, and Tando Bago or to industrial centres in Hyderabad and Karachi for processing.

An Industrial Estate was established in 1986 on an area of 12.2 hectares (30.2 acres) in Badin. However, it did not attract investors. An environment conducive to industrial growth must be developed to encourage investors and industrialists. The revival of the Industrial Estate must be examined. Incentives and provisions must be made, for example to minimize transport and marketing costs, farm-market roads could be built.

Effluent and Solid Waste Management

The major cause of coastal pollution and deterioration has been agricultural effluents from lower Punjab and Sindh. Waterlogging and salinity also contribute to pollution along with the pollutants carried by the Left Bank Outfall Drain (LBOD). Badin houses agro-based industries, which release pollutants into surface drains as well as nearby depressions. In urban areas, the supply of contaminated water, unsafe disposal of municipal and solid waste as well as infectious hospital wastes and congested housing conditions also contribute to environmental degradation. Rural areas in Badin are badly affected by

waterlogging and salinity and lack of pure drinking water.

Education

According to the 1998 Population Census, the overall literacy rate in Badin District was 24.63 percent. The male and female literacy rates were 35.07 percent and 12.9 percent respectively. The urban and rural literacy rates were 44.76 percent and 20.52 percent respectively. The overall literacy rate in Badin District has risen to 27.52 percent in 2001, an increase of less than 1 percent per annum.

Education plays a vital role in the development of an economy. Improving the education sector not only increases efficiency in producing goods and services, but also helps in poverty alleviation. A market benefit of education is higher output due to increased labour productivity.

Health facilities

According to the office of the Executive District Officer, Health, the health infrastructure includes one civil hospital, three taluka hospitals, 12 Rural Health Centres (RHCs), 38 Basic Health Units (BHUs), one mother and child healthcare (MCH) centre with 20 beds and 69 government dispensaries in addition to 28 experimental dispensaries. There are 317 sanctioned male medical officers, 60 female medical officers, 15 lady health visitors and 44 female health technicians. The medical staff in place is, however, much lower than the sanctioned strength. The number of persons to be served by one doctor was calculated to be 5 428 in 2001.

Diarrhoea, dysentery, tuberculosis and ARI are prevalent diseases. Kidney and skin problems are also pervasive. Polio, tetanus, chicken pox and snakebite cases are frequently reported, especially in rural areas. The major issues identified in the health sector include insufficient staff, medicines, ambulance facilities, women medical officers, rural health centres, maternity homes, MCH centres and laboratory and ultra-sound facilities.

Water

The main source of drinking water for villages as well as urban water supply schemes is canals and water courses. Owing to the shortage of freshwater downstream from Kotri Barrage, a major problem being faced, especially by coastal communities is the depleted supply of drinking water. Most of the coastal communities usually purchase water jerrycans at heavy prices and this makes them more vulnerable economically. The water purchased and consumed is very unhygienic and causes many water-borne diseases.

According to the 1998 Population Census, overall, 13 percent of households used piped water (nul), 15.73 percent used hand-pumped water and 6.17 percent had wells as indoor sources of drinking water.

Infrastructure and Housing

The major issues in the infrastructure of Badin District include constraints in the financing of projects and maintenance of infrastructure. The Annual Development Plan (ADP) projects remain underfunded and projects scheduled for completion in a specified time-frame take longer, which impedes the development process and reduces the social benefits. Owing to poor repair and maintenance, valuable assets suffer huge damage.

According to the 1998 Census, there were 101 669 housing units in total: 11 553 *pucca* houses (about 11 percent); 10 501 *pucca/katcha* houses or about 10 percent; 40 986 *katcha* (mud and wood) houses (about 41 percent); 36 478 *jhugies* or huts (wood, straw) (about 36 percent); and 2 151 temporary housing units such as tents were recorded or about 2 percent. The pressure on housing can be judged by the average

household size, persons per room and rooms per housing unit. Housing units with two, three, four and five rooms and more comprised only 5.30, 4.08, 1.30 and 0.63 percent respectively, while housing units with one room only accounted for a staggering 81.82 percent in 1998. In urban areas, the proportion of 10 or more persons per housing unit was 15 percent. This serves as an indicator of the widespread poverty in rural Badin.

Ecotourism

Badin has a rich cultural and historical heritage. It is the land of spiritual leaders who have influenced many people. Some of the historical shrines include *Dargah* of Luari Sharif, Saman Sarkar, Ghulam Shah Qadri, Sajjjan Sawai, Dodo Somro, Sawan Fakir, Shah Trial Ahmed Rajo, Roopa Marri, Wagah Kot and Yousif Fakir. The coastal areas and deserts of the district have their own attractions. The opportunities for ecotourism in Badin are considerable.

An office of the Tourism Department could be established in Badin District. The District Government and other organizations must undertake the publication and circulation of tourist information brochures as well as tourist packages in collaboration with the private sector.

Disasters and Vulnerability

Major disasters in recent years include the cyclones in 1964/1965, heavy rainfall in 1973, floods during 1988, torrential rainfall in 1994, a cyclone in 1999, an earthquake in 2001 and recent floods in 2003. The number of people affected in the latest floods surpassed 360 000 in Badin District. In terms of damage to property 22 567 houses were destroyed, 160 villages were inundated and standing crops over 80, 937 hectares were obliterated. More than 200 000 villagers were rendered homeless. Precipitation of 350 to 450 mm coupled with a huge surge of saline water from breaches of the LBOD further aggravated the situation in Badin and Golarchi/Shaheed Fazil Rahu *talukas.*

Disaster management is currently an ad hoc activity undertaken only in case of emergencies. There is a need to institutionalize it by establishing a disaster management and mitigation wing under the district administration. A master plan for disaster awareness and management should be prepared and a permanent system of reviewing and monitoring the implementation of various components should be introduced.

Devolution and Decentralization

Good and effective governance promotes economic prosperity and social cohesion, reduces poverty, enhances environmental protection and sustainable use of natural resources, and strengthens democracy and human rights. Devolution affords tremendous opportunities to implement programmes and projects at the local level, while considering ground realities. A strong political will in implementing the devolved form of government is required to get the desired results.

Non Government Organizations

There are 25 registered NGOs working in Badin. More than 64 percent work for women and youth welfare. Health and population welfare and education are top priorities for 24 percent and 12 percent of NGO activity in Badin respectively. Other civil society organizations in Badin include the two factions of the Press Club and several wings of political parties, labour organizations and women's groups.

There is a need for organizational development and capacity building of the local NGOs, in order to ensure the long-term sustainability of the participatory development initiatives in Badin District.

Implementation and Funding Mechanisms

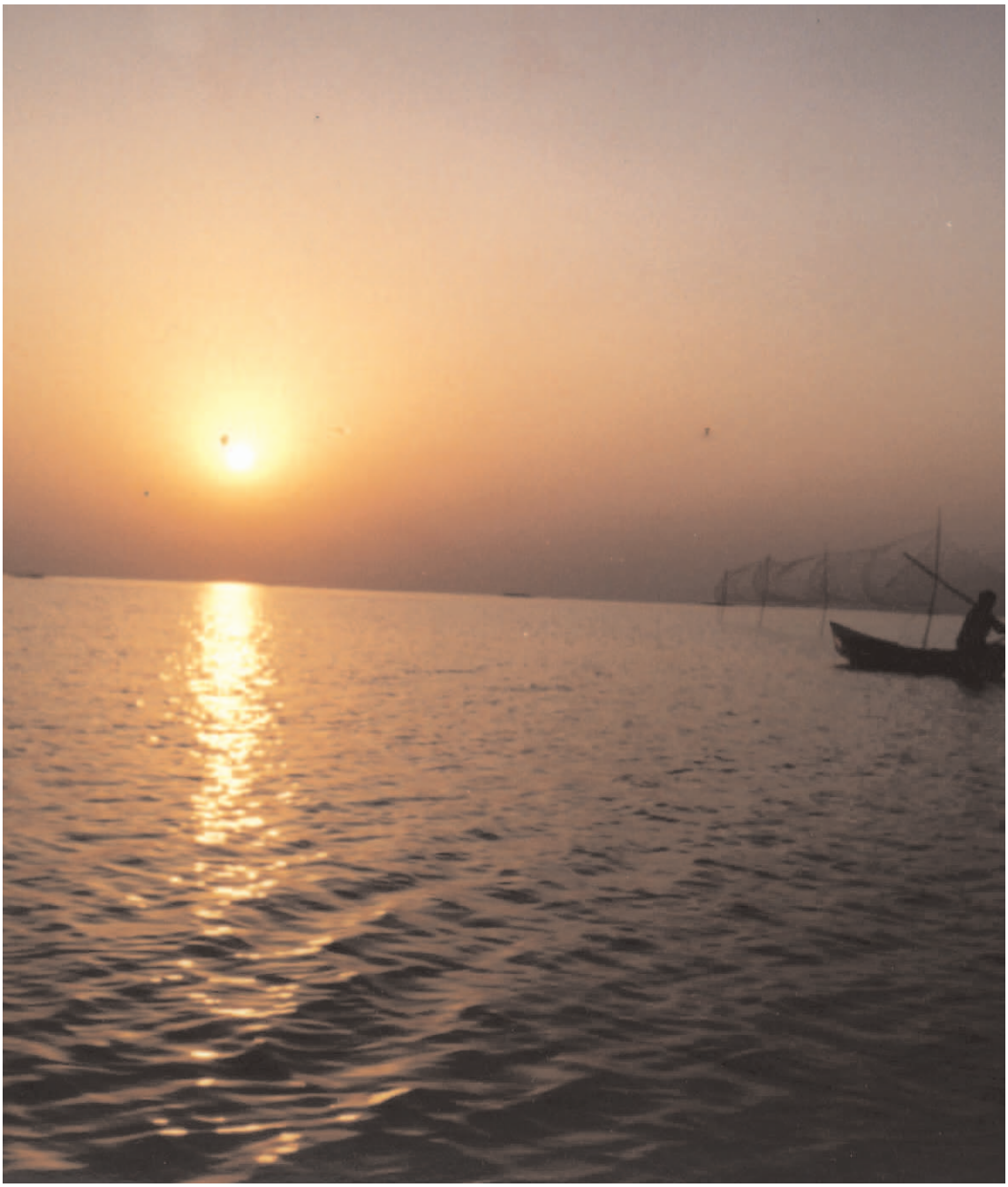
The Badin District Vision is a long-term prescription that needs sustained commitment for realization. Its implementation will depend on the complete and proactive commitment of the District Government. Almost all interventions in each sector will require an element of integration and focus in consonance with the parameters indicated in the DVB. The sectors covered in the DVB include functions that are not yet devolved and are not going to be devolved in the near future.

Fiscal decentralization is central to devolution and the long term DVB has acquired the requisite qualification to see additional allocations from the provincial consolidated fund to support strategy priorities.

For additional funding, the district government can explore federal commitments under the National Conservation Strategy, the Poverty Reduction Strategy and the National Environment Action Plan.

CHAPTER 1

INTRODUCTION



1.1 Introduction

Since the creation of Pakistan in 1947, its citizens have had the distinction of having two policy statements from their elected representatives in their Constituent Assemblies.

The Objectives Resolution passed by the first ever Constituent Assembly is a solemn declaration that defined the objectives of state creation, and constitutional parameters for the newly born state. This resolution was a preamble to the Constitution and became a substantive part of the Constitution in Article 2-A.

The second policy statement was endorsed in the National Assembly of Pakistan when the Principles of Policy were enshrined in the Constitution. These principles determined the parameters of the social and political order which the Constitution was aiming to create. The two policy statements, inter alia, contain the following philosophies:

(1) Power and authority is a sacred trust to be exercised by the State through the elected representatives of the people.

(2) Political dispensation is to adhere to the norms and principles of democracy, freedom, equality, tolerance and social justice.

(3) Pakistan as a Federal Republic.

(4) The Federation and Provinces are obliged to encourage local government institutions.

(5) The State is required to ensure the welfare of the people through decentralization of Administration.

These two statements - being directives of state policy and fundamental to governance - have very clear aims and objectives. They strive to inculcate within the citizens of the country a sense of honour and respect for their country. State institutions are obliged to remain committed to realize the objectives enshrined in these two solemn declarations.

Devolution and decentralization are embedded in Article 32 & 37(i) of the Constitution. The first provision requires state institutions to promote and encourage local government institutions composed of elected representatives of the areas concerned, with special representation by peasants, workers and women. The second provision requires the state to decentralize government administration in order to facilitate expeditious disposal of its

business to meet the convenience and requirements of the public. In relation to these provisions the State refers to the Federal Government, Parliament, a Provincial Government, a Provincial Assembly and such local or other authorities in Pakistan that are, by law, empowered to impose any tax or cess. The magnitude of emphasis on local governance and decentralization can be assessed from the quantum of obligation created for the State in its expanded meaning in Article 7 of the Constitution. A new dimension has been added to the concept of decentralization with the enactment of Article 140-A in the Constitution which requires provincial governments to establish local governments and entrust them with political, administrative and financial powers and authority.

In 2001, the Sindh Local Government Ordinance (SLGO), promulgated to effectuate devolution, had the following declaration in the preamble:

"WHEREAS it is expedient to devolve political power and decentralize administrative and financial authority to accountable local governments for good governance, effective delivery of services and transparent decision making through institutionalized participation of the people at grass-roots level...." .This declaration crystallizes the intentions of the law giver. As a "prelude" it defines the extent, limits and horizons for the law to impact upon. The general purposes of the LGO are very clear in the preamble and the people have every right to expect the institutions and the social and political bodies established as a culmination of this law to strive for the purposes embedded in the statement of aims and objectives.

The expediency given in the preamble has two major components i.e. the devolution of political power and the decentralization of administrative and financial authority. It has also clearly defined the recipients of the devolved powers and authority i.e. "accountable local governments". The desired "outcome" also finds very clear mention - improvement in governance, effectiveness and efficiency of services and transparency in decision-making. At its conclusion the preamble also defines the mechanics for realization of the outcome i.e. through institutionalized participation of the people at the grassroots level. The context is addressed by another statement preceding the preamble of the Ordinance

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District Government with vision to change development paradigm in the District.

- the law has been promulgated to "reconstruct and regulate local governments".

The law, after creation of local governments for local areas, expands on the functions, power, authority and responsibility delegated and decentralized to every tier of local government at district, taluka and union level. Devolution and decentralization are extended and limited to the control, operation and management of devolved functions.

Devolution and decentralization have three basic elements of authority, resources and responsibility. Authority relates to the administrative aspect of the process. The law very clearly outlines that the administrative authority for management of the devolved offices stands decentralized on commencement of the Ordinance, and this authority comprises the operation, management and control of the decentralized offices. This authority is qualified by one provision that requires local governments to exercise their authority in accordance with the general policy of the provincial government.

The resource element of decentralization comprises two sub-elements of human and fiscal resources. The public functionaries posted to and performing in devolved offices are the human assets which local governments are required to groom, harness, motivate and activate for discharge of their occupational responsibilities. Fiscal resources for local governments are intended to create an enabling environment required by these entities for improvement in governance, efficiency in delivery of services and meeting the genuine aspirations and expectations of the electorate. The responsibility element of local governance is focused on transparency and accountability. The law requires local governments to take decisions in a transparent manner and ensure transparency through political and legal accountability. Section 16(3) of the LGO addresses this aspect in the following terms:

"The District Government shall be responsible to the people and the government for improvement of governance and delivery of services within the ambit of the decentralized authority."

It cannot be denied that the present devolution is an all encompassing and Herculean task. The magnitude is further multiplied because this plan uprooted a century-old, well-entrenched system of administration. Focused study of the Ordinance would reveal that the proponents had a clear idea of the enormity of the job and as such tried to put in place certain institutional arrangements to iron out the rigours of transition. At the outset, the law defined local areas and created local governments for them. The union council is the ultimate administrative unit at the district level. The elected entities including *Nazimeen* and councils have a dominant presence and role in these local governments. The *Zilla Nazim,* being the administrative head of the district government, is mandated to provide a vision for district-wide development, leadership and direction for its efficient functioning. The *Zilla Nazim* is also required to develop strategies and time-frames for accomplishment of the development goals approved by the *Zilla* Council. The *Zilla* Council, being the reflection of the will of the people in the district, is the forum for approval of long- and short-term development plans. This institution is mandated to require the district government to undertake measures for good governance and improvement in delivery of services. The District *Mushavirat* Committee, with the *Zilla Nazim* as the chair, is required to crystallize the vision for integrated development of the district besides prioritizing and co-coordinating inter-taluka development plans, resolution of intra-district disputes and setting directions for realizing the economic potential of the district. The system envisages an integrated system of development emanating from the process of proactive participation of the people at every level of local governance. The task needs coherent and sustained efforts to outline development priorities in various sectors, carefully calculate the resource requirements and articulate a viable road map for their realization.

1.2 Background and Objectives

After the development of the World Conservation Strategy, each country was expected to formulate its own National Conservation Strategy (NCS). Pakistan was among the first few countries to start this process, culminating in March 1992, when the Cabinet of the Government of Pakistan adopted the Pakistan National Conservation Strategy, which addressed the issues of conservation and sustainable use of natural resources for economic development. The NCS served as the de facto environmental policy for Pakistan and recommended actions to be taken in 14 core areas to address the issues of environmental degradation and to facilitate the sustainable use of natural resources. The strategy was followed by the National Environment Action Plan, which was approved in 2001. Finally, in 2005 the National Environmental Policy was approved to provide an overarching framework for achieving the goals of sustainable development.

One of the main recommendations of the NCS was for each province to develop a Provincial Conservation Strategy. The government of NWFP took the lead and initiated the development of the Sarhad Provincial Conservation Strategy (SPCS). The work on the formulation of the SPCS started in 1992 and the strategy was approved by the Provincial Cabinet in June 1996. Balochistan Province followed suit and developed the Balochistan Conservation Strategy (BCS), which was approved in 2002. The Northern Areas Administration initiated the Northern Areas Conservation Strategy (NACS) Project in 1999. During the process, it was realized that instead of an exclusive focus on environmental protection, conservation with an increased focus on poverty alleviation and sustainable development would better address issues of social, economic, and ecological wellbeing. Therefore, the nomenclature was changed from the Northern Areas Conservation Strategy (NACS) to the Northern Areas Strategy for Sustainable Development (NASSD). It was envisaged that the remaining provinces would also undertake this task.

In a meeting held on June 6, 2003, the Planning & Development Department (P&DD), Government of Sindh and IUCN Pakistan agreed on following multi-pronged strategy to be adopted in Sindh:

(1) At the provincial level, a sustainable development strategy would be developed;

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Participation of community leaders in formulation of the District Vision.

Mohammad Ramzan Khaskhali

Series of consultations brought together diverse stakeholders.

(2) Simultaneously, the proposed strategy would also be projectised to get funding for its implementation; and

(3) In Badin district, a sustainable development vision would be developed.

The devolution plan at district level, presents a good opportunity to mainstream sustainable development into the local government agenda. The IUCN Pakistan has been working in some districts and has gained valuable experience in this regard. Conservation strategies or the strategies for sustainable development have been developed for Abbottabad and Chitral districts of the NWFP, while similar work is ongoing in the districts of Gawadar and Qilla Saifullah in Balochistan.

To achieve the objective of formulating an overarching vision at district level, District Government Badin formally requested IUCN Pakistan's collaboration for the development of the DVB. The DVB process and the document are based on research on ground realities and future needs/requirements of the district. This document will serve as a district-level integrated sustainable development framework, complementing the requirements of the Sindh LGO 2001.

The document is based on the guiding principles of assisting, facilitating and encouraging district government in articulating a development vision for fulfilling the aspirations of the people in Badin. The following areas are emphasized in the document:

- Focusing on core issues in the district, outlining a viable prescription and road map for realization of goals;
- Reforming institutions, systems, processes and procedures for sustainable development;
- Enhancing human resource capital for equitable management of resources;
- Mobilizing finances for integrated and sustainable development;
- Identifying environmentally friendly income-generating opportunities;
- Empowering people through participatory planning and development approaches; and
- Promoting private, public and civil society partnership.

The Vision presents the status and issues of selected sectors, formulates a general

direction and outlines the measures that could be taken to move progressively towards the sustainability of development input. This study focuses on green, brown and socio-economic sectors. Green sectors involve agriculture, horticulture, forestry, livestock, poultry, fisheries, biodiversity, wetlands and water resources (including irrigation and drainage). Brown sectors involve energy, industry and effluent and solid waste management. Socio-economic sectors involve education, health, population welfare, water supply, infrastructure, housing and ecotourism. In addition, it addresses the issues of disasters, vulnerability and governance in the district.

Formulation Process

The development of a viable District Vision depends on the participation of the all stakeholders including community. In this regard, series of consultative workshops were held on various sectors. The purpose of the workshops was to solicit input in determining the needs and aspirations of the people of Badin. The process was very important in terms of identifying the key priorities of the District and hence the destiny of the Badin.

The formulation and compilation process started with consultative workshops in the district to identify major issues and assess the needs by various stakeholders. Policy measures were furnished for improvement in resource management for sustainable economic growth and poverty alleviation.

As a part of the process, series of consultative workshops were held to develop Badin District Vision. In the first workshop, recommendations were sought on sectors like agriculture, irrigation, drainage, livestock, poultry, forest and fisheries. The participants gave their suggestions and highlighted the short, medium and long term needs within all the sectors in the District. In second consultative workshop the participants focused on the key priority areas in socio economic sectors such as education, health, population, poverty reduction, gender and civil society. Participants suggested various options to improve the socio economic condition of District Badin.

A third consultative workshop was aimed at seeking suggestion on sectors like minerals & mining (Oil & Gas), industry (sugar mills, rice mills, brick kilns), physical planning, road, transport,

Mohammad Ramzan Khaskhali

District leadership committed to sustainable development.

communication, electricity, gas, water supply & sanitation, solid waste management, town planning, trade & industry.

Fourth consultative workshop focused on governance. The final draft of the vision was shared with the stakeholders. The participants gave their feedback on the draft vision and suggested some more feasible recommendations.

1.3 Governance and Sustainable Development

Good governance, effective management, economic development, poverty alleviation and conservation are inter-related. Their ultimate confluence is sustainable development. The DVB highlights the nature of the cross-sectoral linkages and assesses their impact on sustainable development. It is based on the premise that the public sector can no longer be the principal actor in the new development paradigm and that genuine stakeholder participation is a necessity. Rather than exclusively undertaking new interventions, the DVB serves as an umbrella strategy, incorporating the goals and concerns of many other plans, programmes and policies currently being implemented in Sindh and Badin.

While most interventions concern devolved departments, there remain crucial overlaps in areas such as coastal development, highways, oil and gas, irrigation and drainage, and ecosystem management which are administered at higher tiers. With sustainability being the objective, this vision recommends periodic review, fine-tuning, improvement, and continuous monitoring and evaluation of key processes and mechanisms as well as the outcomes and impacts of development initiatives. It is envisioned that this process will keep the DVB relevant, providing the district government with requisite flexibility to accommodate emerging trends and changing realities.

No strategy, no matter how thoughtfully prepared, can achieve measurable gains without capacity building and institutional strengthening of the players involved in implementation. Similarly, a development vision cannot translate into reality in the absence of improvement in governance. For effective implementation, the DVB shall need institutional support in various areas to re-align institutions and budgets, increase knowledge, improve monitoring and mobilize non-conventional sources of funding.

Besides support at the institutional level, a key component of successful implementation is stakeholder ownership. The DVB places ownership of its strategic interventions squarely in the hands of the people of Badin. Their will, exercised through the *Zilla* Council, will be pivotal in turning this vision into a manifesto for integrated development endorsed by local governments, elected representatives, the private sector and civil society as a whole.

CHAPTER **2**

General Profile of Badin District

2.1 Geography and Physical Features

The district derives its name from its chief town, Badin. It is located between 24° 13' and 25° 12' north latitudes and 68° 21' and 69° 20' east longitudes. Badin District comprises five *talukas:* Badin, Matli, Golarchi (Shaheed Fazil Rahu), Talhar and Tando Bago. Revenue units comprise 14 circles, 111 *tapas* and 535 *dehs.*

The climate of Badin District is moderate. However, the summer months - April, May and June - are very hot during the day. The mean minimum and maximum temperatures during this period are 25° and 45°C respectively. December and January are the coldest months with maximum and minimum temperatures of 30° and 10°C respectively. The temperature falls abruptly at night. The climate is tempered by the sea breeze, which blows for eight months from March to October, making the hot weather tolerable. The autumn starts in September and lasts for about two months. The maximum recorded humidity at Badin is 76 percent. Rainfall is highly erratic with an average of about 170 mm. The monsoon dominates from July to September. Rainfall is highly unpredictable and years without rainfall are quite common.

The district is part of the Lower Indus plain formed by the alluvial deposits of the Indus River through the ancient Hakra, Nullah and Gungra water courses. Being a vast alluvial plain, its land is highly uniform in character and is not diversified by hills or rivers. The southern part of the district is close to the delta of the river Indus and the land surface is therefore relatively low in comparison with the northern half. The general elevation of the district is about 50 metres above sea level. The eastern part of the district is connected with the sand dunes of Tharparkar District. The degree of slope in Badin is negligible; the water table has a depth of 240 cm in winter and 150 cm in summer. The drainage system is grossly inadequate and poorly maintained. Consequently, the system does not have the capacity to carry even a nominal increase in precipitation. Flooding is generated by canal and salt water from the irrigation and drainage systems flowing into the area.

The Indus Delta is low lying and bears the full force of the southwest monsoon. The entire coast in Sindh is spread over Badin, Thatta and Karachi districts. The delta, since ancient times, has shifted from northwest to the southeast, towards the sea, thereby creating new and fertile lands. Around 1500 A.D., the Indus Delta was reported to have 23 active creeks. At any one time, however, only nine creeks have been active. Due to changes in the main course of Indus River in 1517 A.D. and 1758 A.D., the delta has moved eastwards of Thatta. Several of the creeks on the right bank, including those around Karachi are now inactive. However, the Indus Delta is still reported to comprise 17 major creeks. The delta adjoins the Badin

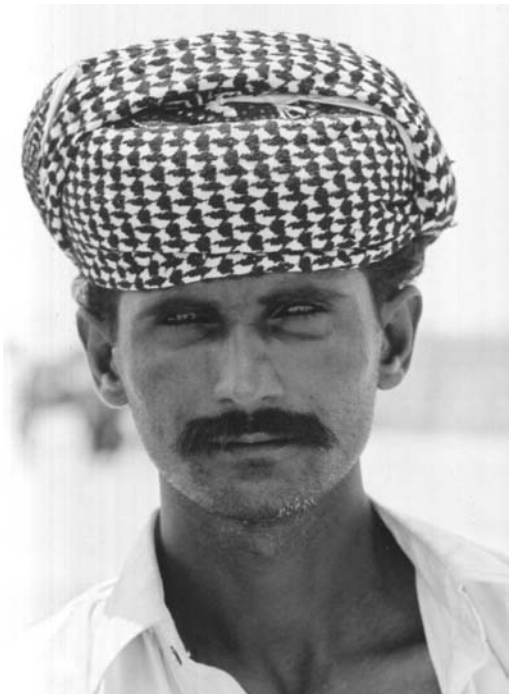
and Golarchi (Shaheed Fazil Rahu) *talukas* of Badin District in which it has two main creeks namely the Shah Samando and the Sir.

2.2 Population

According to the 1998 national census, the population of Badin was 1 136 040, compared to 776 610 in 1981. The population grew by 46.28 percent in 17 years which indicates an average annual growth rate of 2.26 percent. With this degree of growth, the population will double in the next 25 years. Almost 90 percent of the population speaks Sindhi. The average household size in the district is 5.3 persons per house.

Although there is no strong tribal or feudal culture, there are various tribes. Important among them are the Syed, Soomra, Talpur, Leghari, Bhurghri, Memon, Mandhra, Maheri, Ansari, Sama, Juneja, Sheedi and *Mallah*. New settlers come mainly from Punjab and Baluchistan.

The local population is predominantly Muslim. Important among the minorities are the Hindu (jati) who constitute 18.65 percent of the whole. Hindus fall roughly into three main classes: the advanced trading and commercial class in which the Lohana predominates; the intermediate class (Kohlis) who have slightly higher social status than the Rabaries - the primitives and the other scheduled castes. The coastal area communities are mainly occupied by the *Mallah* and Mandhra clans, which comprise fisherfolk and herders who rear camels, goats and cows. The agrarian communities, mainly Talpur, Syed, Memon and Punjabi castes, live inland and constitute landowners, sharecroppers, traders and livestock owners.



Mohammad Ali Qadri

A traditional native of rural Badin.

TABLE 1.1

Population of Sindh

Total Population	1998	1,138,604
	1951	319,070
Average Annual Growth Rate	1951-1998	3.22%
Area		6,726 per sq. km
Density (1998)		169 persons per sq. km
Rural Population	1998	83.6%
Urban Population	1998	16.4%

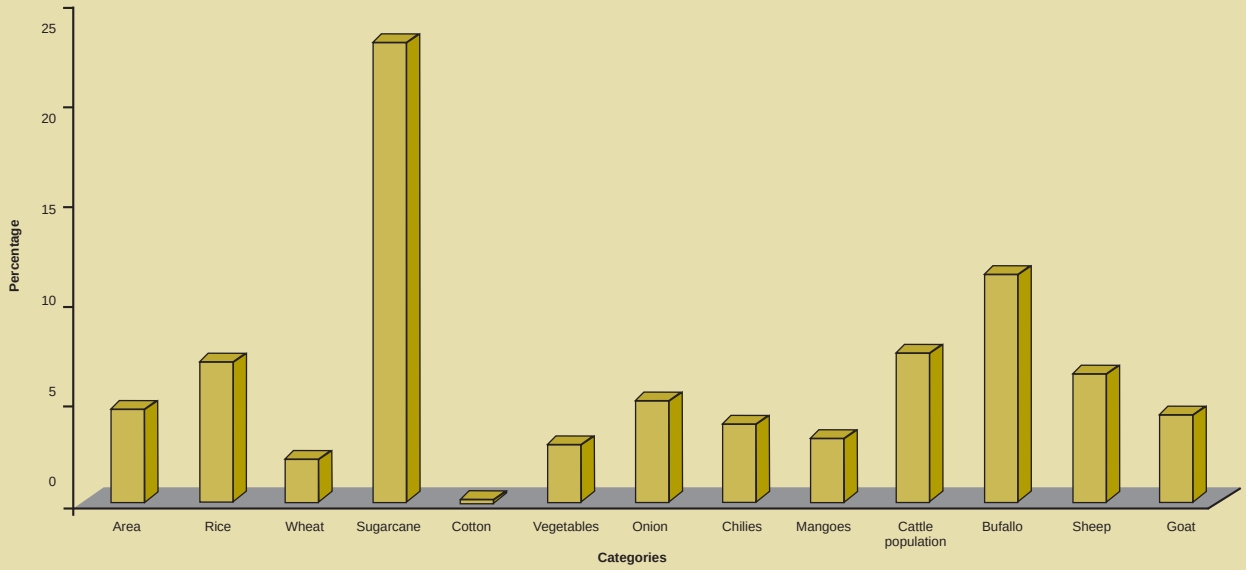
Source: 1997 Human Settlements Survey & 1998 Population Census.

2.3 Cultural and Professional Profiles

Sindh is known as the land of *pirs, fakirs,* and shrines. Tribal bonds are very strong throughout the province and Badin is no exception. Social life revolves on a tribal axis with orbital parameters outlined by religion, customs, traditions, professions, ethnicity and strong attachment to spiritual leaders and shrines. Visiting shrines is customary for the local population. The enormous pull of belief attracts people to shrines in times of trouble, misfortunes and crises. Badin has many important shrines and historical sites. Monthly and annual congregations are held at most of the religious shrines.

FIGURE 1

Badin's Percentage contribution in Sindh



Agriculture is the mainstay of the economy (Figure 1). A number of lakes and freshwater fish ponds allow some communities, particularly the *Mallahs,* to engage in the fishing occupation. Educated and skilled persons are employed in administrative positions in companies in Badin and outside. The district produces sugarcane, rice, oil and gas and the industries related to these commodities recruit the local population.

CHAPTER **3**

GOVERNANCE, LOCAL GOVERNMENT & NGOS

3.1 Devolution and decentralization

3.1.1 Institutional arrangements for devolution

The LGO 2001 defined local areas and created local governments for them. In this area the union council is the ultimate administrative unit at the district level. The elected forums i.e. *nazimeen* and councils have a dominant presence in these local governments.

The concept of village and neighbourhood councils enshrined in section 93 of the Ordinance establishes elected entities in areas where urban dominance overshadows rural areas. Abolition of the rural/urban divide of the pre-devolution era culminated in the introduction of this concept. Municipal functions in their rudimentary form are assigned to these entities. The Citizens Community Board (CCB) is another forum aimed at motivating people to organize, think, plan and implement development facilities in and around their localities. The concept of *Anjuman Musalihat* promotes reconciliation to minimize litigation. The linkages among the union *Nazims,* Insaf committees and the conciliators have been proposed in the law for amicable settlement of disputes amongst the people through mediation, reconciliation and arbitration. These are the three grassroots institutions envisaged in the Ordinance for filling the basic vacuum.

The mid-tier institutions provided to augment the local governments include the monitoring committees, the *Zilla Mushavirat* Committee and the *Zilla Muhtasib.* The monitoring committees monitor the functioning of offices devolved to the local governments. These committees are responsible for the preparation of quarterly evaluation reports on the performance of offices with regard to achievements of targets, responsiveness to difficulties and efficiency in delivery of services and functional transparency. The reports are destined for the councils and action by the concerned *Nazim.* The *Zilla Muhtasib* redresses complaints about bad administration. The *Zilla Mushavirat* Committee, chaired by the *Zilla Nazim,* is a forum where collective political wisdom and administrative acumen focus on integrated development, prioritization and coordination of inter-*taluka* development plans, resolution of interdistrict disputes, arrangement of resources for crisis management and realization of the economic potential of the district.

The Provincial Finance Commission is required and mandated to make recommendations to the governor for a formula to distribute the proceeds of the provincial government in a financial year between the provincial government and local governments. It is also required to propose a formula for fiscal distribution amongst the

district, *taluka* and union governments. The local government commission has certain administrative and audit functions in the local governments. Annual and special inspections, inquiries, auditing, resolution of disputes and submission of reports to the chief minister are some of its important functions.

3.1.2 Functions of Local Councils at District, *Taluka* and Union Levels

"Council" in the context of the Ordinance means a *Zilla* council, *Taluka* council, town council, union council, village council or neighbourhood council. According to section 2(xvi), a local government for each local area includes the concerned council as well. The provision of the law is expressed as follows:

"Local government" includes:

a) a district government or a city district government and *Zilla* council;

b) a TMA and *Taluka* council;

c) a town municipal administration and town council; and

d) a union administration and union council."

3.1.3 Village Council and Neighbourhood Council

These councils are activated by the *taluka* or town municipal administration through elections. In the case of the *taluka,* the *taluka* council determines and notifies a village in the urban areas of the *taluka* to have a village council. In the case of a town, the town council performs this function with regard to the rural areas in the town. These councils have a minimum of five and a maximum of 11 members headed by a chairperson. They have the following functions and roles:

In the development sector, to focus on water supply and sanitation including development and improvement of water supply sources; making arrangements for sanitation, cleanliness and disposal of garbage and carcasses; development of sites for watering of cattle and taking measures to prevent contamination of water.

- Prevention of public nuisances and promoting the plantation of trees, landscaping and beautification.

- Providing sports, cultural and recreational activities. Assist in the formation of cooperatives, report cases of the handicapped, the destitute and of extreme poverty to the administration and mobilization of voluntary resources, including physical labour, property and cash contributions for municipal activities.

These councils are also assigned to assist the union administration in conducting surveys and collecting socio-economic data, selecting sites for providing municipal facilities, identification of encroachments, management of burial grounds and collection of land revenue and other taxes.

These councils have a very important role to play but the law is silent about the enabling arrangements for discharge of their functions.

3.1.4 Functions of the Union Council

The union council is the basic unit of governance in the devolved system. The council, composed of 13 members including the *Nazim* and *Naib Nazim,* is required to meet once a month. Being a directly elected forum it enjoys the backing of popular vote and represents the real stakeholders. The union council has the following important functions to perform:

As a forum for approval the council is mandated to approve the ADP, rates and fees for services provided by the union.

1 US$1.00 = 59.94 Pakistan rupees (November 2005).

Lincoln Daniel

District Assembly in session.

- The council is required to facilitate the formation and functioning of CCBs, cooperatives for improvement in economic returns and reduction of poverty, creation of village councils, establishment of burial grounds, promoting the plantation of trees, landscaping and beautification, and mobilization of the community to maintain public facilities.

- The union council elects committees for monitoring, accounting and conduct of business for the members of the committees.

- The council is mandated to review the performance of union administration and union monitoring committees in addition to a review of the annual statement of accounts and audit reports.

- The union council is obliged to support district and *taluka* level local governments in achieving socio-economic development and improvement of services.

3.1.5 Functions of the Town and *Taluka* Council

The concept of the town council is related to the city district. The majority of its functions are those which a *taluka* council performs in other districts however there is a specific function with regard to approval of land use, zoning and master planning of town development which is performed by the town council. Generally both the councils have the following functions:

- The council is mandated to approve taxes, rates, rents, fees, user-charges, tolls, levies, fines and penalties proposed by the TMA, by-laws for delivery of municipal services, annual budget and appropriations and development plans.

- The council elects committees for monitoring the work of municipal administration and provision of municipal services.

- The council is mandated to review the performance of the TMA presented by the *Taluka Nazim.*

2 Information provided by BP Pakistan Exploration and Production Inc..

A special function assigned to the *taluka* council is its approval to authorize the TMA for floating municipal bonds to raise funds for municipal projects. This function is performed subject to law and with the prior permission of the provincial government through the district government. The accounts committee of the council is mandated to review the audit reports while the Insaf committee is obliged to interact with the Insaf committee of the *Zilla* council.

3.1.6 Functions of the *Zilla* Council

The *Zilla* council is the reflection of the political will of the people of the district as it is comprised of all the union *Nazimeen* elected through adult franchise from throughout the district. Additional weightage to the forum is provided by a mandatory 33 percent female presence and considerable representation of peasants, workers and minorities. The council has the following important functions:

- The *Zilla* council is mandated to approve by-laws and the rates of honoraria and allowances for all the *Nazimeen, Naib Nazimeen* and members of the councils.
- The council is mandated to approve taxes proposed by the district government, the annual budget of the *Zilla* council, development plans, annual and supplementary budgetary proposals and intra district fiscal transfers.
- The council elects committees for monitoring the work of district government departments, promotion of sports and cultural events, review and analysis of accounts.
- The council is mandated to review the performance of the district government, reports of the monitoring committees and the audit reports on the financial transactions in the district government.

The *Zilla* council has an explicit obligation regarding recommendations for enhancement of the care of disabled persons, paupers, the aged, sick, persons of unsound mind, abandoned minors, juvenile delinquents, drug dependents, abused children, needy and disadvantaged persons.

3.1.7 Functions of the *Zilla* Council in the City Districts

In addition to the function of the *Zilla* council in districts other than city districts, the council in the city district has the following functions:

- Approve master plans, zoning, and land-use plans, including classification and reclassification of land, environmental control, urban design, and urban renewal and maintaining ecological balances.
- Review implementation of rules and by-laws governing land use, housing, markets, zoning, environment, roads, traffic, tax, infrastructure and public utilities.
- Approve proposals of the district government for public transport and mass transit systems, construction of expressways, fly-overs, bridges, roads, underpasses and streets.
- Approve development schemes for beautification of areas along rivers, beaches and coastlines.
- Review development of the integrated system of water reservoirs, water sources, treatment plants, drainage, liquid and solid waste disposal, sanitation and other municipal services.

3.1.8 The Committee System

The law governing the functions of the councils at district, *taluka* and union levels lays emphasis on the committee system in local governance. The concept seems to be the culmination of a realization that the council as a whole will not be in a position to focus on issues in various offices. So the committees are mandated for monitoring and reporting to

the council. The system needs a brief mention.

The committee system embodied in the Ordinance has the following broad classification:

- Monitoring: The axis of monitoring is established at the union level where the council elects monitoring committees for municipal services, finance, public safety, health, education, literacy, works and services. The *taluka* and town councils elect committees to monitor the working of the TMA and provision of municipal services while the *Zilla* council elects committees for monitoring the performance of the district government. The elected committees are required to perform their functions in a non-intrusive manner without interfering in day-to-day working and without assuming command and control. Section 138 of the LGO gives a fairly detailed description of the functions:

  - The district monitoring committees are responsible for monitoring the functioning of the devolved offices and functions and preparation of quarterly evaluation reports.

  - The monitoring committees of the *taluka* council and town council are responsible for monitoring the functioning of the offices of TMA or town municipal administration and preparation of quarterly evaluation reports.

  - The monitoring committees of the union council are responsible for monitoring the functioning of all offices of the district government, the TMA and union administration for delivery of services within its area and preparation of quarterly evaluation reports.

  - The reports mentioned above have to contain evaluation of the performance of each office in relation to achievement of targets, responsiveness, and efficiency in delivery of services and transparency in functioning.

  - The reports are submitted to the council for consideration and recommendation of action to be taken. The committees are mandated to identify cases of inefficiency and corruption. They are also mandated to recommend payment of bonuses and performance pay for efficiency.

- Conduct Regulation: Code of Conduct Committees elected by the councils enforce the code ethics for regulating the conduct of the elected members. Section 139 of the LGO has the following conditions on this subject:

  - The number of members is determined by the councils.

  - There is a mandate to ensure adherence of all elected members to the prescribed code of ethics. The endeavour is meant to promote honest, responsible and efficient functioning and behaviour.

  - The committee is required to monitor the conduct of elected representatives and report incidents of inefficiency and corruption.

  - The reports of the committee may culminate in proceedings for disqualification.

  Basically, the arrangement provides internal accountability of the elected representatives. These provisions have devolved a very sensitive responsibility for the members of the committees. The provisions have an obligation for the councils to accord integrity to these reports. The concept is dependent on a very advanced dispensation of democracy, well established norms in governance and a high degree of efficacy and efficiency of processes.

- Dispute Resolution: The law envisages the creation of conciliatory institutions and requires the councils

to elect Insaf committees for resolution of disputes through amicable means. The committee at the union level is mandated to select a panel of conciliators for out-of-court settlement of disputes. The *taluka* level committee is required to interact with the district level Insaf committee while this committee is required to facilitate access to the inspection team of the High Court for redressal of grievances. Ever-increasing litigation is now costing too much for society as a whole in terms of time, money, relations and equilibrium. Much litigation is avoidable. Generally, heinous offences against persons and property are the culmination of minor incidents that have remained unattended. The vision incorporated in the establishment of conciliatory forums and Insaf committees needs flag bearers. The concept is yet to find active supporters in the councils.

- Financial Discipline: The concept of the committee system given in the law requires every council to constitute an accounts committee which is mandated to review the accounts and audit reports of the union, TMA and district government. Section 114 of the Ordinance requires all local governments to conspicuously exhibit the monthly and annual statements of accounts and other relevant statements for inspection by the public. The respective accounts committees are obliged to hold public hearings of objections and take appropriate actions as well. The concept of the accounts committee of the council is a grassroot form of a public accounts committee. This function is highly technical and requires expertise. These committees can ensure financial discipline through sustained efforts in dealing with examination, analysis and synthesis of receipt and expenditure statements. As a prerequisite, a foolproof vigilant audit system is required to facilitate the accounts committees.

3.1.9 Prescription for Effective Working of the Local Government System

The practical implication of the local government system needs understanding and sustained effort.

The law requires these entities to be the culmination of objective realization of the actual situation and concludes that the community has a crucial role to play and responsibility to act. This is possible with movements of awareness and motivation. Placed at the motivational stage the community needs encouragement and support. The public sector institutions have a moral, legal and professional responsibility to support and encourage every initiative of the people wherein they organize and activate their human, fiscal and intellectual resources in support of development, management and maintenance.

Encouragement and support without facilitation and engagement would have little meaning. Community organizations rallying around noble causes need facilitation to organize, register and activate. At the same time they need meaningful engagement to crystallize their vision and understand the dynamics of moving into the actual business of undertaking responsibility. This in turn leads to a genuine need to provide linkages and create networks. Best practices, success stories, innovative performances, good ideas and experiences in organizations need dissemination. Provision and receipt of information is possible when communication channels are kept open. This is possible with linkages and networking only.

With linkages and networking in place the local government institutions require mentoring and monitoring. Organizations need mentoring for optimal usefulness. The elements of mentoring include guidance and counselling. Mentoring is to be followed by monitoring to ensure that the information, knowledge, skills and resources are properly used.

Evaluation and fine-tuning should be the natural follow up of mentoring and monitoring. Concomitantly, adherence to norms, time lines, budgetary constraints and quality standards is ensured. The result of the processes, efforts and engagements is accountability and course correction. Accountability is not and should not be restricted to a mathematical calculation of input, output and outcome indicators. This constitutes a very minor portion of accountability. It includes responsibility for actions and omissions, explanation on justifications and impact. Accountability without diversion to correct course or maintenance of passage in the correct direction would fall short of the requisites.

3.1.10 District Administration Set Up

The district *Nazim* heads the devolved local government system. In Badin District, local government representatives include one district *Nazim,* one district *Naib Nazim,* 69 district council members, five *taluka Nazimeen,* five *taluka Naib Nazimeen,* 75 *taluka* council members, 49 union council *Nazimeen,* 49 union council *Naib Nazimeen* and 1 029 union council members.

3.1.11 Structure of District Council Badin

In addition to the general seats, the *Zilla* council has 33 percent of its seats reserved for women, 5 percent for workers/peasants and 5 percent for minorities. The total number of district council members is 69.

3.1.12 Structure of the *Taluka* Council

The *taluka* government includes the *taluka Nazim,* the *taluka Naib Nazim,* the *taluka* council and the *taluka* administration. There is a *Taluka* Municipal Officer (TMO) who coordinates the *taluka* administration. There are five *Taluka* Officers (TOs) in Badin reporting to the TMO, each being responsible for finance, budget and accounts, municipal standards and coordination, land control and rural-urban planning.

3.1.13 Structure of the Union Councils

District Badin has 49 union councils; each union council consists of 13 members including *Nazim* and *Naib Nazim.* It is comprised of six general seats, of which two are reserved for women. There are four seats for workers and peasants, of which one is once again reserved for women. One seat in each union is reserved for minorities. Every union council has a maximum of three secretaries under the administrative control of the *Nazim.*

3.1.14 Structure of the Revenue Department

Under Devolution of the Power Plan, the Revenue Department at the district level has been re-organized. The Executive District Officer is in charge assisted by the District Officer Revenue, Deputy District Officers Revenue and three *Mukhtiarkar* - one each for Revenue, Estate and Estate at headquarters.

3.1.15 Provincial Financial Award (PFC Award)

On the basis of the first PFC award, the following ratios/criteria of distribution have been adopted among the provincial and the district governments. The provincial share in the net proceeds of the divisible pool for the current revenue expenditures has been fixed at 60 percent, with the remaining 40 percent to represent the share of the combined district governments. The revenues from the divisible pool are given to the district governments on the basis of the following formula:

Population	50.0 percent
Backwardness	17.5 percent

Tax Collection	7.5 percent
Transitional Transfer	25.0 percent

3.1.16 Budget for Social Sectors

Budgetary allocations for social sectors during 2002/2003 in the social sector of Badin are elaborated hereunder.

For primary education Badin District was awarded an allocation of Rs.263 million or Rs.171 for each school going child. The reform programme includes support to school management committees, free text books, scholarships and budgetary support through annual development programmes. The GoS presently provides Rs.167 per student to the school management committees. Current allocations are Rs.170.530 million for Badin District.

The budgetary allocations for the health sector include the SAP and Non-SAP allocations that aim to reduce widespread communicable diseases, bridge nutritional gaps and offer basic health care. For FY 2002-2003, an allocation of Rs.169.09 per person was made for Badin District.

TMAs are responsible for water supply and sanitation. Previously, the municipal systems were financed from district taxes and revenues. After the revision of tax structure and withdrawal of local and district taxes, the system has been financed by the federal government through grants in lieu of trading privileges and *Zilla* tax. The amount of Rs.161 138 only was allocated to Badin District for this purpose during the year.

3.2 Status and Issues

The budget allocation and utilization issues include equitable distribution of resources, efficient use of funds and the fiscal absorptive capacity of the newly created local governments and the participatory approach to development. The fiscal absorptive capacity remained the main issue of concern in the social services sector in both previous and current system of governance. Around 40 percent of allocated budgets are not utilized or worse, the total allocated budgets are underutilized. The district *Nazimeen* and other functionaries of local governments perceive the procedural problems, low capacity of the concerned staff and staff shortages as the major reasons for weak fiscal absorptive capacity. Many posts are still vacant at district and *taluka* levels; this is affecting the smooth functioning of the district government. The required staff and infrastructure for the devolved system are not available, which is central to the success of devolution. Untreated sewage is drained into canals but local administration is not able take action. The TMA is facing problems in the operation and maintenance of water supply schemes.

3.3 Measures for Sustainable Development

Good and effective governance promotes economic prosperity and social cohesion, reduces poverty, enhances environmental protection and sustainable use of natural resources, and strengthens democracy and human rights. Devolution has provided tremendous opportunity to implement programmes and projects at the local level, while considering the ground realities. Better results can only be achieved if the devolved government is implemented in its true spirit and zeal.

Immediate Action

- Approved funds for the district functions must be released punctually and the district government may be entrusted with the responsibility and authority for effective coordination between various district level offices and programmes.
- To control encroachment, prices and adulteration, magisterial support/powers may be given to TMAs and EDOs.
- Currently, the audit of TMAs is being done by the district; this may be

Mohammad Ali Qadri

Hoping for prosperity.

conducted in *talukas.* The relationship between TMAs and union councils may be redefined.

Medium-term Interventions

- Conflict resolution mechanisms as incorporated in the Ordinance may be activated so that issues hampering a smooth working relationship among and between various tiers of local government and provincial government departments can be resolved.

- The issue of at-source deductions by the provincial government, various authorities and corporations may be resolved in consultation with the district government so that an enabling environment is created for it to forward its point of view on such issues.

- EDOs entrusted with additional responsibility may be relieved of the additional charge through posting of officers to fill the vacancies in line with the devolution plan. The posting of EDO (Law) may be given priority.

Long-term Interventions

- Local government should be given due authority over the operation and management of the devolved entities with accountability arrangements for improvement in governance and betterment in delivery of services.

- The devolution plan could be implemented if required staff, along with infrastructure, are provided. According to the devolution plan, four TOs for the departments of planning, regulation, infrastructure and finance may be appointed in each TMA of the district. DDO positions in all *talukas* may be filled.

- Market committees should be made effective by registering commission agents.

- The potential of CCBs may be utilized for development in the district.

- Departments should be equipped to meet emergencies.

- Transport facilities should be given to departments for field work.

- Office and staff capacity building is needed.
- Capacity building of the social welfare department should be undertaken.
- Wastewater plants and sanitation should be the domain of the local government.
- For financial resource mobilization, powers may be transferred from the Excise & Taxation Department to EDO Finance to collect property tax as well as entertainment tax.
- The TMA is responsible for water supply and sanitation at the *taluka* level. TMAs could undertake quality work, if provided with required trained staff and necessary accessories.
- Allocation of block grants for mega projects should be explored.
- Re-introduction of town committees should be considered.
- The indirect system of local elections should be abolished.

3.4 Non-Governmental Organizations

There are 25 registered NGOs working in Badin. More than 64 percent of the NGOs work in Women and Youth Welfare. Health and Population Welfare and Education are top priorities for 24 percent and 12 percent of NGO activity in Badin respectively. Other civil society organizations in Badin include the two factions of the Press Club and several wings of political parties, labour organizations and women's groups.

The aftermaths of natural disasters over the last five years have resulted in raised awareness and support from development agencies and donors. Various developmental programmes and activities are under implementation in the district. These are mostly managed by larger organizations such as SAFWCO, TRDP, Strengthening Participatory Organizations (SPO), the National Rural Support Programme (NRSP), World Conservation Union (IUCN), Oxfam, PFFF, Action-Aid Pakistan and Islamic Relief.

Nasir Ali Panhwar

Partnership with NGOs is vital for implementation of District Vision Badin.

The capacity of local NGOs to undertake sustainable development programmes is very weak. Badin Development and Research Organization (BDRO), Badin Rural Development Society (BRDS) and the Natural Resources Management Program (NRMP) have over the year's attained prominence yet an increase in local NGOs and their capacity is required.

This pinpoints the need for organizational development and capacity building of the local NGOs, in order to ensure the long-term sustainability of the participatory development initiatives in Badin District.

3.5 Measures for Sustainable Development

Immediate Action

- There is a need to provide training and capacity building for local NGOs. This must be followed by developing linkages and networking among the NGOs and with the private and public sector entities.
- Focusing on empowerment and participation of women in projects with bearing on their conditions and sphere of activities should form essential components of all programmes and projects.

Medium-term Interventions

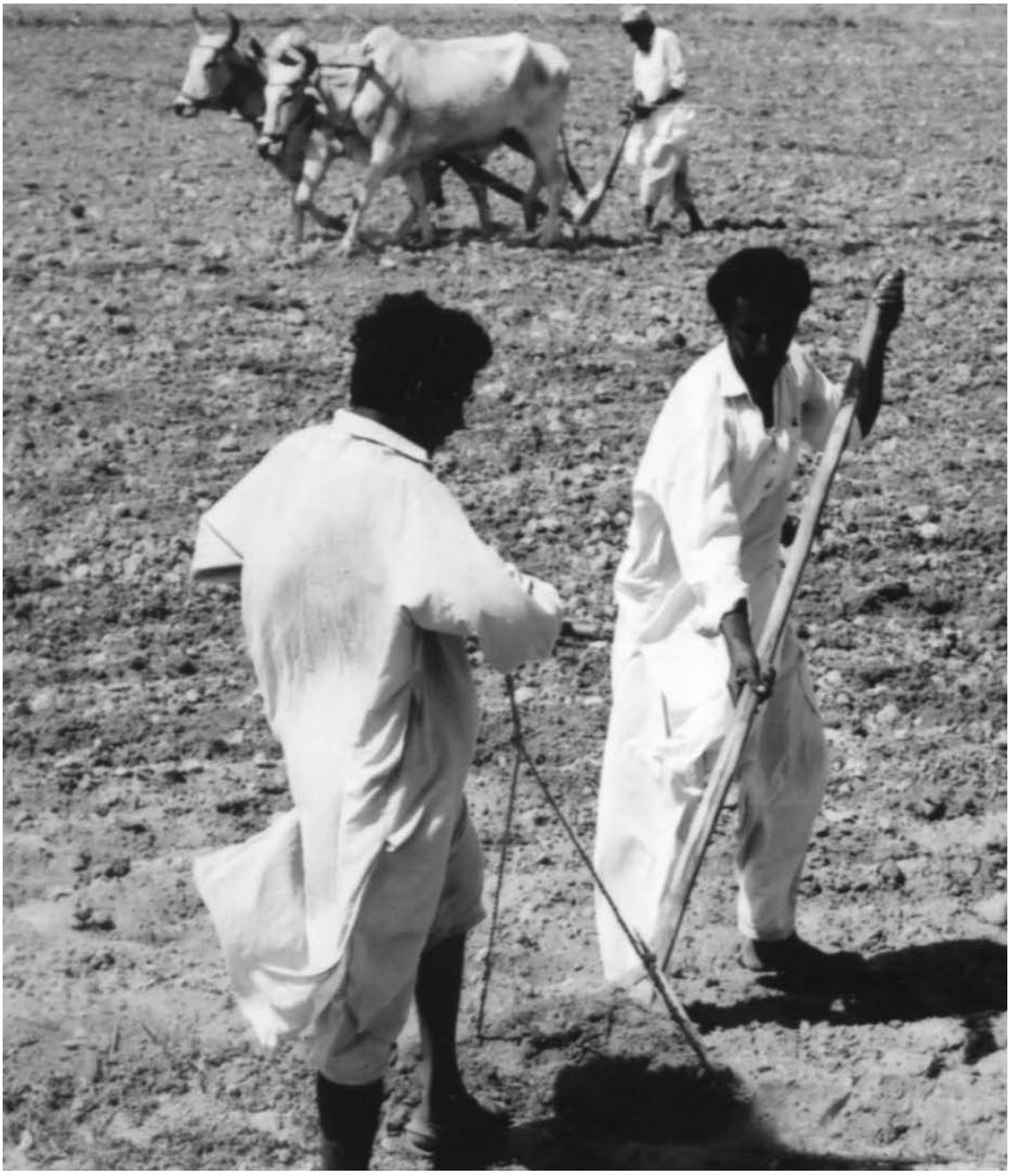
- Organizational strengthening needs to be undertaken as capacity building to motivate communities for effective participation in development intervention. This activity could be initiated with the establishment of an NGO resource centre at Badin.
- There is also a need to support and encourage proactive local CBOs and NGOs to undertake development projects.

Long-term Interventions

- Promoting transparency and financial integrity among NGOs through institutionalization of accountability mechanisms in the Community Development Department at the district level is a crucial.

CHAPTER **4**

GREEN SECTORS



Green sectors involve agriculture, horticulture, forestry, livestock, poultry, fisheries, biodiversity, wetlands, irrigation and drainage. This chapter presents the status and issues of these sectors, formulates a general vision and outlines measures that can be taken to move progressively towards sustainable development in an integrated manner.

4.1 Agriculture and Horticulture

4.1.1 Status and Issues

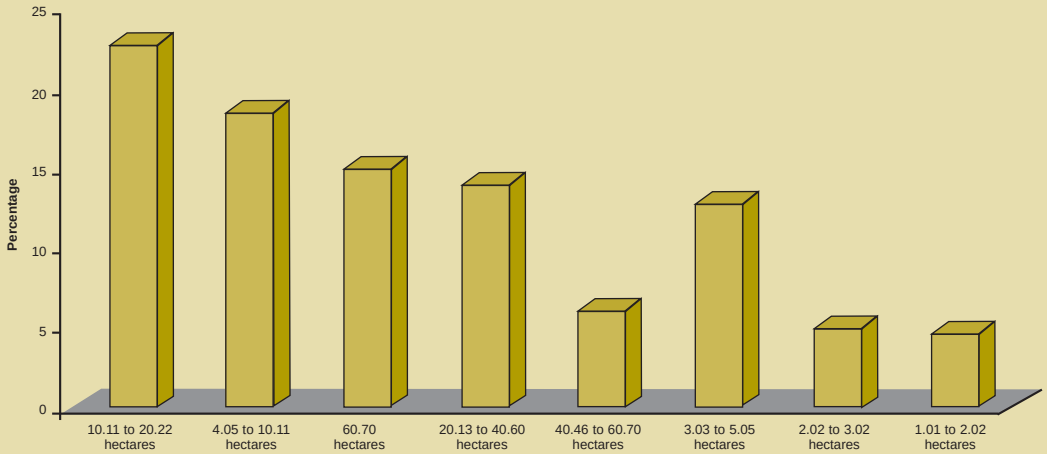
About 85 percent of the population of Badin District lives in rural areas, with farming as their main occupation. Rice, sugarcane, cotton, wheat and sunflowers are the major crops. Minor crops include onions, chilies, pulses, tomatoes and melons. The soil in the Left Bank Canal command areas is deep alluvial deposits suitable for irrigated agriculture. The soil is brown, moderately calcareous and the pH mostly ranges from 8.0 to 8.4. The drainage capacity of the irrigated soil is very low. Therefore, salinity and waterlogging are a major problem. In recent years, the problems in the agricultural sector have been further compounded by inadequate irrigation water availability.

Data on farm size reveal that the number of farms and farming areas increased considerably between 1990 and 2000. Figure 2 illustrates the distribution of farmed area in the district. Farms of 10.11 to 20.22 hectares (22.7 percent of the area) occupy the maximum area, followed by 5.05 to 10.11 hectares (18.57 percent of the area), 60.70 hectares and above (14.99 percent of the area), 20.13 to 40.46 hectares (14.06 percent of the area) and 40.46 to 60.70 (6.08 percent of the area). Among subsistence farms, farms of 3.03 to 5.05 hectares are the most numerous (12.9 percent), followed by 2.02 to 3.03 hectares (5.07 percent) and 1.01 to 2.02 hectares (4.76 percent) of the total number of farms. The data reveal that Badin is essentially a district of medium and large farmers where farm sizes above 10.11 hectares constitute 57 percent of land-holdings. This data also illustrate that, given appropriate incentives and marketing facilities, there is considerable scope for commercial agricultural production in the district.

The total geographical area of Badin District is 694 145 hectares, the reported area being 568 851 hectares. The cultivated area is reported to be 310 457 hectares. However, the net cropped area is only about 155 428 hectares. The area not available for cultivation is estimated to be 175 926 hectares. Out of the total cultivated area, fallow land accounted for 259 000 hectares in 2001/2002 while the net area sown was recorded to be only 203 000 hectares (about 44 percent). Thus, given an approved supply of irrigation water and other

FIGURE 2

Distribution of farmed area in Badin District



agricultural inputs, there is great scope for extensive agriculture in Badin District.

According to Development Statistics of Sindh (2003), the area cropped to rice during 2001 and 2002 was 60 957 hectares, producing 1 16 265 tonnes of rice. Sugarcane was grown over an area of 47 871 hectares, producing 2 025 236 tonnes. The area cropped to wheat was 21 762 hectares with production of 34 418 tonnes and for cotton was 3 236 hectares with production of 8 026 bales. About 76 percent of the total cropped area is sown in the *Kharif* season and about 24 percent in the *Rabi* season. Vegetables from Badin, especially tomatoes, fetch better prices because of their continuous availability even in the low yield seasons when crops from other areas are not ripe for marketing.

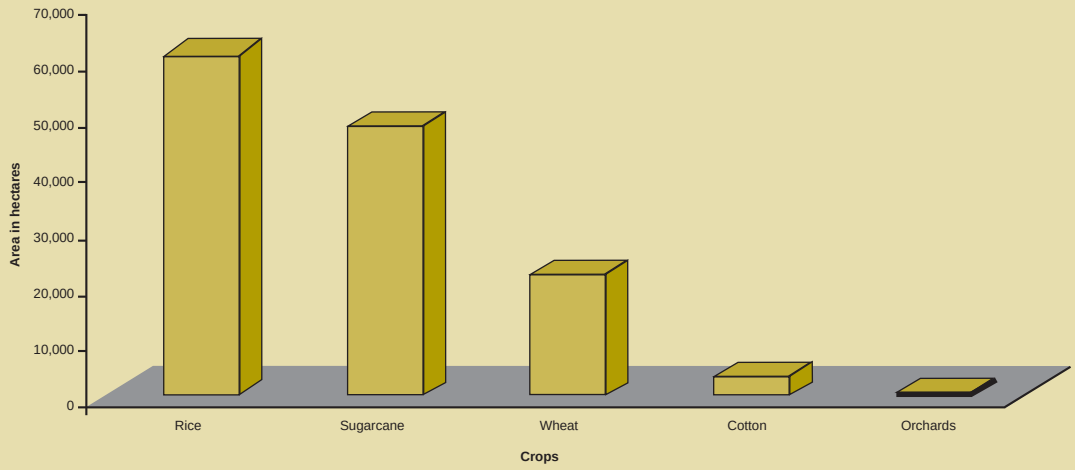
Sunflower is staging a come-back in the cropping pattern after about two decades. The need to diversify and adapt to cropping patterns that require less water was realized owing to insufficient irrigation water. Badin has the potential to

Mohammad Ali Qadri

Rice: one of the major crops in the district.

FIGURE 3

Cropping patterns in Badin District



develop into an oil-seed estate to the same extent that it is recognized as the sugarcane estate in Sindh. Sugarcane production has suffered over the years, but an increase in the cultivation of crops that consume less water can compensate for the income losses suffered by the sugarcane growers. Wheat cultivation has been adopted and the yield per acre is quite substantial in the district.

The total area under orchards is reported to be around 4 956 hectares. This area is extensively used for growing vegetables such as carrot, radish, onion and tomato. Fruits include mango, banana, *chikoo,* guava, musk melon and water-melon.

According to the official statistics of 1998/1999, higher doses of chemical fertilizers were applied to crops with higher economic returns i.e. sugarcane, particular vegetables and orchards while doses for other crops were relatively low. However the use of indigenous and imported fertilizers in Badin registered a decrease from 39 294 tonnes in 1996/1997 to 30 815 tonnes in 2001/2002 as reported in Development Statistics of Sindh for 2003. On the other hand the quantity of chemical pesticides sold in Sindh increased from 4 820 tonnes in 1999/2000 to 8 957 tonnes in 2001/2002. District-wise data on the use of pesticides are not available. However it is understood that chemical insecticides and pesticides are sprayed on cotton and sugarcane crops two or three times in a season. Vegetable crops such as chilies, okra and tomatoes are heavily infested and receive five to 10 pesticide sprays. Emergence of weeds in wheat is combated generally by the application of chemical granules. Rice, maize and millet are generally pesticide-free while mango orchards are sprayed at least once each season. The use of pesticides is likely to increase in future along with the projected increase in the area under cotton and vegetables. Heavy application of pesticides causes land and water contamination and health hazards for farmers, their families and livestock.

Currently, the package of modern agricultural practices does not contain suitable replacements to reduce the use of chemical and organic herbicides and insecticides in various crops. The seeds of approved pest-resistant varieties are usually unavailable and treatment of seeds is not very common.

In the post devolution era, agriculture at the district level is managed by the office of the Executive District Officer (EDO), Agriculture. It is responsible for the development services of almost all the green sectors including agricultural extension, livestock and poultry development, forests and inland fisheries. The office carries out various activities in accordance with the directions of the relevant departments of

the Government of Sindh (GoS). However, district-specific programmes and projects are yet to be developed and implemented and research components are weak. The district, despite being an agricultural estate in the province, is without adaptive research farms and stations. Similarly, linkages between research and extension are few and far between. As a matter of principle the agricultural extension unit at the district level needs to be strengthened to ensure the best possible and timely inputs for all farmers. Sub-standard pesticides, exorbitant fertilizer prices, malpractices among traders and non-availability of quality seed are some of the farmers' major problems. These problems have been perpetuated with the closing of the Sindh Agricultural Supply Organisation (SASO) and the Sindh Seed Cooperation. Lack of infrastructure for marketing and sale of produce further inhibits farmers. Road access in rural areas is limited and there is no cold storage facility or canning industry for preserving produce.

Credit facilities for farmers are inadequate. There are only two branches of Zarai Tarqiati Bank Limited (ZTBL) in the district. The lending operations of this bank are quite limited in Badin as the proportion of defaulters is quite substantial owing to the high incidence of natural disasters and liquidity problems among the populace.

Badin District is irrigated primarily through the Sukkur and Kotri barrages. Access to irrigation is limited mainly because of the shortage of freshwater downstream from Kotri Barrage. Even in areas where irrigation water is available there is poor implementation of the best technological options that can prevent wastage of water.

Women, as major players in managing natural resources at the household level, are key clients for extension services. Traditional cultural norms, particularly in rural areas, preclude women from interacting freely with men. The absence of female extension workers amounts to the exclusion of women from extension activities. Besides the obvious question of inequity, this is also a matter of concern on a different level; with women having no access to extension services; thus a valuable human resource and knowledge base is wasted.

The net result of these factors is that although agricultural activity accounts for the largest component of the economy in the district, the sector in its present form has severely limited income-generating potential and cannot be relied on to serve as a tool for poverty alleviation or a catalyst for development.

4.1.2 Measures for Sustainable Development

In the developed world agriculture is probably the most subsidized sector. Sustained focus on the issues of this sector has transformed it into a driving force behind industry, trade and economy as a whole. With international trade barriers falling wide open to the onslaught of free trade, there is a need to assess the magnitude of forthcoming challenges and work out detailed strategies to successfully withstand the competing forces.

Agriculture provides employment for the majority of the labour force in rural areas of Badin. Agro-based industries are heavily dependent on this sector. Consequently the performance and survival of other sectors of the economy rely on the agricultural sector. Given its importance, there is a genuine need for improvement in resource management to ensure sustainable economic growth and poverty alleviation. Policy measures that can be taken to move progressively towards sustainable development are listed hereunder.

Immediate Action

- Devolution has regrouped certain offices at the district level that operated in different administrative compartments till 2001. The newly created departmental entities at this level need focus and attention for creating cohesion and effective command and control mechanisms and systems. An urgent need is the

provision of required human resources to fill vacant posts in all the green sector departments.

- The first step that must be undertaken is assessing vital indicators in the sector. These must be based on reliable statistics collected and compiled through objective efforts.

- It is opportune to engage grassroot entities at the union level to focus on ways and means to improve the efficiency of departmental extension efforts and all institutions directly related to agriculture.

- Ever increasing poverty is an incapacitating factor. It is gradually compelling farmers to abandon agriculture. The phenomenon is the result of the perpetual imbalance of inputs and the ultimate outputs in the shape of returns. Farmers have never received fair returns for their produce. This trend needs to be arrested through planning and adequate steps to assist the farmers in obtaining reasonable prices for their crops. Middlemen margins could be controlled through market regulation aimed at protecting the interests of farmers. Civil society vigilance can act as a catalyst here.

- Agricultural extension services must be strengthened through appropriately tailored capacity building programmes; provision of operational resources, mobility and coverage; awareness and understanding of the latest farming practices and the ability to transfer this knowledge to farmers.

- There is a need to improve efficiency, regulation and implementation in the department of seed certification to ensure timely availability of quality seed, especially for rice, sunflower, cotton, wheat, vegetables, oil palm and melons.

- The problems of waterlogging and salinity need immediate attention. Measures such as adopting the use of gypsum for eradicating soil salinity, and promotion of saline agricultural practices must be considered. The issue will need the juxtaposing of water usage patterns and practices in the district to analyse current trends. Given the limitations in water resource management, it is vital to explore the application of modern conservation techniques for water usage. Alternative and innovative solutions to address chronic water shortages will benefit both users and the government.

- The development of green belts of suitable tree species and vegetable crops alongside the proposed coastal highway is also required. Regulatory measures and fiscal incentives for these initiatives can prove useful. The predictability of returns could be ensured through timely announcement and judicious implementation of support prices. These measures will help achieve targeted policy outputs.

- The prevalent sugarcane policy needs balancing to protect the interests of both growers and mill owners.

Medium-term Interventions

- Over time the quality of agricultural inputs has deteriorated. Substandard pesticides and fertilizers are playing havoc with the collective efforts of farming families. Implementation of the Agricultural Pesticide Ordinance, Sindh Fertilizer Quality Control Act and the Sindh Cotton Ordinance 2002 must be an immediate priority. This requires the creation of monitoring and implementation arrangements through consensus among the functional hierarchy of the department and the monitoring committee of the *Zilla* Council. The department's role in supervising the production and use of seeds/cultivars, pesticides, herbicides and fertilizer should encompass institutional, administrative and regulatory cover.

- The policy of agriculture for subsistence needs to be abandoned

and replaced with agriculture for poverty alleviation. This shift will require a change in the cropping pattern of Badin. The re-emergence of sunflower in the cropping pattern after about two decades on account of the crisis in the sugar industry could allow the development of Badin as the oil-seed estate of Sindh. Efforts to increase rice and wheat production may also substitute for the income losses suffered by the sugarcane growers. The impressive wheat yield per hectare in Badin should be capitalized upon. The shift in focus from subsistence farming to a more market-oriented approach will require improved road access, market regulation, the establishment of cooperatives and meaningful engagement of the private sector as prerequisites.

- Women play a major role in Natural Resource Management (NRM). This has never been taken into account in interventions and activities related to the agricultural sector. Almost all extension services are dominated by men. Thus essential client and service providers cannot communicate effectively. Conforming extension agency practices with traditional cultural norms in rural areas could be the only solution to mitigate the isolation and marginalization of women. Sustained efforts are required by the district government to induct an appropriate number of female extension workers to increase the knowledge base of women engaged in agriculture-related activities. This effort will also require an objective evaluation of procedures, processes and mechanisms for coordinating the activities of inter-related NRM departments, projects, NGOs and community-based organizations (CBOs) for improvement and optimization as well as the cost-effectiveness and timeliness of interventions.

- Credit facilities are not easily available to farmers in the district. The district government must initiate corrective measures to redeem the situation especially for women who are rarely able to receive financing. At the same time the lending institutions are obliged to review their current policy of blacklisting the district. It is the responsibility of the district government to initiate the process of repairing the damage. This will require the focused engagement of political leadership, public functionaries, financial institutions, civil society and NGOs to resolve the

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Sustainable Agriculture: one of the means for addressing poverty.

issue through their collective wisdom. Civil society organizations should undertake the role of guiding rural farmers and communities in investment, record keeping and repayment schedules. Microfinance should be developed as a way to address poverty by opening up alternative avenues of income generation.

- Farmlands in Badin range from medium to large in area, which can conveniently accommodate the introduction of suitable new technology such as cotton-picking and rice-planting machines. Building on modern concepts such as integrated crop management and creating capacity at various levels to implement new practices based on these principles with emphasis on innovation, discovery and experimentation should be a medium-term priority for policy-makers. Dissemination of detailed knowledge on all inputs ranging from primary tillage to post-harvest techniques will help to create a conducive environment for the farmers.

- Provision of cold storage facilities, establishment of a canning industry for vegetables and fruits, value-added and by-product industry for agricultural produce and processing industries are some avenues where productive and mutually advantageous public-private partnerships are possible. Other probable areas for public-private partnership could be demonstration plots for new product varieties and technology, scientific management of work on saline/arid agriculture and opening a branch of the Trading Corporation of Pakistan.

- Proper infrastructure to reduce loss and improve the marketing and sale of the agricultural produce needs to be established.

- According to statistics (2001/2002), the new sown area is 44% only. Practical steps need to be taken to increase the area under cultivation.

Long-term Vision

- Swift transportation facilities, farmer-friendly marketing arrangements and, above all, a well-maintained communication network are the basic requirements for an efficient and profitable agricultural sector. The district government needs to improve market and support service infrastructure including farm-to-market roads. This sector will need increased and sustained investments in communication infrastructure in rural areas.

- Biotechnology is an important field and various research studies are being conducted globally. The district level managers of agricultural services must be attuned to this research. Close liaison with research institutes nationwide will allow them to sensitize their clients in the district. Resource constraints for translating research into results could be addressed through the involvement of private companies to develop and multiply suitable hybrid and breeder brand seeds for suitable crops such as sunflower, palm oil, musk melon, maize, tomatoes, okra, betel leaf and strawberry.

- As a matter of principle, all NRM-related departments should be positioned to harness the skills, capacity and knowledge of the human resources engaged in these departments for progressive improvement in their working environment, value addition to the output and enhancement of returns. Investment in human resources will, in the long run, facilitate progress towards the ultimate objectives outlined above.

- Over time operational funds for agriculture have suffered a gradual decline. Various donor-funded programmes are closing down due to resource constraints. However, due to the centrality and vitality of the sector, some new initiatives are emerging. The lessons learned from past interventions need to be

revisited. Mismanagement must be curtailed. The local governments must have detailed prospective plans for the upcoming interventions in the agriculture and irrigation sectors. The efficiency of sectors and the success of initiatives undertaken depend on the availability and flow of operational funds. The district government should formulate a long-term plan for progressive increase of resource allocation in green sector departments.

- Development input without landmark indicators and milestones for measuring progress result in distortion and manipulation of figures and statistics. Every plan must have monitoring and evaluation mechanisms to assess the impact. This will be possible only when realistic sectoral targets are determined on the basis of reliable data. Determination of targets must be augmented with plans that highlight implementation details.

- Agriculture Research Farms should be established where research on crops should be carried out to produce a variety with saline water tolerance and less water requirement.

4.2 Forests

4.2.1 Status and Issues

Badin District is a forest-deficient area in Sindh. The total forest cover in the district is approximately 12 000 hectares. There are no natural inland forests in the area, however, there are two irrigated plantations known as the Rari and Boharki forests. The Boharki, spreading over 6 879 hectares along the border, is known for its importance from the defence aspect. The Rari forest covers 4 856 hectares of land in the Shaheed Fazil Rahu *taluka.* But due to forest officials' negligence, the forest is being denuded rapidly and the fertile forest land is being used for agricultural purposes. Boharki forest is experiencing the same fate.

Owing to lack of management and corruption, the very existence of the irrigated plantations is being jeopardized. It has been reported that frequently forest areas are allotted to local contractors on the pretext of removing moribund, fallen and dead trees. However, the contractors cut down healthy trees instead. Unskilled labour hired by the contractors often burn unwanted trees, causing damage to the rest of the forest. Cyclone 2A in the district caused losses to 70 percent of the trees in Boharki forest which also led to a shortage of fuelwood.

As there are few energy resources in the rural area, the local population's dependence on wood necessitates significant imports but this dependency also motivates theft and illicit felling. The true picture of the current state of forests is not fully known, largely because of insufficient or unreliable data and interpretation.

The two forests mainly comprise six tree species: Acacia nilotica (Babul), Eucalyptus camandulensis (Safada), Tamarix dioca (Lai), Prosopis glandulosa (Mesquite or Devi) and two species of tamarisk. Other trees and bushes in the forests are Zizyphus jujuba (Ber), used as fodder for goats and camels; Azadirachta indica (Neem), used for

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Dwindling forests.

timber; Ficus religiosa (Pipal); Tamarindus indica (Tamarind) and Salvadora persica (Khabar).

According to the Forest Management Plan for these plantations as well as for social forestry plantations of Badin in 2001, the irrigated plantations are very poorly stocked and only 4.1 percent or about 500 hectares of their total area contains any trees. Much of the area is affected by salinity and waterlogging.

Of the tree-stocked area, 96.6 hectares are covered with Babul, 69.2 hectares with Babul and other tree species, 302 hectares with Mesquite or Devi, 14.2 hectares with Casuarina, 1.6 hectares with Conocarpus and 7.3 hectares with a mixture of different species. The empty areas of about 2 503 hectares in both forests can be utilized; part of the saline/upland area of 7 739 hectares can also be rehabilitated through tree planting. However, this is not possible currently because of the shortage of canal irrigation water supply. The sanctioned water quantity of irrigated plantations is 101.5 cusecs, out of which only about 16.18 cusecs are currently available for these plantations.

The total revenue for 1991 to 2000 was Rs.3.3 million against total expenditure of Rs.1.6 million during this period, for the two forest plantations. The main sources of revenue of the Sindh Forest Department (SFD) from these plantations are wood cuttings and the sale of minor forest products. The minor produce from the forest is reeds from grasses. Reeds are sown together for blinds, shades and walls for huts. Baskets, chairs and ropes are also made from grasses from the forest areas. Other grasses are used as fodder for animals.

4.2.2. Measures for Sustainable Development

Forests support a rich diversity of flora and fauna and provide the fuelwood and fodder needs of local communities. At the same time, their health is connected with the social and economic welfare of local communities. They are a vital part of the conservation component of the sustainable development triad. This crucial link has been repeatedly ignored by the concerned authorities and forest resources have instead been allowed to become severely depleted.

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A poorly managed forest tract.

Immediate Action

- The district government should determine the actual situation of forests in the district as a first priority. Critical review of the current departmental practices, protection mechanisms, promotional policies and approaches should form part of the analysis.

- A through situational analysis, accounting and audit of the existing stock should be undertaken with a focus on preparing an inventory of voids, blanks and plantable areas and consideration of options for investing in these areas to augment fuelwood supplies, improve the landscape and environment and support the incomes of rural communities.

- The district government should steer the process of assessing ecologically available and nationally required forest and tree cover.

Medium-term Interventions

- Forests and plantations need to be relieved of pressures from fuelwood collection. This can be achieved only when the sources of wood supply are diversified. Consistent focus on agro-forestry, farm forestry and social forestry will definitely increase stocks. Extension of Liquid Petroleum Gas (LPG) supplies could help take pressure off the plantations. The option of expanding gas supply - both through cylinders and pipelines, and perhaps at subsidized rates - to reduce pressure on forests should be examined. While energy is not a devolved issue, and remains under the jurisdiction of the federal government, efficacious and innovative advocacy can lead to informed decision-making by the concerned authorities.

- Keeping in view the importance of forests, plantations and tree cover to the environment, the district government should have a comprehensive conservation plan for the medium term with detailed components on plantation targets, regular monitoring mechanisms and periodic reviewing arrangements.

- Given the enormity of pressures, it is difficult to manage forests and plantations through departmental and regulatory mechanisms only. The public sector managers are obliged to engage NGOs, CBOs, private sector entrepreneurs and philanthropists for creating advocacy and lobbying forums to organize public opinion around core issues in the sector.

- In the medium term, the district government must focus on completing plantation in the voids, blanks and plantable areas identified in surveys and stock taking. This will need regular plantation campaigns and involvement of union councils, educational institutions, green sector departments and private sector organizations. Impacts of the intervention can be optimized by creating a district level cell for steering the process.

Long-term Interventions

- In the long run, local government at all three levels must have tree plantations on the requisite areas assessed and earmarked to meet ecological standards, national requirements and local needs. For

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A forest awaiting protection.

example, every union council must have block and community forests and plantation cover of at least 20 percent of the total area with urban union councils having institutional arrangements for urban forestry. Areas should be proportionately marked for the agriculture, fodder and fuelwood requirements of the district.

- The inland forests should fill voids, blanks and gaps appropriately and mangrove forests should be regenerated.

- The legal and regulatory regime for protection and policing of plantations needs to be appropriately tuned to present day trends, needs and requirements to involve communities in the promotion, protection, management and conservation of plantations.

- Industrial units, commercial enterprises, colleges and schools should make substantial contributions to the creation, maintenance and improvement of green belts.

- The forest department must shed its policing mind-set and all stakeholders must be included in a mainstreamed participatory managerial orientation. The interventions should include measures to consolidate the participatory umbrella by providing (i) transparent administrative mechanisms; (ii) capacity building, advocacy and education; (iii) indicator tracking and (iv) rewards or punitive measures related to achieving targets. Last, but not least, the gulf that exists between the forest department and local communities over issues such as participatory management, rights and obligations needs to be bridged.

- A new management plan must be prepared on the basis of satellite imagery data for the exclusive management of the inland forests in Badin District. The new plan as well as PC-I should incorporate the principles of sustainable and integrated development of all natural resources (forests, ranges, water, biodiversity, fisheries, etc.) through the participatory approach.

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Shrinking forest area.

- Existing agro-forestry tree growth of about 8-10 trees/hectare can also be doubled easily without adversely affecting farm productivity in order to reduce pressure on government forests. Likewise, local NGOs such as the Natural Resource Protection Programme (NRPP) can be involved in block plantation and social forestry programmes on community lands and the outskirts of coastal villages.

4.3 Livestock and Poultry

4.3.1 Status and Issues

In an area where subsistence-level agriculture is prevalent, livestock rearing and poultry farming become a crucial part of economic life by supplementing household income. Both small-scale domestic and large-scale commercial producers operate in the district, but few administrative, technical, marketing or financial incentives have been provided. Neglect of the sector has resulted in chronic feed shortages, minimal breed

improvement, poor dissemination of modern techniques, artificially depressed prices and the absence of participatory orientation. At the same time, road conditions in the rural areas, the high cost of transport and volatile demand hinder expansion in the sector. Support services for livestock and dairy production are far from satisfactory, with ad hoc or non-existent marketing planning, capacity shortfalls in extension services and only nominally improved credit facilities.

Livestock contributes roughly one-third to the total share of agricultural production. Its main by-products, including hides and skins, have substantial export potential as semi-finished and finished products. Rearing of cattle is a supporting profession in Badin, with agriculture being the main activity. Most farmers traditionally keep some poultry for their eggs and meat. It has been estimated that a substantial amount of animals are used in farm operations. Bullocks provide draught power and are used for transportation. Donkey carts are frequently used for transport in villages and in towns. In coastal areas, the reliance on livestock is quite high. Various indigenous breeds of buffaloes and cows are found in the district. Sheep, goats, camels, horses, asses and mules are also the main livestock.

There is a need to increase the numbers of livestock to generate income through the sale of farm products. Production for the market, even at the expense of consumption at home, has become quite common in many areas in Sindh. There are some areas in Badin where organized livestock farming is taking place. Cattle farms and livestock farms are located mainly in the urban areas. Most other units are small in size and not very well kept.

According to the District Development Plan published by the Sindh Regional Plan Organisation in 2001 during 1998/1999 the total livestock population in Badin declined by 12.3 percent from the preceding year. Comparison of data for 1996 and 2000 reveals that there has been a substantial decline in the numbers of livestock, especially cattle, buffalo and sheep in Badin District. The most obvious reason for this trend is the loss of livestock recorded after the 1999 cyclone and sale of livestock by poor families to survive its aftermath. Colossal loss of livestock in the 1999 cyclone resulted in great economic loss and consequent poverty among the coastal populace. Diseases are also causing heavy losses in the livestock sector in the coastal area in the aftermath of the cyclone. Therefore,

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Cattle in search of fodder.

health facilities must be provided for the animals. Operational funds and professional veterinary staff are in high demand at the union council level. There is a need for donor NGO funding in the form of small loans and micro finance to develop livestock wealth in the poor communities of Badin District.

The number of veterinary hospitals (7), dispensaries (2) and veterinary centres (49) has remained static during the last decade. Keeping in view the large number of livestock, the number of veterinary hospitals and dispensaries is not sufficient. Medical supplies for livestock are also reported to be in short supply.

Women have no access to new knowledge or the latest techniques in husbandry. Livestock extension services are staffed by men and social norms in the district restrict women's' interaction with them. This situation is aggravated by mobility restrictions imposed by the inhospitable terrain, population dispersal and resource shortfalls. Overall, community involvement in husbandry is minimal. Public-sector services, characterized by a top-down approach, are sporadic; consequently, improved techniques and practices from domestic and international sources rarely filter down to the field level.

A poultry development office at Badin extends technical advice and training on diagnosis, treatment and vaccination, but the office does not have adequate funds to operate properly. The government can strengthen this institution and allocate required funds.

4.3.2. Measures for Sustainable Development

Research indicates that animals are important for many family incomes but the sector is beset with constraints and inefficiencies. In addition, diseases have caused huge losses for farmers who raise livestock. Poultry is another sector that has developed from a marginal activity to become a commercial enterprise. It can provide avenues for commercial ventures and enhance the income of the poor.

Immediate Action: Livestock

- A census with a complete head count of the existing livestock and poultry must be conducted. Stocktaking should be undertaken with detailed assessment and a framework for medium- and long-term planning in the sector. Furthermore, there is a need for relevant indicators to address bottlenecks in the sector. Both analytical and quantitative indicators of the nature and extent of shortages in the sector should focus on optimal rather than subsistence needs. Cross-sectoral remedial measures can be based on this analysis.

- Education and training of women engaged in husbandry activities should be emphasized to enhance productivity. The provision of mobile veterinary dispensaries will augment this effort. These should be launched on an experimental basis in three union councils in collaboration with the private sector.

- The effect of frequent and recurrent natural disasters on the livestock industry must be analysed. All stakeholders must collectively devise a plan and take measures to mitigate losses.

- People involved in livestock rearing must be educated about the use of services such as livestock vaccination and health facilities. Hygiene and sanitation conditions in cattle farms which are sources of parasitic and bacterial infections in livestock must also be addressed. The possibility of promoting the rearing of comparatively fewer, better-nourished animals over larger numbers of undernourished animals must be scrutinized. This exercise will be useful for future planning, where a more scientific orientation will be promoted with greater stress on improving quality rather than quantity alone.

Medium-term Interventions

- Improvements in the sector can be made by enhancing the existing veterinary extension system by seeking greater coverage both in terms of area and the number of animals. Modern technology must also be promoted, particularly in the fields of storage, transport and animal nutrition as this will further improve the delivery of outputs. However, it must be adapted to local conditions to bring about an eventual change in administrative orientation.

- Services for increasing the livestock population may be extended at the *taluka* level, with the establishment of information centres to disseminate information on marketing of livestock and other related matters.

- Objective analysis and quantification of the extent and nature of feed shortages focusing on optimal rather than subsistence needs is required. This analysis will serve as a prelude to developing cross-sectoral remedial measures.

- The involvement of local communities for transferring greater control and responsibility to stakeholders is crucial. Women must also be employed and trained as extension workers to disseminate information on livestock rearing.

- Lack of human resources could be substituted by developing veterinary specialists to cater to the needs.

Long-term Interventions

- It is necessary to seek solutions to key livestock breeding issues, particularly the lack of indigenous established breeds, the inadequacy of insemination services and difficulties in acquiring medication. Examining alternatives or supplements to public sector service delivery such as the participation of local communities, the active involvement of NGOs and projects or support from the private sector must also be explored. There is also a need to focus on restricting public sector involvement to regulation and enforcement, and extending support to stakeholders.

- Infrastructure development to support the sector must be made a top priority. There is a need to establish mobile veterinary dispensaries and

Mohammad Ali Qadri

Badin has diverse species of goats.

Mohammad Ali Qadri

A precious livestock asset.

provide livestock health facilities and vaccines. Furthermore, measures must be taken to support the industry through the establishment of milk collection centres and slaughter houses. The provision of micro-credit schemes for the purchase of livestock and dairy development would greatly benefit the sector and contribute to poverty alleviation in the district.

- Veterinary and livestock developments at the district level should be organized in line with the requirements of devolution reforms and strengthened through tailor-made capacity building programmes. Veterinary centres should be strengthened through the provision of requisite resources with each union council having at least one veterinary hospital. These organizations should have the capacity to provide livestock breeders with technical training.

- Of utmost importance is the need to formulate a comprehensive marketing and production strategy so that market volatility, overproduction and dumping no longer threaten the interests of the stakeholders.

- Efforts need to be made to position the dairy industry as a central component of a diversified economy. This would also require monitoring the progress on indicators, addressing fodder issues and redoubling efforts to improve breed quality, output and animal health.

Immediate Action: Poultry

- There is a need to study the scale of gaps in the sector as a preliminary step towards initiating remedial interventions.

- Key issues such as disease control and breed improvement must be examined and options to involve the private sector, NGOs, local communities and commercial producers should be explored.

- Credit and financial incentives should be provided to enable producers to fully utilize their production capacity.

- Initiatives for capacity building and mobilization of small-scale rural producers, particularly women, must be undertaken to improve efficiency in the sector. Backyard poultry producers, particularly women, need to be provided with support.

- Cooperative marketing must also be promoted at the village level so that small-scale rural producers are not overlooked in the effort to boost large-scale commercial operations.

Medium-term Interventions

- To develop the poultry sector, there is a need to focus on technical training, provision of information and facilities for poultry farming and experimental introduction of poultry insurance.

- Planning options must be explored to counter demand and supply fluctuations and introduce a modicum of stability to this volatile sector.

- The infrastructure for support and expansion of this sector must be built upon. Provision of information and facilities for poultry farming is necessary. The allocation of poultry inputs such as feed, vaccines and chicks to farmers and local communities may result in expansion of the sector. The scale of poultry feed shortages needs to be assessed and then addressed through remedial interventions.

- There must be improvements in credit availability and financial incentives for feed mills to fully utilize their production capacity.

- The formulation of a modern production and marketing plan for the sector, particularly to mitigate the volatile swings in demand and supply is essential. Besides specialist input, all stakeholders need to be involved in the process. Stakeholders must build on the work of NGOs and projects, and provide capacity assistance.

- Research and dissemination of appropriate technologies (small scale economical Gas/kerosene oil incubators) suitable for poultry production at household level needs to be carried out.

Long-term Interventions

- To strengthen this sector there is a need to fine-tune, monitor and evaluate the outcomes of integrated production and marketing plans, particularly through the use of indicators.

- Public and private collaboration and cooperation must be strengthened. The local government must maximize private sector participation and optimize public sector administrative input for regulatory, enforcement and support functions. Technical expertise must be garnered from academics, professionals and experts.

- Cooperative marketing and capacity building at the village level is required to ensure small-scale rural producers are equally involved in the effort to boost large-scale commercial operations.

4.4 Fisheries

4.4.1. Status and Issues

As a coastal district, Badin relies on fisheries as an important component of the economy. The current situation suggests that habitat protection has not been addressed, enrichment is not a priority and general indifference to the fisheries sector is pervasive. As such, it is no surprise that little has been done to check the discharge of dangerous effluents and untreated waste into water sources, which not only seriously undermines water quality but also threatens the existence of fish species. Similarly, the absence of land-use planning, accelerated urbanization and population growth have transformed some streams into virtual municipal drains.

About 10 percent of the overall marine fish exports originate from Badin (Figure 4). Promoting fish production will not only raise the income of fish farmers, but will

Mohammad Ali Qadri

A view of Badin fish harbour.

also benefit other businesses including processors and exporters.

During 2000/2001, total fish production in Pakistan was recorded at 665 000 tonnes; the contribution from marine fisheries along Sindh and Balochistan coastlines was 480 000 tonnes, while the contribution of inland fisheries was 185 000 tonnes. Of all the coastal fisheries, the contribution from the Sindh coast and Indus Delta is higher than Balochistan despite Sindh's coastline being smaller (only 350 km). During 1999, out of a total of 474 665 tonnes of marine fish catches in Pakistan, the Sindh coast contributed 333 047 tonnes; the Exclusive Economic Zone (EEZ) under the control of the federal government produced an additional 184 545 tonnes (Figure 5). Badin, being part of the Sindh coastal area, contributes significantly to marine fish production, especially shrimp. It is estimated that out of the marine fish exports worth US$100 million, about 10 percent comes from the Badin coast.

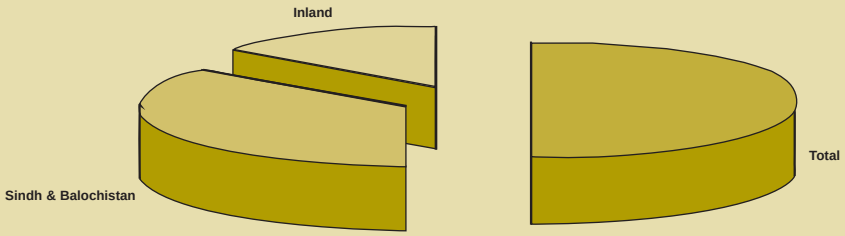
Sindh Province holds the premier position in the fisheries sector of the country. It commands almost 100 percent of the brackish, 65 percent of the freshwater and 71 percent of the marine water resources of the total fisheries area of Pakistan. These resources comprise 400 commercially important species of marine fish, 200 species of freshwater fish and 13 species of shrimp. The coastal areas of Thatta and Badin districts are considered major fishing areas. Fisheries in these districts were doing very well until 1996. Since then, however, drought and destruction of breeding grounds and estuaries has reportedly caused 70 to 80 percent reduction in fishing. Marine fisheries in Badin District, which replaced the freshwater fisheries, have also experienced a significant reduction after the destruction of the tidal link and Choleri Weir. The brackish water fishing resources are still quite significant in Badin District, as it has many surface drains as well as natural depressions and waterbodies.

Badin is considered to have some of the most productive freshwater fisheries in Sindh. Inland fisheries statistics for Sindh in 2002 revealed that out of the total fish production of 80 659 tonnes, some 14 152 tonnes or 17.5 percent were produced in Badin which was second only to Thatta District in inland fish production.

In Badin *taluka,* there are 100 fish farms covering 1 619 hectares. In Tando Bago *taluka,* there are 150 fish farms encompassing 3 540 hectares. Fish farms are also found in Golarchi, Matli and Talhar.

FIGURE 4

Share of fish catches in Pakistan (2000-2001)



The vast majority of these fish ponds have been established in former lakes and natural depressions. Only a dozen or so fish farms are reported to be managed on scientific lines and profitable in financial terms. Most of the farms are facing problems related to technology, maintenance of proper soil and water balance and feeding practices. There is a need for appropriate training as well as the establishment of hatcheries to supply fry from successful species.

Badin has many other freshwater fisheries including natural depressions and waterbodies such as the Dhoro Puran, surface drains, inland lakes, tidal lakes and canals and distributaries. The development of freshwater fisheries at selected locations in these vast areas could yield significant gains in terms of fish production as well as income generation for the local communities.

4.4.2. Measures for Sustainable Development

The district's rich aquatic potential is neither protected nor rationally exploited. There are gaps in institutional capacity, as well as commercial interest. Despite an insatiable domestic demand, fish output is lower than potential output.

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Fisheries are an important component of economy.

Mohammad Ali Qadri

Badin contributes significantly to national marine fish production.

Immediate Initiatives

- Fisheries extension may be re-organized in line with the requirements of the devolution plan, strengthened through provision of resources and capacity-building efforts and positioned to steer the sector to perform as an important component of the district economy. The department should concentrate on building a team for preparation of an action plan for the sector.

- Fisherfolk in the district may be given technical training in modern fishing techniques. Direct access to marketing facilities would be beneficial for fisherfolk by eliminating the role of middlemen.

- The district government should examine the registration of fish ponds, promotion of lined fish ponds for the introduction of shrimp farming, appropriate site selection for fish ponds and their proper upkeep.

- The district's fisheries and aquatic potential needs to be studied systematically to develop these resources as components of a diversified economy. Limnological analyses of all waterbodies should be carried out to determine the current status of aquatic resources and to facilitate medium-term habitat rehabilitation interventions. The Sindh Wildlife Department as well as forest and fisheries departments must join this exercise.

- The impact of pollution and sea intrusion caused by mega development projects and other factors needs to be assessed with a focus on aquatic resource deterioration and biodiversity loss.

- The problems of harmful fishing practices should be addressed to ensure that harvesting is carried out sustainably and overfishing is minimized.

- Review fish and aquatic resources from the twin viewpoints of economics and conservation. The district government needs to embrace this orientation and create a management plan that will cater to both aspects simultaneously.

Medium-term Interventions

- The *Taluka* Municipal Administration (TMA) should be tasked to gradually stop discharging drainage effluents

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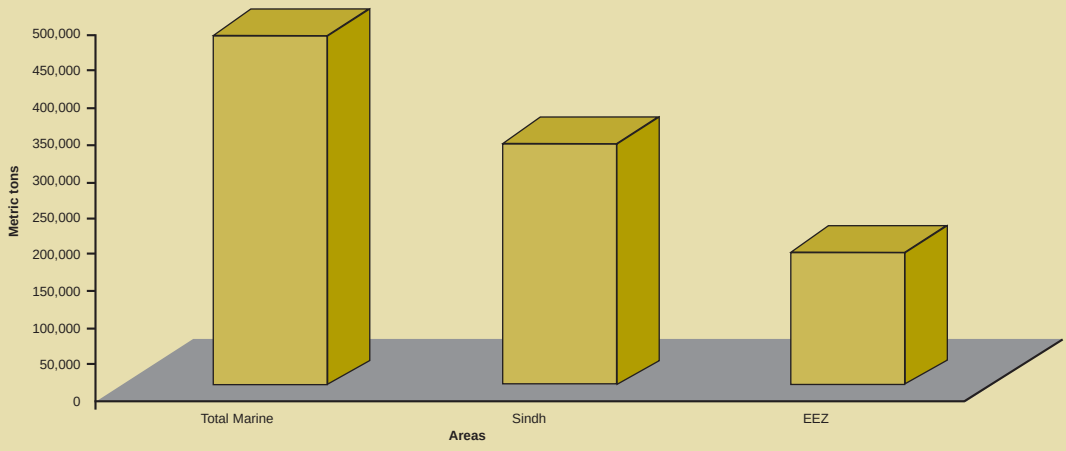
Modern fishing techniques have yet to arrive in Badin.

into fresh waterbodies and ponds. Wetlands may be protected from both fisheries and ecological standpoints. Technical and resource inputs should be sought from NGOs, development projects and donors to conserve fisheries resources and aquatic biodiversity.

- Private sector involvement in managing fisheries may be examined with a special focus on the safe disposal of wastewater from industries.
- Saline water of the LBOD and fresh water may be mixed for use in fish ponds. The size of fish ponds should be limited to five to ten acres.
- Cooperative societies may be developed with representation from NGOs for the betterment of the fishing community.
- Awarding fishing contracts to local communities may be examined to create better employment

FIGURE 5

Marine fish catch patterns in 1999-2000



opportunities in the sector for the local people. This may be augmented with training for fishing communities in modern and sustainable practices. The training may focus on modern development practices for freshwater fisheries. Funds generated through the award of fishing contracts may be pumped into developing the sector.

- Aquatic resources should be enriched on a site-specific basis through species introduction, habitat rehabilitation and protection. Such measures should use a participatory approach and local communities should be allowed to share in the economic benefits.

Long-term Interventions

- There must be a concerted effort to build infrastructure to strengthen the income-generating potential of this sector. Cold storage for fisheries may be developed and a shrimp-processing industry may be established. The option of constructing jetties must be considered. Transportation facilities and road access are equally important to transport perishable goods to the market.

- Aquatic resources must be protected from encroachment and pollution and harvesting should be carried out sustainably. Furthermore, the provision of alternative livelihoods and employment opportunities for fisherfolk is important for conservation and poverty alleviation.

- Measures need to be taken to address the overwhelming pressure of pollution on most waterbodies and its impact on aquatic resource deterioration and biodiversity loss.

- The restoration of tidal lakes by replenishing freshwater supply and providing inland fish fry varieties is important for the sustainability of the fisheries sector.

- Efforts to tap the potential for fish farming in an integrated manner must be made, supplemented by capacity-building inputs and the use of modern technology.

- There is a need to support habitat rehabilitation and enhancement using the latest technology and research findings. Donors and projects already active in various NRM activities must be motivated to enter the fisheries sector.

4.5 Biodiversity

4.5.1 Flora and Fauna in the District

Flora: There are many different kinds of grasses and other plants. Half-a-dozen species of trees are common in Badin. The Babul tree (Acacia nilotica) is common in agricultural fields. The Ber tree (Zizyphis numuaria) is found mostly in the cultivated fields as a horticultural crop. Kandi is a small tree. Its wood is strong and is made into implements and household furniture and its charcoal is used as an inferior fuel. The other most common trees and shrubs are the Pipal (Ficus religiosa), Tamarisk or Pilu (Salvadora decidues) and Devi or Mesquite, the charcoal of which has good commercial value in Sindh and Punjab.

Fauna: Jackals and foxes have been seen in the diminishing areas of wasteland. Pigs (wild boar) are found in small numbers in the rice-sugarcane tract. Hares are fairly common in the rural landscape. The most common birds are black partridge, grey partridge, the Indian owl and the long-billed vulture. Among waterfowl, the greater flamingo and other migratory winter birds are found in lakes and waterbodies. Common reptiles are cobra, krait, rat snake and the Indian shelled turtle.

4.5.2 Status and Issues

Biodiversity concerns are woven into a diverse range of activities and sectors including forests, rangelands, pollution and waste management, population

Abubakar Shaikh

Compiling an inventory of species should be given priority in the district.

welfare, infrastructure, tourism, water supply and poverty alleviation. As such, most development activities have a direct impact on biodiversity issues. This fact needs to be incorporated formally into development planning in all sectors. Demographic trends and socio-economic conditions in the district have far-reaching consequences on the ecosystem. Population growth and poverty exert heavy pressure on natural resources. In the absence of land-use planning, unregulated construction has been allowed to encroach on forests and habitats, even when they are located within the boundaries of protected areas. Traditional practices such as burning to facilitate grass growth also pose a serious threat to biodiversity, while recent droughts have made the land more susceptible to accidental fires.

Green sector interventions undertaken in the past have failed to take into account the potential impact on biodiversity. Exotic species such as eucalyptus have been introduced to the area in order to accelerate short-term gains. This has invariably taken place without any serious analysis of the long-term impact on native species. Development activities in a number of sectors also pose a threat to biodiversity.

Biodiversity issues are innately long term and isolated interventions can only address surface symptoms rather than root causes. This understanding needs to be incorporated into all planned interventions. In this connection, awareness raising on a massive scale will be required to enlighten stakeholders, concerned agencies and local communities. At the administrative level, it will be necessary to ensure continuity in policy and long-term institutional support at all levels. At the same time, cross-sectoral partnerships and community involvement will need to be developed. These efforts must be backed by biodiversity specific legislation and widespread reform.

4.5.3 Measures for Sustainable Development

Immediate Action

- There is an immediate need to compile an inventory of genetic, species and ecosystem diversity and to review the manner in which threats to biodiversity can be addressed. Furthermore, there is a need to complete an inventory of the district's

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Community participation in biodiversity conservation must be ensured.

flora and fauna, deriving definitions, concepts and methodology through consensus.

- Baseline indicators and explicit targets for biodiversity protection must be established and communicated to all stakeholders. This would require assigning unambiguous implementation roles to key players, backed by monitoring and accountability components. This would also call for setting targets and examining available alternatives to initiate interventions in this context.

- Awareness raising on biodiversity and improving understanding among stakeholders about the needs of the sector are essential. Stakeholders must realize that biodiversity and protected areas are vital economic entities that can directly and indirectly enable poverty alleviation. This could be done through sustained advocacy, meaningful public consultations and focused debate.

Medium-term Interventions

- Statutory support - biodiversity-specific legislation - must be evaluated and measures to reform the macro framework must be undertaken. In order to ensure continuity in policy and institutional support at all levels, cross-sectoral partnerships as well as community involvement must be encouraged. The sustained political will and commitment of implementing authorities is essential.

- The Environmental Impact Assessment (EIA) regime must be enforced, making it mandatory for all development projects to undergo an assessment prior to implementation. Mass awareness campaigns and communication exercises are suggested as immediate steps in this context.

Long-term Interventions

- The district government and development agencies should use local resources optimally while seeking funds for biodiversity conservation from donors such as the Global Environment Facility (GEF) and the United Nations Environment Programme (UNEP) as well as the private sector.

4.6 Wetlands

4.6.1 Status and Issues

Often referred to as "biological supermarkets[1]" because of their extensive and rich food webs and biodiversity, wetlands are among the most productive ecosystems in the world. In Pakistan, 19 wetlands have been recognized under the Ramsar Convention. Sindh Province has a number of wetlands including nine Ramsar sites of international importance with a total surface area of 283 952 hectares. Sindh's coastal and estuarine wetlands serve as spawning, rearing and nursery grounds for crustaceans and fish. They also serve as critical breeding, rearing, staging and wintering grounds for a number of globally important species of birds. The waterfowl from Central Asian republics migrate to the wetlands of Sindh as they are situated on the Central Asian-South Asian flight path.

Over 100 wetlands, which vary in size, form and characteristics, are located in Sindh. These wetlands are important biodiversity pools and a source of income for thousands of local people. They range from shorelines, rivers, lakes, marshes, ponds and channels to lagoons.

Badin District is an important component of the coastal ecosystem of Sindh. Various important wetlands are situated in the district: Nurruri, Pateji, Shakoor *Dhand,* Dahee, Shaikh Kerio, Cholri, Mehro, Sanhro, Bakradi, Bakar, Mandhar and Narahi (wetlands and waterbodies); Phoosna, Charvo, Khango, Jari, Jaffarali, Nira *Dhand,* Dhandka, Soomar and Soomro (lakes). Many are now degraded.

The tidal link of the LBOD, constructed in the early 1990s, passes through a series of large, shallow interconnected tidal *dhands.* To maintain the ecology of *dhands,* the 1 800 feet long Cholri Weir with 94 bays was constructed at the south limb of Cholri *Dhand* and on the northern bank of the tidal link. This was done to reduce the tidal effect and maintain the *dhands'* environment. Since it started operating, the tidal link has been subjected to bed erosion and sloughing of the embankment. Drainage effluent and continuous upward movement of seawater from Shah Samdo Creek had increased the saline area of tidal lakes

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Badin has a variety of wetlands.

1 Mitsch, W.J. & Gosselink, J. G. 1993. *Wetlands*, New York, Van Nostrand Reinhold, 2nd Ed.

from 17 004 hectares in 1991 to about 24 291 hectares in 2003.

The tidal link connects Badin with Shah Samdo Creek and mudflats arising from Sir Creek in the Indus Delta. A few patches of mangroves consisting mainly of Aviccenia Marina are scattered on the mudflats.

The most important Ramsar-recognized wetland in the region[2] is the Nurruri coastal wetland. It is located 30 kilometres south of Golarchi in Badin District. The reported area is estimated at 2 540 hectares. The Nurruri wetland is a shallow water lagoon with barren mudflats on the northern side. It supports an appreciable number of some very important birds particularly Phoeniconaias minor (the lesser flamingo) and Pelicanus crispus (the Dalmatian pelican). Species of aquatic plants such as Typha and occasionally Tamarix are found within and in the vicinity of this area.

A large village, Ahmad Rajo, is located to the north of Nurruri wetland. The privately owned land of the site provides livelihoods to approximately 4 000 people in the surrounding areas, mainly through fisheries. At present, nearly all of the area of the site is dry except the portion that touches the sea. The site, which consistently hosts large populations of waterfowl, is no longer a sanctuary for migratory birds. The freshwater fisheries have totally collapsed. The socio-economic system of the area, which was

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Wetlands have a rich biodiversity.

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Livelihood of people depends on wetlands.

2 Ramsar Site No.1069

dependent on wetland resources and agriculture, is in dire need of rehabilitation.

Owing to severe drought conditions and the cyclone of 1999, the ecological conditions of this wetland have changed drastically. The freshwater supply to this lagoon was completely cut off after the modification and deepening of the Phuleli-Guni outfall drain. This outfall drain starts from Tando Mohammad Khan and carries drainage water into the sea. It is a part of the Kotri drainage system. The other outfall drain, Karo-Ghargro, has also lost its importance as a freshwater reservoir to Nurruri due to seawater intrusion. These were the two main sources of freshwater for Nurruri wetland. These factors have affected the livelihoods of the local population. Activities such as agriculture, fishing, livestock grazing and hunting diminished significantly after the degradation of the wetland.

4.6.2 Measures for Sustainable Development

Immediate Action

- A feasibility study to evaluate the benefits of the introduction of iron gates or a weir in Gunni-Phuleli outfall drain near Mullah Goth must be conducted. The introduction of iron gates in Gunni-Phuleli outfall drain near Way Point should also be considered. Appropriate action, based on the results of these feasibility studies, should be taken.

- There is an urgent need to educate local people about wildlife and the conservation of wetlands.

Medium-term interventions

- Economic valuations of wetlands should be conducted and based on the outcomes, awareness raising about economic losses due to loss of biodiversity must be undertaken.

- Stakeholders and conservationists must lobby for the rehabilitation of these important wetlands. A Management Plan for Nurruri and other important wetlands should be prepared and implemented. Regular monitoring programmes for the ecological changes evident in wetlands must be initiated as well.

Long-term Interventions

- A wetland inventory must be set in place to establish a baseline for

Mohammad Ali Qadri

Economic valuation of wetlands is yet to be undertaken.

measuring future changes in wetlands, their functions and values. The last study of wetlands has not been updated since 1992. The state of the wetlands identified at that time must be considered.

- Effective conservation activities must be undertaken to protect the natural properties of the wetland ecosystem. These actions can range from the strict protection of an area to the inclusion of conservation activities in development projects, based on a detailed action plan aimed at protection of wetlands and wildlife habitats.

- It must be taken into account that conservation and development initiatives are integrated in the design and implementation of projects and activities related to the sustainable use and development of wetland and biodiversity resources.

4.7 Irrigation and Drainage

4.7.1 Status and Issues

Irrigation: Irrigation is not a function devolved to the district government and thus, the district government does not have the authority or obligation to manage, operate and control the functions of the department. However, issues in irrigation have direct bearing on almost every government entity and for the district as a whole. These issues cannot be ignored by the district government and it must have a clear understanding of the complexities associated with the sector.

Badin has a reported area of 672 000 hectares. Land utilization statistics for 2001/2002 revealed that the cultivated area in the district stood at 462 000 hectares, including a current fallow of 259 000 hectares and net sown area of 203 000 hectares. Around 25 000 hectares of the cropped area were sown more than once and as such the total cropped area was assessed to be 228 000 hectares. Cultivable wasteland in the district was estimated to be 70 000 hectares. An area of 131 000 hectares in the district was categorized as not being available for cultivation. In the same year 60 958 hectares were cultivated with paddy and sugarcane was grown on 47 872 hectares. Regarding irrigated sown areas, in 1998/1999, 246 300 hectares were categorized as irrigated. Statistics for the *Kharif* 1998 season revealed that the seasonal sown area of 186 000 hectares was totally dependent on canal irrigation.

These statistics disclose the total dependence of agriculture in Badin on canal irrigation. This requires a highly efficient network of tributaries, channels and water courses. The geographical location and topography of the district demand the additional input of a sophisticated drainage component to maintain farmland productivity and fertility besides balancing of the rising water tables and salinity intrusion. Thus Badin District is in a highly critical situation. It is estimated that the groundwater level that was below 4 metres in the 1930s has risen to less than 1.5 metres in recent years. Forty percent of the fertile land has been lost to salinity and waterlogging. Low yields and abandonment of land are the natural consequences of this situation.

The entire district is irrigated by the Sukkur and Kotri barrages. The area being fed by Kotri Barrage is divided into perennial and other systems of irrigation. The irrigation network mainly comprises the Guni, Phuleli, Akram Wah and Nasir canals. Along with the irrigation water received from Sukkur Barrage, the total irrigation supply amounts to 15 208 cusecs for the command area of 603 000 hectares.

The total cultivable area by these canals is 1, 133,12 hectares. There are major problems in water supply, distribution and management. Out of about 12 000 water courses, 2 000 have been lined up to a length of 30 percent. Under the recent institutional reforms, the Left Bank Canal Area Water Board (LBCAWB) is

managing the irrigation and drainage system in Badin. The LBCAWB is located in the coastal fringe on the Left Bank of the Indus River. Its gross command area is reported to be 64 6430 hectares in Badin and the southern part of Hyderabad (south of Tando Mohammed Khan).

The water allowance for the Fuleli command area is among the highest for all feeder canals in Sindh. This is because 40 percent of the command area is reserved for rice cultivation. Fuleli is classified formally as a non-perennial canal. There is a (design and actual) provision for *Rabi* cultivation. Except for *Rabi* cultivation, cultivation intensities in both Fuleli and Akram Wah are less than the design intensities (at 72 percent and 78 percent respectively).

With a total length of 381 RD (reduced distance), the Akram Wah Feeder Canal conveys water from the Kotri Barrage to the Gaja Branch at RD 110, and then again to the very tail of the Left Bank Canal southeast of Tando Bagho and Badin. The intermediate area (over some 200 RD) is irrigated through the Fuleli Feeder. This has resulted in a lengthy Akram Wah Feeder with a relatively modest discharge. In order to control losses from the canal, it has been lined over 190 RD. Currently the lining of the Akram Wah is in very bad shape; the lower part of the lining is extensively damaged over most of its length. As a result, the maximum discharge in Akram Wah is only about 3 100 cusecs which is less than the designed 3 714 cusecs. The recently constructed Fuleli Gaja Link (with a capacity of 300 cusecs), is intended to alleviate this inadequacy.

Another feature of the Akram Wah feeder canal is the number of lift machines, which has increased from 11 to 204, and is still rising. These lift machines can abstract 10 to 20 percent of the maximum discharge (3 714 cusecs) without much supervision at preferred times during the day. When the available supply is less than the full discharge supply, the impact of the abstractions from lift machines grows significantly. The degradation of the lining of the canal and the increase in the number of direct outlets result in a substantial reduction of the actual supply of the Akram Wah Canal made available for Gaja Branch and the tail area between and around Tando Bagho and Kadhan.

The Fuleli Feeder Canal, with a total length of 299 RD, conveys water from the Kotri Barrage to the middle reach of the Left Bank Canal. Its first major take-off is at RD 145 to the Guni Branch with some 4 000 cusecs. Other major branch canals are the Murad Wah, Matli, Sultani and Nasir branches on its left bank and the

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Agriculture in Badin is largely dependent on canal irrigation.

Imam Wah Jagir and Mir Wah Talhar branches on its right bank.

Like the Akram Wah Canal, the Fuleli is designed as a regime canal. This implies that these canals can operate within a range of 70 to 110 percent of full supply capacity. Lower supplies lead to sediment deposition and inequitable supply between distribution channels. Under these circumstances rotations are used. These rotations are normally programmed but deviations occur, resulting in erratic water supply. Moreover, the rotations are largely run on the basis of experience (i.e. water levels that are known to accommodate the supply for certain distribution channels) but are not quantified (a known discharge for a specific canal). Major regulators in the Fuleli have been rehabilitated recently. However, the decreased supply of irrigation water in the system has apparently led to sediment deposition and inequitable distribution, to the disadvantage of tail-end users.

The water courses are officially under the control of the irrigation department; water distribution proceeds through the warabandi (scheduled supply and closure) system. The increase of (largely uncontrolled) direct outlets and the presence of large farm holdings, has a negative impact on the equity of water distribution and the ability to reach tail-end canals with lower flow even when rotation schedules are applied.

Drainage: The SMO Water and Power Development Authority (WAPDA) has installed a series of piezometers/open wells to monitor the rise and fall of underground water levels. Near the coastal strip, the water table depth is shallow and ranges between 1 and 2.5 metres, whereas, moving upwards, it ranges between -0.5 to 3.5 metres. The average water table is within the range of the required water table depth for agricultural crops.

Similar to the watercourses, the drains at the field level are operated and maintained by the farmers themselves. Most of the area in the Left Bank Canal system is served by an extensive surface drainage network, comprising the Gaja-Guni, Karo Gungro and Fuleli drains; the Kadham Pateji Outfall Drain (KPOD) and the Western Sirani, Lowari, Tando Bagho and Shadi Bahadur branch drains that are linked either directly or through *dhands* to the Arabian Sea.

Some of these channels are currently under rehabilitation through the investment component of the National Drainage Programme. The non-rehabilitated channels present serious capacity problems. Moreover, the evacuation of saline water is thwarted by tidal influence, especially on the lower KPOD. Notwithstanding the fact that the Karo Gungro Branch Drain and its sub-channels (the Gaja-Guni Branch Drain and others) are located in the Left Bank Canal command area, these channels are still operated by drainage sub-divisions (Gaja and Bathoro) under control of the Chief Engineer, Kotri Barrage. It is feasible to split these sub-divisions and their commands and give full control to the LBCAWB for proper operation and maintenance.

4.7.2 Drainage Projects

The LBOD Stage-I Project: The LBOD project was launched by WAPDA in 1986 and is now under the purview of the Sindh Irrigation and Drainage Authority, (SIDA); its objective is to provide a long-term solution to the drainage issues of Sindh, by removing saline drainage water into the sea. The first phase of work, known as the LBOD Stage-I Project, concentrated on the provision of drainage to control the water table in three badly affected districts, including Nawabshah (222 577 hectares of irrigated area), Sanghar (146 496 hectares) and Mirpur Khas (144 877 hectares). The LBOD project involved the construction of some 1 931 kilometres of large drains, 2 000 wells and nearly 200 drainage sumps, as well as 2 414 kilometres of small disposal channels, access roads and overhead power lines over an area of 526 000 hectares in Sindh.

Along with other components of the project, a 42-kilometre-long tidal link was also constructed in Badin to convey the drainage water of the project to the

Arabian Sea. The tidal link and all four interconnected tidal lakes - Pateji, Cholri, Mehro and Sanhro - play an important role in the local wetland ecosystem. There has been a continuous issue, raised by the local irrigation experts and growers in Badin and Thatta districts, about damage to fertile lands and other adverse environmental impacts due to a design fault in the tidal link of the LBOD. The defects in the tidal link surfaced for the first time in 1999, when a major portion of the weir of the tidal link was washed away by the sea tide. According to local irrigation experts, the water of Kotri surface drains, which previously flowed into natural creeks, has been obstructed by the construction of the tidal link. Consequently this drainage water becomes stagnant and creates salinity and waterlogging. Another reason is reported to be the construction of an 18-foot-high weir to block the water of the Dhoro Puran Outfall Drain (DPOD) from flowing into the Indian part of Shakoor Lake. This weir compounds the pressure of drainable effluents in the KPOD and the LBOD channels. The 2003 floods in the coastal union councils of Badin, including Kadhan, Seerani, Bughra Memon, Mithi Thari and Ahmed Rajo, have also been attributed to the breaches in the LBOD spinal drain, tidal link structures and the resultant back-flow of drainage effluents

National Drainage Programme: The National Drainage Programme (NDP) was funded by the Government of Pakistan (GoP), the World Bank and other international donors. As a comprehensive programme, the NDP is focused exclusively on solving the drainage and agricultural effluent problems in the Indus Basin. The programme components are:

A) Sector Planning and Research Component

1) Policy Studies

- National Water Policy
- Water Rights in Selected Canal Commands
- Gypsum pricing marketing and distribution
- Promoting private investment in irrigation
- Exploration and regulation of fresh groundwater
- Revenue options and prospects for WAPDA's water wing
- Efficacy of past drainage investment

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A sub-drain of LBOD project carrying drainage effluents.

2) Planning Studies

- Pre-feasibility of National Surface Drainage System
- Balochistan Effluent Disposal
- Flood Protection and Drainage of Peshawar Valley

3) Monitoring Studies

- Indus Basin Revised Model
- Soil salinity and waterlogging surveys of irrigated areas of Indus plain
- Institutionalized Environmental Monitoring of Land & Water Conditions
- Physical Monitoring of LBOD Stage-1 Project
- Post Construction M&E of Fourth Drainage Project
- Third Party Monitoring of NDP and Institutional Reforms

B) Institutional Reforms Component

1) Institutional Reforms

- Establishment of Sindh Irrigation & Drainage Authority
- Establishment of Pilot Area Water Board;
- Formation of Farmer Organizations (FOs)

2) Social Mobilization

- Establishment of a Social Development Cell in SIDA
- Undertaking uncompleted IIMI activities
- Formation of about 1 400 FOs and 14 AWBs in Sindh
- NGO coordination and awareness workshops

3) Environmental Component

- Basin-wide EMP
- Environmental Auditing
- Proposals submitted by EPA Sindh

4) Investment Component

- Design Engineering & Supervision Consultants
- Future Operation Plan of remaining RBOD work
- Formation of Project Review and Monitoring Committees

C) Programme Coordination & Supervision

The NDP is currently under implementation. Its institutional reforms component has spread only to three canal systems - the NARA, the Ghotki and the Left Bank. The training and research components have not been implemented properly. The investment component is also lagging. The donors and the GoP recently completed a review of the programme; as a result major changes and replacements of various project components are likely to occur. The impact of institutional reforms in Badin is minimal so far and elections to the LBCAWB have not taken place. Formation of FOs, and irrigation and drainage management transfer to these bodies is also progressing very slowly. Hence, inequitable distribution and theft of water are still very common.

4.7.3 Hydrological and Ecological Changes

Beg and Qureshi (2004) have reported that major changes in the hydrology and hydrogeology of Badin took place after the upstream construction of:

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Ecological degradation on the rise.

1) Channels to transfer water to and from different river branches and to irrigate farm lands;

2) Barrages to divert river flow to canals and channels;

3) A drainage system to drain the saline effluents from the Left Bank of the Indus to the tidal link;

4) Flood protection embankments and dykes to prevent river overflow, thus restricting the flow to the main channels; and

5) Dams to irrigate marginal lands and to control floods.

The ecology of the district has changed completely as a result of the alteration in the upstream water balance, which has reduced the flow of water, and more importantly, sediment into the deltaic region. These activities have confined the river to a single channel, dried up most of the creeks and channels and caused shrinkage of the delta. The hydrological and ecological changes highlighted above necessitate sufficient Indus flow downstream from Kotri to maintain the valuable coastal ecosystem and wetlands of Badin.

4.7.4 Flood Control

Ecological changes have resulted in the isolation of Badin from the deltaic ecosystem and deprived it of freshwater resources. Rainstorms have now assumed the role of floods in inundating large tracts of agricultural land. With a water table within the depth of 240 cm in winter and 150 cm in summer, and a grossly inadequate drainage system that is not maintained properly, the soil in the area encompassed by the 3- to 5-metre contour line does not have the capacity to carry even a nominal increase in precipitation. Flood conditions are created when canal and saline water from the irrigation and drainage channels flows in through the breaches occurring in canals and drains.

No storage reservoirs/small dams have been built to control floodwater during heavy rainfall, although there are several depressions along the coastal area. The construction of the LBOD for effluent disposal into the sea via a tidal link drain and the extension and remodelling of the KPOD where Kotri surface drainage is discharged, are projects currently perceived as mega failures and a major cause of flooding in Badin.

4.7.5 Status and Issues in Irrigation and Drainage

Preliminary assessments indicate the following major issues in this sector.

- Badin is not receiving the required quantity of irrigation water to sustain its cultivable area. Supply lines are in bad shape and poorly maintained. In some places it is the shortage of water that is hindering yield improvement and better returns. Elsewhere, seepage and wastage of water are not attended to. In yet other places it is the rising water table that is threatening the productivity of farmland. Above all, almost everywhere mismanagement in planning, incoherent execution and lack of supervision and evaluation are aggravating the situation.

- The existing drainage system does not address the problem and is far from satisfactory. Interventions have fallen short of the requirements. The existing institutional and management arrangements are not sufficient to address the problems.

- Irrigation and drainage channels have transformed into silt deposits, resulting in weed growth. Both are prominent factors that obstruct the smooth flow of water.

- Storm water disposal arrangements are in total disarray. Nominal increases in precipitation result in overflow and flooding in villages, farmlands and fishponds. Rainwater remains stagnant in farmlands because there are no drains and generates great loss in terms of time and returns.

- Appropriate lining of water courses, channels and drains augments irrigation and drainage arrangements and introduces efficiency. It is unfortunate that lining has either been a low priority or a mismanaged task and has added to the miseries of farmers. In view of the limited options and alternatives, this factor seems to be the greatest deficiency.

- The systems in the sector are operating in compartmentalized and regimented segments. The elements of coherence and integration are non-existent. Meaningful engagement of the stakeholders is not mentioned in the list of priorities.

- In the ultimate analysis, it is the district, agriculture and the farmer that suffer because of huge gaps in efficiency, management and supervision levels in the sector. This

NPIWC

Water courses are being lined under a National Programme for Improvement of Water Courses.

phenomenon makes it mandatory for the district government to address the issues.

4.7.6 Measures for Sustainable Development

Immediate Action

- The district government should initiate a consultative process with stakeholders at all levels immediately, including the union council level to articulate and assess the issue. The present dual system (IDP & SIDA) of irrigation water management may be reconsidered for effective implementation.

- Lining of watercourses is also a necessary requirement and this needs to be undertaken through participation.

- Re-assessment of the present drainage infrastructure - a new drainage system should be a priority. Continuous cultivation of lands in Sindh after the commissioning of barrages and the disposal of agricultural and industrial effluents throughout the coastal districts has generated drainage problems as well as the twin menaces of waterlogging and salinity.

- Duly organized and appropriately sensitized public opinion is vital for the resolution of these complex issues in the long run. This cannot be done without mobilizing communities that in turn need the support of civil society to activate the grassroots social organizations for creating awareness, providing formal forums for debating the issues, building opinions, facilitating two-way communication and influencing decision-making positively. This initiative will provide an opportunity to the district government to benefit from the collective wisdom of the people and tailor its policies to conform to their aspirations.

Medium-term Interventions

- Recommendations have been made to restore Mancher Lake as a reservoir to store rainwater; this may be used for the command area of Kotri Barrage.

NPIWC

Linning of water courses through farmers' participation.

- An assessment of underground freshwater resources must be undertaken. Lobbying for freshwater release is advocated, as recommended by recent studies. Freshwater may be released in the Indus River downstream from Kotri Barrage to maintain equilibrium between sweet and saline water and to recharge freshwater aquifers.

- The design defects of the LBOD project must be evaluated. Required changes in the design must be lobbied for. It should be considered whether the disposal of effluent can be equally managed from the DPOD by removing or re-designing its weir. Thar could be irrigated by LBOD water for which a channel could be built in the DPOD.

- There is a need to promote water-course lining, renovation, canal earthworks and on-farm water management techniques. These may be adopted to reduce waterlogging and improve the availability of irrigation water for crop production. There should be a shift in focus to the lining of canals and tributaries prior to lining of water courses.

- Undertake mangrove reforestation and replanting programmes to check sea intrusion and stabilize the banks of the tidal links.

Long-term Interventions

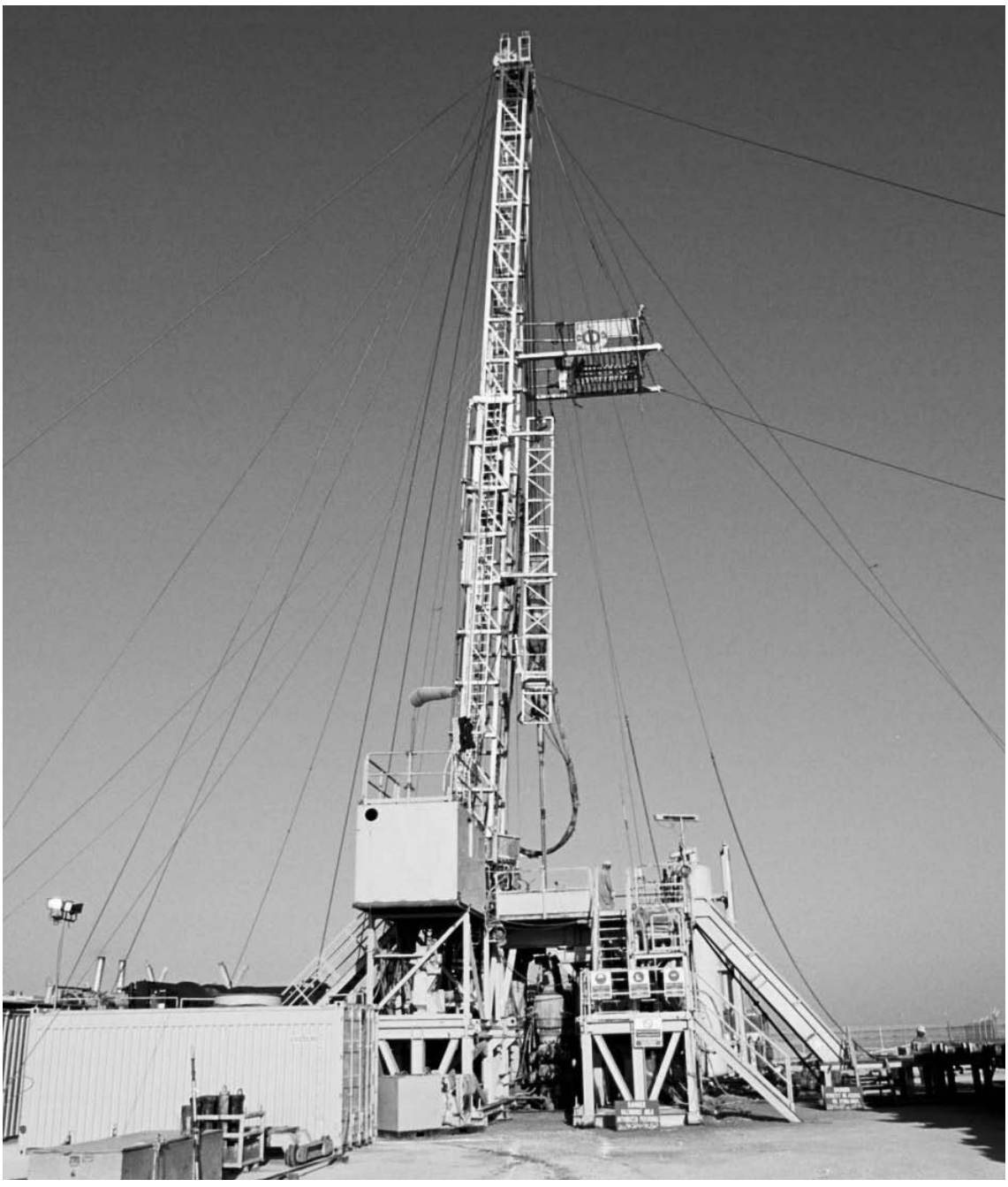
- Rehabilitation of the Indus Delta by the coastal union councils, restoration of ecology, controlling salinity, managing floodwater and improving drainage are some issues that have a major bearing on the environment and communities. These major challenges need special programmes, specific funding windows and long-term engagement. The first step of placing them on the development agenda of the district government will go a long way towards sensitizing policy-makers to the magnitude of these issues.

- It cannot be denied that the present system of managing irrigation and drainage has not matched the requisite standards in terms of efficiency, efficacy and management. Decentralization of authority and delegation of responsibility is the only long-term option. At the same time it is necessary to build the requisite skills and capacity at the local level to manage complex issues. It is imperative for the district government to start building its institutional capacity for assuming responsibility in the future.

- The LBAWB must be re-organized after elections and capacity building of the newly formed FOs is undertaken, to check water theft and ensure equitable water distribution in the larger interests of small growers and tail-end users in coastal areas.

CHAPTER **5**

BROWN SECTORS



Brown sectors include energy, industry, and effluent and solid waste management. This section presents Brown sector issues, formulates a general vision and outlines measures that can be taken to move progressively towards sustainable development in an integrated manner.

5.1 Energy

Like any other rural district in Pakistan, Badin is predominantly dependent on wood as a primary source of fuel for cooking with electricity being a major source of lighting. Statistics in the 1998 national census revealed that 76.29 percent of the housing units had electricity for lighting and 23.39 percent used kerosene for this purpose. The remaining 1.32 percent used other sources. In terms of fuel, 72.70 percent of the households used wood, 21.97 percent used gas, 3.92 percent used kerosene and the remaining 1.41 percent used other sources. There are no indications of planning and investment in alternative sources of fuel and energy. The existing tree cover cannot meet rising needs. The pressure on wood for cooking fuel is directly responsible for diminishing forests, which in turn affects agriculture, soil and above all the climatic balance in the district. Although fuelwood is imported into the district to meet current demands, existing poverty and poor management have led to widespread theft and illegal felling of this resource.

Electricity is supplied to only 678 out of 1 547 settlements, which makes only 44 percent of the total. Domestic connections have been provided to only 17 922 housing units out of the 22 000 *pucca* and semi-*pucca* units and a few of the 40 986 *katcha* units of the district. The remaining 82 percent of the households use kerosene or wood for lighting.

Advocacy efforts have not been made to promote efficient fuel use; consequently, there is little public awareness about fuel conservation measures, such as construction of energy-efficient structures or the use of fuel-efficient cooking devices. Success in achieving fuel efficiency, adopting new technologies and altering existing fuel-use habits depends largely on women who are the primary users of fuelwood. They must be made aware of the long-term ramifications of adopting these innovations.

Alternative fuel sources are scarce and expensive. Liquid Petroleum Gas (LPG) and kerosene are available but costly, putting them out of the reach of the rural poor. Solar power, wind energy and biogas technologies, meanwhile, have not been properly explored.

5.1.1 Solar and Wind Energy Resources

The effective development of low cost energy production systems can be used to offset water scarcity by either deep drilling for freshwater or direct desalinization of brackish water.

Technically economical wind power can be generated at wind speeds of 4m/s with modern wind turbines. Power can be generated at wind speed of 3 m/s. The average duration of these required wind speeds in Badin and Thatta districts is about six to eight hours per day. Theoretically, 59 percent of this power may be extracted but in reality a maximum of 45 percent of this power can be extracted approximately. Thus, the coastal area of Sindh has wind power potential of generating 500 000 mega watts. Coastal areas of Badin are difficult and expensive places to reach with an electric grid. Wind energy can be utilized as a source of power generation for water pumping with the proper maintenance infrastructure in these areas.

Considering energy demand and topography, the villages of Golo Mahandro, Bhugra Memon, Shaikh Kerio and Bdhadar Lund in the coastal area of Badin are feasible sites for windmill installations. Many other locations in the coastal area could be suitable for windmill installations, after due validation and technical surveys.

There is a good potential for harnessing solar energy for electricity production in the coastal areas. The average solar radiation over Karachi, Badin and Thatta is about 18 MJ/m2 per day and is greater than the world average (13 MJ/m2/day); thus the coastal area of Sindh lies in an excellent solar belt range. The average solar insulation in the coastal area is about 5 kWh/m2 per day. The annual mean values of sunshine duration lie between eight and 10 hours per day throughout the coastal area.

The amount of electricity generated depends on the capacity of panels and the availability of solar radiation. A solar energy panel of 4 kW capacity generating about 7 300 kWh per year of electricity is sufficient for a village of about 50 homes for electrification. Similarly a solar energy panel of 8 kW capacity generating 14 600 kWh per year of electricity can electrify a village of about 100 homes in the coastal area of Sindh. Solar energy panels of 40 W and 100 W cost Rs.35,000 and Rs.50,000[3] respectively.

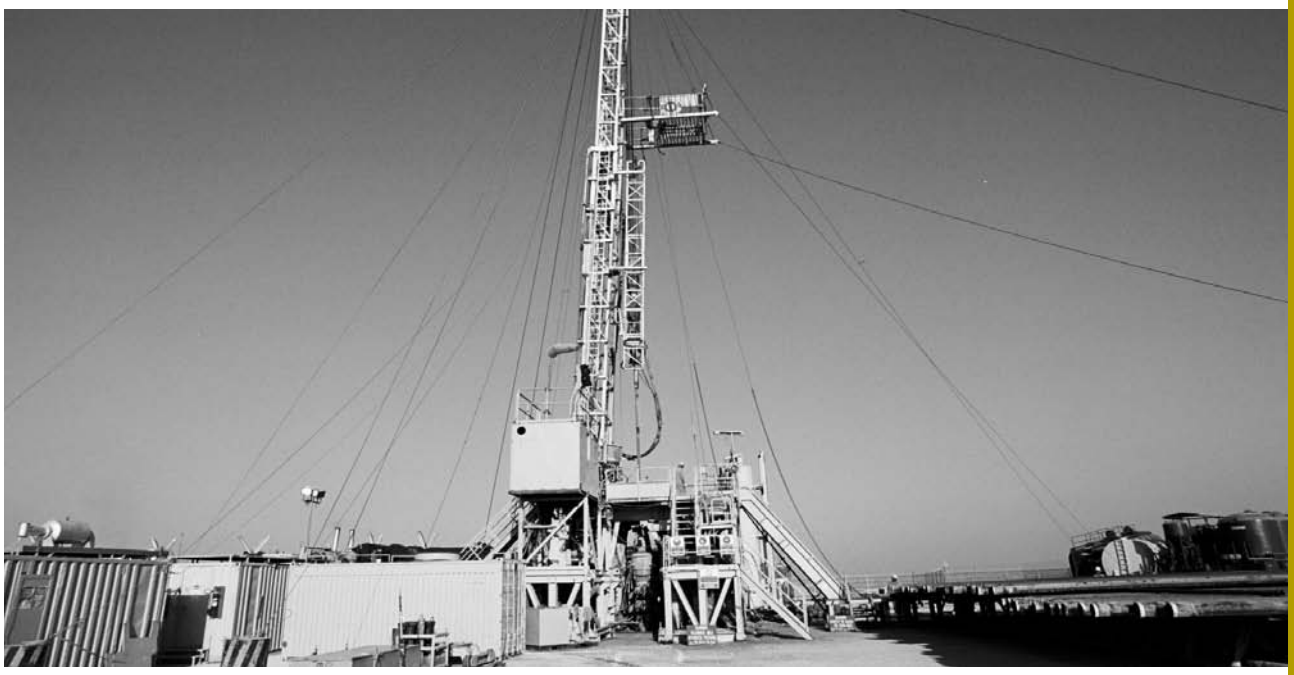
There is also a reasonably good potential for tidal energy in the coastal belt of Sindh. It can be converted into electrical energy with the help of turbines and generators. Generation of electricity using tidal power is very similar to hydroelectric power. Electricity generated through an ocean tidal energy conversion system can be used for electrification of the coastal belt, production of hydrogen fuel as well as other applications. Harnessing ocean tide currents is essential for the socio-economic development of the coastal belt of Sindh including Badin District.

There are numerous benefits associated with the development of wind generators and solar energy panels. The main environmental benefit is that they reduce the emissions commonly associated with electricity production by displacing coal, oil, gas and nuclear generation plants. These emissions include greenhouse and acidic gases from fossil fuel stations and the radioactivity associated with the nuclear fuel cycle.

Underground water can be lifted through wind turbines as well as through solar power-driven pumps. This water can be used for drinking, irrigation and other purposes. This would result in increased agricultural and livestock outputs and socio-economic uplift. Brackish water can be converted into potable water by solar- and wind-driven technologies.

Electricity improves the quality of life and supports economic development activities. It supports health care, education and community services. Irrigation extends the growing season, enhances crop performance and boosts

3 US$ 1.00 = 59,94Pakistani rupees (November 2005)



BP

Badin is a major source of oil for the country.

productivity and sales. Electricity opens the door to value-added processing of agricultural goods and community products. Wind and solar electricity can provide power for irrigation to increase the productivity of cultivated land and reduce labour inputs. Electricity allows people to extend their productive hours, redirect time for personal enrichment or pursue the production of handicrafts or other products for sale. Electricity can be used to add value to local agricultural products through milling, processing, drying, packing, distilling and pasteurizing. Adding value to local products gives rural communities an opportunity to retain more income from agriculture and expand production without jeopardizing the environment.

Even though there is potential for the electrification of the district, the high initial cost of renewable energy technologies such as wind generators and solar energy panels deters this potential from being harnessed. There is also insufficient awareness among the public about their utilization and the importance of renewable energy resources and the environmental impact of fossil fuel use. There is a dearth of technical expertise and trained human resources.

5.1.2 Oil and Gas[4]

Although petroleum exploration in Pakistan began more than a century ago, 1977 was perhaps the most significant period for petroleum exploration in Badin. After a modification of petroleum regulations in 1976, and the dramatic increase in crude prices in the mid-1970s, several foreign companies entered Pakistan. One of these Companies was BP Pakistan Exploration and Production Inc (BP) (formerly known as Union Texas Petroleum), which made a significant oil discovery at Khaskeli in 1981. This resulted in the area's first oil production in 1982. By the end of 1986, six more oil discoveries were recorded, in addition to six gas discoveries.

To date BP has drilled 142 exploratory wells, resulting in 61 oil and gas discoveries. Oil production from its fields in Badin accounts for approximately 44 percent of the total oil produced in Pakistan, whereas the company produces 8 percent of the country's gas. BP is the only oil and gas company working in Badin district. It operates the Badin concession on behalf of its partners Occidental Petroleum and Government Holdings. As BP is the only oil and gas exploration and Production

4 Information provided by BP Pakistan Exploration and Production Inc..

Company in Badin District, any discussion on oil and gas in Badin will focus on the company. According to estimates, the average daily crude oil production from Badin District was recorded to be 20 931 barrels in 1995, 24 002 barrels in 1996 and 25 762 barrels per day in 1997. The highest ever recorded production of 30 000 barrels per day was achieved in 2001. Since then, a decrease in crude oil production has been reported.

Exploration & Petroleum (E&P) operations in Pakistan are regulated by the Directorate General of Petroleum Concessions (Ministry of Petroleum and Natural Resources) under a set of regulatory rules. E&P companies are also signatories to a Petroleum Concession Agreement (PCA) with the Government of Pakistan. Through these conditions, companies like BP are contractually obliged to the government to undertake a number of measures that will bring benefit to the country, such as the payment of taxes, royalties and training of national staff. The payments of these royalties and taxes are made directly to the Federal Government. Oil companies cannot pay royalties directly to a provincial government. Therefore the district does not get any money from the oil and gas reserves in the form of royalties.

BP has invested in the social development of Badin District through the building of infrastructure as well as schools and health facilities for the use of the local population. Despite these positive initiatives in the field of social development of Badin, there is still a great need for even more work in this field because the level of poverty and lack of services for the majority of the people is still a major issue in this area. A private company can only contribute so much in the field and the main responsibility lies with the government to provide sufficient funds for socio-economic development. Since royalties from the oil sector, which are significant, go directly to the federal government, much of the money which should be spent on development of these areas does not reach the intended population.

In terms of a comparison with other industries in the area, the companies operating in the oil and gas sector in Badin are more environmentally conscious and adhere to certain accepted standards in their operations. It was noted during an environmental audit of some key companies operating in the area, that lectures on environmental issues were regularly arranged for staff. Also, many companies have separate environmental units that concentrate on minimizing environmental damage to the surrounding area.

The water produced from well operations is disposed of in an environmentally sound manner in deep underground strata from where the water was initially produced. Sewage generated from nearby offices and residences is discharged into soak pits, which are fixed with a secondary treatment unit. In terms of release of pollutants into the air, it was noted that the gaseous emissions from equipment and trucks are within the prescribed limits. All solid waste generated at the facilities is either recycled or burned in an incinerator.

5.1.3 Measures for Sustainable Development

Immediate Action

- Initially, there is a need to start a comprehensive, multi-sector, participatory effort to devise a district-level plan for the energy sector. The focus should be on pursuing alternative fuel sources, increasing indigenous capacity to cater to local fuel demand and undertaking advocacy efforts to increase civil society awareness about efficient fuel use. In addition, encouraging fuel conservation and promoting the use of fuel-efficient heating and cooking devices are also essential.

- The need for new forms of power supply as opposed to the provisions made for electricity must be examined. Steps to minimize

transmission losses from the grid electricity supply must be taken. Cross-sector efforts must be made to curb power theft and illegal electricity connections. The district government can also set an example by controlling its electricity bills through the enforcement of a monitoring system and regular reconciliation of bills with electricity supply companies.

- A study on the delivery of natural gas to both rural and urban areas in the district must be initiated. Based on this systematic approach, long-term lobbying to increase the supply of natural gas to rural areas which currently rely heavily on fuelwood should be considered.

Medium-term Interventions

- The provision of and increased access to alternative energy sources will reduce reliance on biomass such as fuelwood. This should be considered by the district government and stakeholders. There is a need to augment the supply of fuelwood by promoting farm forestry, social forestry and nursery raising; planting multiple purpose trees and fast-growing species in wastelands; and providing afforestation inputs. In this context, partnerships with all relevant stakeholders should be strengthened.

- The use of fuel-efficient heating and cooking devices must be promoted. The district government should ensure that fuel-efficient buildings are constructed. Maintenance and regular monitoring of such projects is also crucial.

- LPG must be introduced and provision of subsidies must be made to address the twin factors of cost and availability. All stakeholders must explicitly address the use of processed fuel, especially in light of the increasing use of diesel. Compressed Natural Gas (CNG) availability needs to be improved and mass awareness and advocacy campaigns to promote conversion to CNG should be initiated.

Long-term Interventions

- Alternative sources of energy can be promoted by developing solar energy, establishing biogas plants, employing wind power and building water mills coupled with enhancing the capacity of stakeholders, particularly in relation to expertise in alternative fuel technologies.

- The oil and gas industry provides employment to the local population and capacity building and sensitization on conservation and efficient use of energy resources. This may include effective community development and social development projects, giving priority to women's education, health and economic development and environmental awareness. Private companies should be encouraged to monitor their social development projects regularly. Furthermore needs' assessments must be conducted prior to undertaking initiatives so that they are tailored to local needs.

- Research and development are important aspects for developing alternative and fuel-efficient energy sources. Therefore, it is essential that links are created with the Pakistan Council for Appropriate Technologies, research institutions, the academe, donors, NGOs and the private sector to pursue hydroelectricity development with a focus on pursuing the use of alternative technologies such as solar energy and wind power. Options such as utilizing local energy sources by establishing micro-hydel power plants, developing solar energy plants, introducing biogas plants and constructing windmills and water mills must be explored. The capacity building initiatives of stakeholders, particularly in relation to expertise in alternative fuel technologies, must be undertaken as well.

5.2 Industry

Badin is predominantly an agricultural economy. The available industries are

mostly agro-based. Sugar mills and rice mills form a large part of the district's economy; there is only one cement pipe production factory.

5.2.1 The Sugar Industry

Presently, there are six large-scale sugar mills, namely, Bawani Sugar Mills located in Talhar, Ansari Sugar Mills in Matli, Army Sugar Mills in Badin, Fauji Khoski Sugar Mills in Khoski (now Dewan Khoski), Mirza Sugar Mills in Khadhan and Pangrio Sugar Mills located Pangrio. In addition, the Dewan Sugar Mills at Bhudho Talpur (Thatta District) is located at the border of Golarchi taluka, and crushes a substantial quantity of sugarcane. The Dewan Group acquired Khoski Sugar Mills in May 2004. This sugar mill was owned and operated formerly by Fauji Foundation Pakistan (under the management of the Pakistan Army). After acquisition, the name of Khoski Sugar Mills Ltd. was changed to Dewan Khoski Sugar Mills Ltd. Dewan Khoski Sugar Mills capacity is 4 000 tonnes of crushed cane per day.

On an average, each sugar mill crushes about 100 000 maunds of sugarcane daily during the three-month season. Badin District is recognized as a sugar estate owing to its high production and recovery ratio. Due to recent the crisis in the sugar industry and reduction in irrigation water supplies, cane area and production as well as recovery ratios have decreased. The cane industry pays Rs.0.25/maund as the sugar cess. Rs.30 million was transferred by the provincial government to the district government of Badin in lieu of sugar cess, after devolution. This amount is reportedly utilized for the repair and maintenance of roads through a committee that includes members of district administration and government.

The issues faced by the sugar industry include government interference, de-zoning, lack of research and development programmes especially with reference to new seed varieties, underutilization of sugarcane wastes after crushing and high cost of production. Suggested measures to revive the sugar industry include reduction in the cost of agricultural inputs, research on new high-yielding varieties, utilization of molasses, bagasse and sludge for the production of value-added products such as chip board, fertilizer and alcohol.

The six sugar mills of Badin District discharge various pollutants into the nearby water courses, surface drains and other waterbodies causing water

Mohammad Ali Qadri

Sugar mills are an important component of the economy.

Mohammad Ali Qadri

Drained effluent from a sugar mill.

contamination and health hazards in and around the urban localities of Badin, Matli, Talhar, Khoski, Kadhan and Pangrio. There is a need to enforce the Cleaner Production Program at the Badin sugar mills, as recommended by the Federation of Pakistan Chamber of Commerce and Industry (FPCCI) for adoption by the industrial sector in Pakistan.

5.2.2 Storage and Handling Industry

This is an essential component of the industrial infrastructure at the grassroots level but it has not evolved in Badin. The main constituents of this industry at the farm level for storage are to enhance the shelf-life of products and freighting. The district has only 10 wheat and rice procurement centres and five warehouses. It has yet to prepare itself to respond to the needs of the export market. The quality of its outputs needs to be controlled to add value to the primary products that are being exported. The growers, packers and forwarding agents need to be educated on the demands of the export markets.

Currently all cash crops (including fruits and vegetables), live animals, dairy products and fish catches in Badin District are dispatched to the nearest market in taluka centres such as Badin, Talhar, Matli, Golarchi/Fazil Rahu, Tando Bago or to industrial centres in Hyderabad and Karachi where they are processed on an industrial scale.

All agricultural products are processed locally. Paddy, millets and lentils are de-hulled while wheat is threshed and bagged or ground to make flour before the products are transported to markets, storage depots or to industrial units in the cities of Sindh. Value addition of the primary products in the urban centres of Badin is not attempted, mainly because the infrastructure does not exist. Preservation of farm products, especially during surplus periods, can be beneficial for farmers. Only five large storage warehouses have been constructed in the district for grain and there are no cold storage houses or vegetable and fruit preservation units in the district. Food-processing factories are yet to appear in rural towns.

5.2.3 Rice Sheller's/Husking Mills

Badin District is known as a rice-growing area even though it is at the tail-end of the Phuleli Canal which irrigates its lands. Shortage of water due to drought

reduced the area under this crop by 30 percent in 2002.

There are 34 sheller/rice-husking units in Badin taluka, 23 in Talhar, nine in Golarchi, seven in Matli and six in Tando Bago - totalling 79 units in the district. Only 12 of these units are complete units with a system for husking as well as polishing. All of them, large or small, have a processing room or hall, depending on the capacity of the mill, which houses the de-hulling unit.

The process of separating the rice from the husk involves rubber rolls and hullers for shattering the paddy while different methods are used for separation of head rice, broken rice, rice powder, dust and bran. The husking of paddy produces 52 percent head rice, 10 percent broken rice, 2.5 percent powder rice, 33.75 percent husk and 1.25 percent waste and dust particles. The integrated units have rice-polishing units, which use broken rice for cleaning and polishing. Various types of cleaners and polishers are used to give a shine and silky appearance to the rice.

Paddy husking is a seasonal process and is limited to only four months after the rice is harvested. The husking operation in Badin starts in November and ends in February. The operations of a polishing unit are spread over a period of eight months. After the husking operation, the husked rice requires six to 10 weeks for drying and conditioning. Therefore, the rice is stored for a period of at least two months before it goes through the polishing process. The processed rice, both husked and polished, is stored during the first few months of the harvesting season, as prices are generally low owing to the abundant supply of rice in the market.

The husk is separated and air-blown outside the processing hall into the open yard of the mill. Small units blow the husk outside their premises. Besides husking paddy to produce about 137 thousand tonnes of rice, the units in Badin also produce about 60 000 tonnes of rice husk, which is used as fuel by the brick kilns and also as floor material by poultry farmers.

The production system in the rice-husking mills of Badin District must be upgraded to meet health, safety and environmental standards. The noise of the rubber rolls and hullers and the dust raised in cleaning, together with the husk particles in the air, impair the health of workers and residents of nearby neighbourhoods. To combat these externalities, dust catchers should be installed as an integral part of the production system. It should also be mandatory for these units to provide protection to the workers as prescribed by the Factories Act.

5.2.4 Flour Mills

There are over 100 flour mills in Badin. The majority of them use *chakkis* or electrically operated grinding machines. A number of them operate by the roadside and in urban centres. These units also grind spices and thus expose the environment to odours from their production process and workers to harmful emissions. There is a dire need for these units to abide by the Factories Act and to be relocated away from populated areas.

5.2.5 Brick Kilns

The construction industry is not yet fully established in Badin but use of baked bricks for construction or renovation is on the increase throughout the district. There are at least 30 brick kilns in Badin. All of them are located on the outskirts of the towns and use rice husk and a small quantity of fuelwood as energy. They prepare bricks from sand transported from canal beds, soil and water from hand-pumps. After drying in the sun, the bricks are baked using fuelwood. They are finally covered with a heap of rice husk purchased from the rice mills. The casting of about 50 000 bricks takes about a week and their incineration (using about six tonnes of rice husk) takes another week. The quality of the bricks is sub-standard, firstly because the soil and water are both saline, and secondly because the size of the brick and the amount of time it is baked for is not standardized. However, everything

Mohammad Ramzan Khaskhali

Site of Badin Industrial Estate.

works in favour of the kiln owners who have a strong grip on the market. Each brick kiln engages 30 to 50 labourers, including children, who are generally members of a few families. The children assist the senior members of the families and are hired seasonally. The kiln business is degrading the land from which much clay is extracted.

5.2.6 Charcoal Kilns

Deforestation has reduced the forest cover in Badin District to a mere 800 hectares. The trees along the canals have been removed and plantations along roadsides are hard to find. Ironically, the district is a major supplier of fuelwood and charcoal to the rest of the province. Every wood stall is filled with the branches and roots of Prosopis juliflora, popularly known as Mesquite or Devi, which are part of the wild vegetation throughout the district.

In the absence of an alternative fuel such as gas, wood is being used throughout the district for cooking. According to estimates, about 160 trucks loaded with 10 to 15 tonnes of fuelwood and 40 trucks carrying from eight to 10 tonnes of charcoal are dispatched every month to markets in Hyderabad and Karachi.

5.2.7 Industrial Estate, Badin

An Industrial Estate was established in 1986 on area of 12.2 hectares in Badin. It was designed to have 107 plots and received approval for setting up food, beverage, handicraft and light engineering industries. Infrastructure facilities like roads, water supply, sewers and telephone connections were provided. However, the well-located estate did not attract investors and only 17 plots could be allotted, out of which only 10 were used. Currently, there is no industrial activity in the estate. Some of the reasons for the low occupancy of plots and lack of investor interest are:

- Badin is not on the radar for national industrial zones and marketing centres;
- The Estate does not receive incentives offered to other national industrial estates for the establishment of industries; and
- Badin does not possess an adequate infrastructure and thus lacks gas, water or dependable power supply, essential for setting up industries.

The concept of the industrial estate as a base for adding value to local products is

yet to take root and the dearth of food-processing/preservation and associated facilities and adequate transportation reduces returns for farmers and producers.

5.2.8 Cottage Industry

Badin is a rural area adjacent to deserts. It has a rich cultural heritage and offers unique handicrafts as weaving and knitting are grounded in the day-to-day life of the people. However, this sector is not fully developed and has the potential for economic growth.

5.2.9 Measures for Sustainable Development

Immediate Action

- An in-depth analysis of the issues of the sector must be undertaken. Steps must be taken for crystallizing its vision into a long-term action plan for the development of industries in the district. This action plan should provide the district government with a case, cause and capacity for advocacy, lobbying and influencing policy formulation.
- There is a need to engage the sugar mills, municipal administration, irrigation and agricultural departments in a meaningful and objective dialogue to resolve the issues of waste management. This will require the proactive lead role of the agricultural department at the district level to provide the requisite forum.
- It is also necessary to address the issue of husk disposal in accordance with safety measures. This will require a sustained dialogue with the owners of rice mills and brick kilns as well as poultry breeders.

Medium-term Interventions

- It is of the utmost importance to initiate regulatory specifications aimed at ensuring the safety and welfare of the workers working in the kiln business with a special focus on the elimination of child labour.
- To expand the industrial base, processing and value-adding plants need to be set up. Lobbying for the development of the Badin Industrial Estate is required for this. The private sector can also be invited to invest by providing facilities and incentives to establish cold storage plants.

Mohammad Ramzan Khaskhali

Badin Industrial Estate could attract more investors.

- Cottage industries that produce local handicrafts must be developed by providing markets, infrastructure and credit facilities, especially to women.

- The district government needs to provide institutional support to assist, facilitate and support farmers in the realization of fair, timely and appropriate returns for their crops.

Long-term Interventions

- Stakeholder participation and input is very important, especially in this sector, and a forum for the entrepreneurs to discuss and debate sector-related issues needs to be provided.

- Permanent dialogue between sugar mill management, the government and growers must be encouraged. Timely payment to the growers should be mandatory. Efficiency of production both in farms and factories must be promoted. The import of sugar should be curtailed in order to encourage local industry. Excessive government intervention in the sugar industry should be curtailed.

- An environment conducive to industrial growth must be developed to encourage investors and industrialists. The revival of the industrial estate must be examined. Incentives and provisions must be made. For example to minimize transport and marketing costs, farm-market linked roads may be built.

5.3 Effluent and Solid Waste Management

Effluent and solid waste management is a devolved issue with major responsibility resting with the municipal administration. The waste generated in and around the district has many dimensions and cannot be left to handling by municipal authorities only. Even the district government per se is incapable of dealing with the magnitude of the problem. Salinity, waterlogging, seawater intrusion, failures of drainage arrangements, industrial and domestic wastes all combine to exacerbate the situation. Leaving the district to tackle an issue created by many factors and entities including those located beyond its jurisdiction is the worst-case scenario.

The major cause of coastal pollution and deterioration has been the agricultural effluent from lower Punjab and Sindh. Waterlogging and salinity also contribute towards pollution along with the pollutants carried by the LBOD. Badin houses agro-based industries, which release pollutants into surface drains as well as nearby depressions. In urban areas, the supply of contaminated water, unsafe disposal of municipal and solid waste, infectious hospital wastes and congested housing also intensify environmental degradation. Rural areas in Badin are badly affected by short supply of pure drinking water.

5.3.1 Agricultural Wastes

The Perspective Plan 2001-2015 shows that at present about 33 million tonnes of salt are annually introduced into the Indus Basin, of which 56 percent leaches into groundwater, 7 percent is stored in evaporation ponds, 8 percent is dumped into Manchar and Hamal lakes, 2 percent is stored in Peshawar Valley and 27 percent enters the Arabian Sea via the Indus and LBOD. Thus Sindh bears the major brunt of these agricultural effluents. Badin is where these disposals take place. It is unfortunate that the economic and environmental losses of the district are neither accounted for nor compensated through long-term sustainable development programmes.

5.3.2 Industrial Wastes

The disposal of untreated municipal and industrial effluent into waterbodies wreaks havoc for water quality especially near and downstream from the outfall points. Pulp and paper, textile, fertilizer, cement and sugar factories are responsible for this pollution. In this context, the problem

in Badin is caused by the sugar industry. Across Pakistan there is little pressure or incentive to build waste-water treatment plants for industrial effluent. This is damaging the aquatic system and also reducing revenues from fisheries, causing diseases and contaminating groundwater.

5.3.3 Domestic Wastes

The towns of Badin, Matli and Talhar generate sewage, which is generally discharged into surface drains and natural water courses. Another source of pollution in coastal areas is residential waste generally consisting of food waste and garden trimmings which are biodegradable. Non-biodegradable solid waste mainly comprises plastic detritus. Residue from the burning of wood, coal, coke and other combustible waste (mostly generated from household activities) are other sources of pollution.

5.3.4 Solid Wastes

The solid waste generated in the coastal areas needs proper handling and management because it can generate various diseases and associated epidemics besides degrading the environment and the quality of human life. In localities housing low-income groups, children are often seen playing among the garbage and thus come in direct contact with decomposing food, pathogenic organisms and sharp objects. This is a serious health hazard and can only be mitigated by satisfactory disposal of the waste. Solid waste is often dumped into open manholes and drains. Such disposal can lead to breakdowns in public utility systems as items like plastic bags can block sewer lines and cause sewage overflow.

5.3.5 Drainage

Although the LBOD is aimed at providing drainage facilities to the three districts of Nawabshah, Mirpurkhas and Sanghar, the tidal link of the LBOD has been constructed in Badin to convey drainage effluent to the Arabian Sea. The defects in the tidal link emerged for the first time in 1999, when a major section of the tidal link's weir was washed away by the ocean tide. The drainage system has also been held responsible for the losses incurred in the flood of 2003. During design and construction, engineers probably did not consider that the drain flow is opposite to the wind direction. Stormy wind from the sea reduces the velocity of the drain considerably. The back-flow from the sea reaches RD 42 of Kadhan Pateji Outfall Drain (KPOD) and

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The waste generated in the district has to be managed properly.

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Domestic waste needs proper handling.

most drains of Kotri Surface Drainage suffer back-flow, owing to strong sea wave action. The continuous back-flow has raised the water table in the area.

It is asserted that the KPOD cannot dispose of the 20 000 + cusecs of effluent, since it is already quite low lying. The drainage effluent should be disposed according to the old design i.e. through the DPOD by removing its weir and remodelling it. The water could then easily flow into Shakoor Lake and the Runn of Kacch. This proposal needs to be technically evaluated and a sustainable solution to the problem needs to be developed.

5.3.6 Management of Solid Waste and Effluent

As discussed already, waste management is a complex issue and will need major collaboration from the union council up to the federal government. Otherwise the deteriorating situation may culminate in Badin becoming a saltwater and waste dumping ground.

Like any other rural area in Pakistan, Badin has no water treatment plants. In this regard, public safeguards dictate that as all domestic wastes contain pathogenic organisms, any consideration of re-use must ensure that the recycling of these organisms is avoided. Clearly, the safest means is to avoid re-use altogether if freshwater resources are available at acceptable cost. This indicates the importance of necessary freshwater releases downstream from Kotri Barrage. Some local NGOs in Badin are raising awareness and advocating ways to prevent water-borne diseases through workshops and seminars for hygiene measures. In the long run, the development of a comprehensive scheme for a proper collection and treatment system, including installation of treatment plants at appropriate locations, especially in the town of Badin under the new local government administration will be needed. Also the development of effluent treatment plants in coordination with industrial associations may be useful. One way to tackle this problem is to treat the sewer water at source, before it reaches waterbodies and the coastal zones.

Another way to reduce coastal marine pollution would be to re-use treated water in the cities and towns of the coastal belts for domestic non-potable water, industrial needs, municipal irrigation, agriculture, floriculture and animal husbandry and recharge of ground- and surface water.

5.3.7 Measures for Sustainable Development

Immediate Action

- The district has to take the lead by placing the issue with all of its ramifications at the centre stage of policy formulation and create a widened advocacy forum to pursue the matter. This would require the creation of an institutional forum (such as a roundtable) drawing representation from all stakeholders including NGOs, CBOs and FOs.

- The creation of specific TMA grants to handle the task of sanitation and water supply is also required. The grants may be used for the construction of drains to take sewer water out of Badin and connect small drains with the main one. The termination point of the large drain may be located on the outskirts of Badin town. These ponds should be 2 000 x 5 000 feet with pumping motors. The TMA must be responsible for building suitable dumping sites at appropriate locations. Regular collection of waste may be ensured by TMAs. Dumping sites may be relocated on the outskirts of towns and recycling plants may be established.

Medium-term Interventions

- There is a need to identify core issues that need attention, pursue these matters with the concerned township authorities and take remedial measures in areas that fall within the district's jurisdiction. This integrative effort should address (i) the extent of pollution, (ii) contamination through seepage during conveyance and (iii) sources of pollution. The identification of pollution sources will be a principal input for developing more focused remedial interventions.

- The participation and cooperation of local communities to find long-term solutions to the problem of sewage and wastewater disposal is essential, with the district government serving as coordinator. Community participation and mass awareness campaigns would be helpful to elicit active cooperation from households and commercial establishments.

- The district government should, through its health department in collaboration with the TMAs, carry out an assessment aimed at examining key health impacts such as the incidence of water-borne diseases and infections as a result of water contamination to facilitate appropriate remedial measures.

- Identification of the sources and quantity of solid waste generated in the district in various categories (municipal, hospital, toxic), and developing procedures for appropriate disposal of biomedical and toxic waste must also be carried out. This can be done only by maintaining on-site inventories and vigilant monitoring of disposal.

- There is a need to lobby and solicit provincial and federal government support for addressing the ever-increasing issues of drainage, salinity, pollution and intrusion of seawater.

Long-term Interventions

- There is a need to map out an intervention plan with the town administrations and cantonment board playing a major role in overseeing implementation. Minimally, the intervention plan should take into account the following areas:

- The extent of existing coverage, availability of financial and technical resources and the efficacy of existing implementation, monitoring, review and enforcement mechanisms;

- The extent of public involvement, civil society awareness and general understanding of the environmental and health impacts of indiscriminate dumping;

- The extent to which private sector involvement through user tariffs can be pursued and gradually increased;
- The handling of biomedical waste and the feasibility of building incinerators in all hospitals in the district;
- Formulating basic indicators, setting annual targets and assigning responsibility for meeting targets;
- Pursuing capacity building on an ongoing basis.
- The district government should seek private sector investment and provide the necessary support by enacting legislation and lobbying with concerned stakeholders, including local communities and financial institutions. Private sector entry in civic services must be encouraged, employing market-based instruments and punitive measures based on the "polluter pays" principle.

CHAPTER **6**

SOCIO-ECONOMIC SECTORS

Socio-economic sectors include education, health and population welfare, drinking water, infrastructure, housing and ecotourism. This chapter presents socio-economic issues, formulates a general vision and outlines measures that can be taken to move progressively towards sustainable development in an integrated manner.

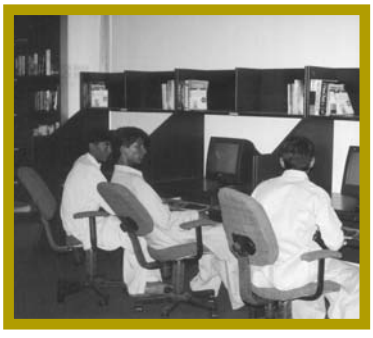
6.1 Education

Education plays a vital role in the development of the economy. Improving the education sector not only increases efficiency in producing goods and services, but also contributes to poverty alleviation. A market benefit of education is a higher output due to increased labour productivity. Studies on the economies of education have shown that income increases by 2.7 percent with every additional year of primary school education and by 4 percent with every additional year of secondary school education in Sindh (Nasir and Nazli, 2000). Non-market benefits include better health, increased efficiency in job searches and other personal choices. There are also social benefits due to spill-over effects. These include enhanced productivity of co-workers, awareness on birth control, alleviation of environmental stress and crime reduction (Jimenez et al., 2003).

District Education Plan for Badin (2005-2009)

The District Education Plan (DEP) is an effort of the District Education Board (DEB), which was established in February 2004. The District Coordination Officer (DCO) Badin, along with the DEB proposed to 'develop a strategic plan to improve the rate of literacy and quality of education in the District through active participation of all stakeholders'.

An integrated plan has been developed which explores possibilities for ensuring a sustainable future for the district, which means increased emphasis on building capacity of the human resource, in social, environmental and economic aspects of the district. Furthermore, there is also emphasis on meaningful community participation where a learning culture is promoted, where both communities and educational institutions act as learners and teachers. This process of mutual learning will lead to enhanced motivation which will hopefully increase student enrolment, improved literacy rates, respect for individual learning needs and contextualization of content and skills according to local needs.



Abubakar Shaikh

Majority of schools in remote areas are without proper buildings.

It is hoped that the course of action laid out by the district leaders and administrators can be brought together to ensure a brighter future for Badin.

6.1.1 Status and Issues

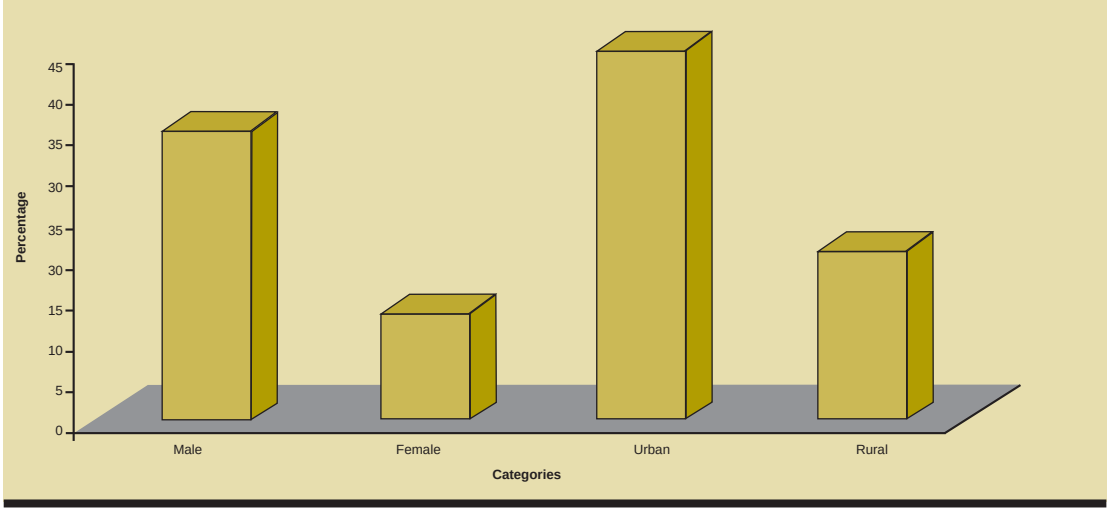
Literacy rate

According to the 1998 Population Census, the overall literacy rate in Badin District was 24.63 percent. The male and female literacy rates were 35.07 percent and 12.9 percent respectively. The urban and rural literacy rates were 44.76 percent and 20.52 percent respectively. The overall literacy rate in Badin District rose from 24.63 percent in 1998 to 27.52 percent in 2001 - an increase of less than 1 percent per annum.

Literacy-wise, Matli *taluka* ranks first at 27.95 percent (both sexes) followed by Badin (26.96 percent), Tando Bago (23.13 percent) and Golarchi/Shaheed Fazil Rahoo (17.83 percent). In all

FIGURE 6

Comparison of literacy rates in Badin District



Mohammad Ali Qadri

Computer Centre developed by private sector.

talukas, the literacy rate of urban areas is higher than rural areas (Figure 6) - 48.49 percent (both sexes) for Tando Bago, followed by Matli (48 percent), Badin (43.8 percent) and Golarchi (34 percent). The literacy ratio for men is higher than women in all cases. The literacy ratio for men between 15 and 19 years is higher than the other age groups. Female literacy is generally higher for those between 10 and 14 years. This indicates that young people, especially women, are more literate than the older population.

Primary schools

There were 812 primary schools for boys and 214 primary schools for girls in Badin in 1998, with an average enrolment of 36 students per school, compared with the recommended average population of 150 students per school. From the population data, it is estimated that the present number of schools is sufficient on an overall basis up to 2010. However, the numbers of teachers and functional schools need to be increased. In addition, the small remote villages and the settlements in coastal areas need special programmes for literacy and primary education. It should be noted that 735 settlements with populations exceeding 200 do not have primary schools.

Middle schools

There were 52 middle schools for boys and 22 for girls in Badin in 1998. On average, 40 students were enrolled in each middle school. In view of the population aged between nine and 14 years, it is estimated that the number of middle schools needs to be doubled during the next decade. Recent information reveals that the district government has made significant efforts in this regard. However, there are still as many as 111 settlements each exceeding 1 000 inhabitants that do not have middle schools for boys. The number of middle schools for girls is even lower and there are 117 settlements, each exceeding populations of 1 000, where there are no middle schools for girls. There are no middle schools for girls in any rural settlements of up to 500 inhabitants each in Badin and Golarchi *talukas.*

High schools

There were 15 high schools for boys and two high schools for girls in Badin with an average enrolment of 288 students per school during 1999/2000. According to the 1998 census, the population of youths between 14 and 16 years for both sexes was 52 270. If all of this age group

is to be enrolled, 136 more high schools will be needed by 2010. Out of the 134 rural settlements exceeding 1 000 inhabitants, 132 lack schools for girls. There are currently four higher secondary schools in the district - three for boys and one for girls.

Hostel facilities are available at the Mir Ghulam Mohammad Khan Talpur Higher Secondary School, Tando Bago. The rest of the high schools have no hostel facilities. Hence, the students from distant rural areas, especially the girls, are unable to receive high school education.

Degree colleges

There were two degree colleges each for boys and girls in 1999/2000. Student enrolment in these colleges was 2 787 and 881 for male and female students respectively, in 1998/1999. Male and female college teachers have, however, declined from 67 to 30 and 21 to 15 respectively from 1995/1996 to 1998/1999, owing to the continued ban on recruitment in Sindh.

Mosque schools

The first tier of the schooling system, especially in rural areas, is the mosque school. Badin had 371 mosque schools in 1998.

Technical institutes

There are three technical institutes in Badin District; only one of these i.e. the Government Poly-Technical Institute Badin is functional with a small staff and student complement. The two monotechnical institutes have not yet started their training programmes. A private sector computer training centre is also operational at Badin. Reportedly, there is also one vocational school for women with very limited admission, mostly in sewing and handicraft trades.

The issues that need to be immediately addressed in the education sector are shortage of primary and secondary schools for girls; shortage of trained female teachers at primary and secondary levels; insufficient higher secondary schools and degree colleges; lack of hostel facilities at the *taluka* level; no polytechnic training institutes and programmes; few technical and vocational instructors; and non-operational training institutions.

The low literacy rate has always remained an issue of concern in Sindh, especially in rural areas. The GoS has

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An historical school with boarding facilities.

Abubakar Shaikh

Students from poor households are dependent on public sector schools.

tried to achieve higher levels of enrolment in primary schools; however, the outcomes of its programmes have not been impressive. Despite rising expenditures, the goal of universal enrolment in primary education has remained elusive. The lower literacy rates and enrolment of girls in rural areas indicates some of the areas requiring action. The quality of education is also a major issue. The reasons for low quality education include poor teaching skills and traditional rote learning. Teacher training, improvement in curricula and provision of a better learning environment are recognized factors which can generate desired improvements. The reasons for low female enrolment include lack of boundary walls, absence of female teachers and distance to schools. Although the private sector is becoming an important supplier of education in Badin, poorer households are more dependent on public sector provision of education. All these issues require additional initiatives from public policy. Education is a devolved subject and happens to be the largest public entity at the district level. Over time, public sector education has constantly lost ground in terms of quality, relevancy and objectivity. Non-functional schools are a current phenomenon. Absenteeism among teachers has become routine. Drop-out rates are regular and phenomenal. These circumstances require extra efforts to stop and reverse the downslide.

6.1.2 Measures for Sustainable Development

Immediate Action

- Concerted efforts need to be made to motivate parents and civil society to value education and to encourage children to remain enrolled in schools. Efforts should be made to improve public perception on the overall benefits of education, including its role in improving job prospects and socio-economic mobility. Nothing short of a comprehensive, sustained and long-term advocacy campaign will help to accelerate development in this arena.

- Pakistan is committed to “education for all” by 2015. The dismal literacy ratio in Badin is indicative of a long indifference to the sector. In this context it is essential for the district government to have a detailed action plan with specific annual targets supported by a vigilant monitoring system.

- The concept of parent-teacher associations was introduced to involve the local communities for improvement of schooling as a whole. At first glance, it seems that the concept has been restricted to minor activities and has not been utilized for improving enrolments and controlling drop-outs. No prescription for imparting primary education will work unless drop-outs are completely eliminated. This will not be possible without making schools and schooling attractive for students. The district government may consider providing free books, sports facilities and incentives to retain students in the schools.

- Technical education seems to be the lowest priority in the district. It needs strengthening by introducing courses that are in demand in the market.

- Shortages of teachers, particularly for female students, are a major issue. A gradual but sustained approach is required to provide appropriately trained female teachers in their own localities for primary schools. This also requires providing teachers with incentives and training.

- Teachers and managers at the primary level are provided few or no refresher courses and sensitization to modern techniques. This is probably the reason for ubiquitous stagnancy. The district government must address the issue by mapping out a detailed plan for providing training to teachers at primary levels.

Medium-term Interventions

- Many settlements have no schools, particularly for girls. The district government should plan a phased approach to provide these settlements with schools. Funds need to be allocated for this and the private sector could also be involved in the establishment of skills-oriented higher education which will be extremely beneficial for the district. Improvements are required for the existing infrastructure of school premises by providing classrooms, furniture and facilities to attract enrolment. Furthermore, incentives and books may be provided to control drop-out rates.

- Education consumes the largest fraction of resources in the district budget. The district government needs to introduce the concept of performance budgeting in the sector to bring about efficiency and efficacy.

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NCHD: contributing to education and health sectors.

- It is evident that the public sector cannot handle education in isolation. It has to take on board the community for better results. The district government should engaged civil society in formulating a district-specific education promotion policy within the overall parameters of the government policy, introducing syllabuses and curricula in consonance with local needs and raising awareness about the core issues of the education department.

- The issue of shortage of teachers can be dealt with by appointing teaching staff for rural areas. The district government should look into increasing collaboration between existing training institutes in Badin such as extension centres of PITE and the Department of Education. Furthermore there is a need to establish some training institutions that could work on a continuous support basis, i.e. once the teachers are trained they should not be left on their own, rather they should be provided with support to be able to put what they have learned into practice; such models are practised at the Institute for Education Development (IED) and Teachers' Resource Centre (TRC) whose support can be sought in this regard.

- There is a need to establish and implement an effective monitoring system overseen by the district government. This should begin with training of supervisory staff and providing them with transportation to carry out field work. Each school can begin with a process of self-evaluation with School Management Committees.

- A system of shifts in schools to maximize the efficient use of existing resources can be implemented keeping in mind the needs of each area. In some cases afternoons could be utilized for arranging relevant skills' training for upper primary, secondary and higher school children; which could be useful for finding future employment. Also afternoon and evening slots can be used for parental and community awareness; discussions on key social, economic and environmental issues faced by the community could be arranged by youths, teachers and high school children. The same premises can also be used as adult literacy centres in the afternoons and evenings. This step should also allow other key issues to be addressed, such as lowering drop-out rates (children are often forced to leave school because their household responsibilities make attendance inconvenient) and expanding the reach of female education.

Long-term Interventions

- Public-private collaboration in education is being explored. The district government must enter into meaningful arrangements with committed private sector entities for introducing shift systems in schools so that the existing resources are put to optimum and efficient use. This will help improvement in enrolments and control drop-out rates by providing the option of different timing slots. Technical and vocational education is a tool to directly address employment and poverty alleviation issues. Implementing interventions to improve access, particularly for girls is required; curricula need to be updated; equipment and facilities supplied; and Information Technology (IT) training provided. The provision of competent faculties and adequate oversight should be ensured.

- Teacher-training programmes must not only look into methodologies for subject teaching but also provide an integrated approach as highlighted in Education for Sustainable Development (ESD); other relevant topics should be part of the course. Teachers should be trained accordingly with emphasis on critical pedagogy.

- There must be emphasis on co-curricular activities at primary, middle and higher schools. These may be accomplished by involving students in

environmental/nature clubs where they learn and act simultaneously to improve their surroundings; youth groups could be encouraged to become involved in learning various skills and promoting social services in their communities.

- Education on IT and skills' development should be imparted till matriculation. Linkages of ICTs for development/sustainable development should be highlighted during teacher-training programmes and also with high school children while introducing these technologies in education.

- Surveys must be conducted by union councils to assess the enrolment statistics and to achieve the targets set for 100 percent enrolment by 2008 at primary education levels.

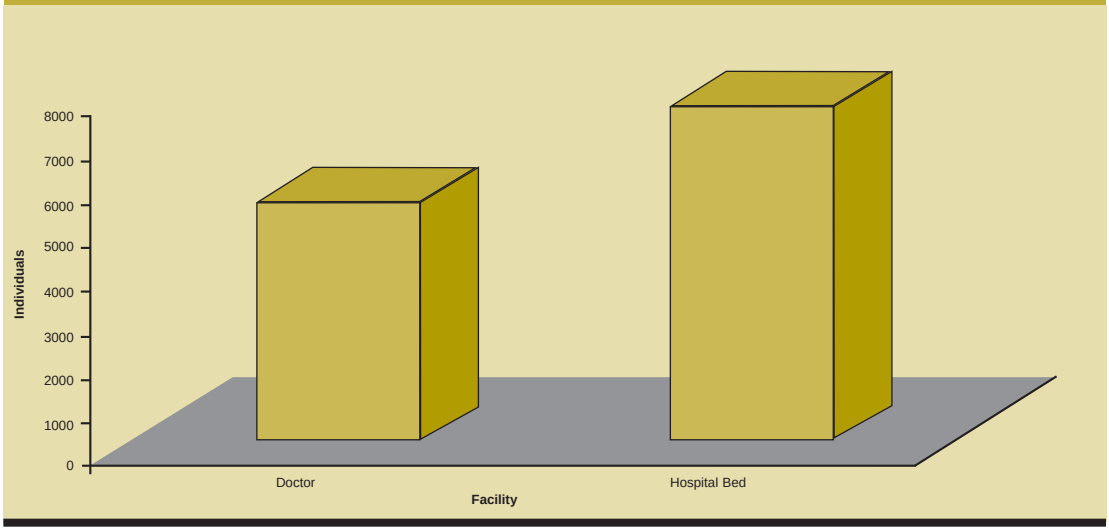
- The curricula must be revised and upgraded. This should be done once every two years and hence syllabuses should be revised accordingly. Simultaneously the teachers should be provided with training to implement the revisions in syllabuses. The syllabuses must be developed according to local needs. Curricular revisions can be looked into more carefully. Besides basic skills in language, mathematics and sciences, emphasis should be laid on making the contents specific to the areas and districts. Furthermore, an integrated /holistic/inclusive curricular approach such as the one the ESD promotes should be adopted to boost sustainable development in the district.

6.2 Health and population welfare

Health is an important sector of social services and one of the major factors for economic growth. A healthier society can contribute to efficient labour and reduce poverty. The sector receives much attention due to its importance and relevance to economic uplift. The government has initiated a health reform programme at the district level to strengthen district and *taluka* level health outlets. The reform includes strengthening of health management and information systems, setting up a system of continuous training and strict supervision and increased health services at the local level. Formation of village health committees and social monitoring are also part of the reform package. While large investments are made in health sector projects, the required operational funds and staff are not provided, resulting in underutilization of facilities and the deferment of optimal benefits to the community. Emphasis on primary health

FIGURE 7

Doctors and number of hospital beds in Badin District (2000-2001)



care is required. This needs to encompass adequate allocations, staffing and improvements in mobile systems. Trained women health workers are essential for improving maternal health. Nutrition is an often-ignored area. Nutrition education can prove to be the most cost-effective programme for substantially improving the health of the younger population of the district.

6.2.1 Status and issues

Health facilities

The availability of health facilities in Badin is deplorable (Figure 7). According to the office of the Executive District Officer (Health), the health infrastructure includes one civil hospital, four *taluka* hospitals, ten Rural Health Centres (RHC), 36 Basic Health Units (BHU), one Medical Centre with 20 beds and two Mother and Child Health Care (MCH) centre and 25 government dispensaries in addition to 74 experimental dispensaries. There are 362 sanctioned medical officers', 15 lady health visitors and 44 female health technicians. The medical staff in place is, however, much lower than the sanctioned strength. The population to be served per doctor was calculated to be 5 428 persons in 2001.

TABLE 2

Health facilities in Badin

1.	Civil Hospital	01
2.	*Taluka* Headquarter Hospitals	04
3.	Rural Health Centres	10
4.	Basic Health Units	36
5.	Medical Centres (20 beds)	01
6.	Government Dispensaries (12 without SNE)	25
7.	Experimental Dispensaries	74
8.	MCH Centres	02
9.	Unani Shafa Khana	01
10.	District Council Dispensaries	30
11.	School Health Clinics (not functional)	30

Source: Badin District Government, 2004

There were only six RHCs in the district during 2000/2001, catering to the needs of about 1.2 million people. The pressure on RHCs is likely to increase further with the projected growth of the rural population till 2010. BHUs provide primary health care services in rural areas. There were only 41 BHUs in 2000 with an average patient population of 29, 271. According to the 1998 population census, there was one hospital for 227 208 persons. This number had increased to 240, 020 persons per hospital by 2000. There is one bed for 7, 676 patients.

Mohammad Ali Qadri

A dilapidated BHU at Ahmed Rajo.

Mohammad Ali Qadri

Underutilization of health services is common in the district.

Hence, there is immense pressure on the present health infrastructure. Infant mortality and maternal deaths are high in rural areas, and can be lowered by providing basic health facilities at the community level.

There were only 360 beds in district hospitals, dispensaries, RHCs and BHUs in Badin in 2000. On average, there were 3 156 and 3 334 persons per bed in the district in 1998 and 2000 respectively. Therefore more hospitals and beds are immediately needed to extend health services properly. There are only two MCH centres in the entire district to cater to the specific treatment needs of women.

It is claimed that almost all rural settlements are covered by the EPI programme.

Disabled population

The disabled population includes people who are blind, deaf, mute, crippled, psychologically disturbed, mentally challenged and those with multiple disabilities. There were 18 149 disabled persons in Badin District in 1998. The proportion of disabled women is lower than that for men. The disability proportion is higher in urban areas compared to rural areas. The majority of disabled literate persons, i.e. 67.26 percent, are below the matriculation level for both sexes in all areas.

Population Welfare

The District Population Welfare Office is the key agency for the implementation of population programmes and delivery of family planning and reproductive health services. The district offices are responsible for planning, organizing and implementing all family planning activities through Family Welfare Centres (FWCs), Reproductive Health Services Centres (RHSCs), Registered Medical Practitioners (RMPs), *hakeems* and homeopaths. These service outlets are insufficient in number. The 1998 population census reported 17 FWCs with 15, 901 patients, one RHS with 270, 310 patients, and two Mobile Service Units (MSUs) with 135, 155 women patients between 15 and 55. The Contraceptive Prevalence Rate (CPR) was estimated to be 15.1 percent.

In addition to the aforementioned official infrastructure, the Family Planning Association of Pakistan (FPAP) also maintains a branch office in Badin. The

Mohammad Ali Qadri

A hosptial established by the Family Planning Association of Pakistan.

FPAP, a government sponsored NGO, assists the district management in population planning and welfare activities.

6.2.2 Major health problems and issues

Diarrhoea, dysentery, T.B. and ARI are prevalent diseases. Kidney and skin problems are also pervasive. Polio, tetanus, chicken pox and snakebite cases are frequently reported, especially in rural areas. Main diagnostic facilities like endoscopy, CT scan, cancer treatment, kidney transplantation, dialysis, neurosurgery, and cardiac surgery are not available in the district. Only general surgery and AIDS testing facilities are available. The recent natural disasters have impaired health throughout the coastal belt.

The major issues identified in the health sector include insufficient staff, medicines, ambulance facilities, women medical officers, rural health centres, maternity homes, MCH centres and laboratory and ultra-sound facilities. All health-related indicators in the district depict a gruesome picture where disease runs rampant. This situation, as in the education sector, will need a major effort by the district government to improve health services and provide much-needed medical cover for the poor and needy.

6.2.3 Measures for Sustainable Development

Immediate Action

- A strong preventive health care system is required with particular focus on principal disease sources like contaminated water, improper waste management, malnutrition, poor personal hygiene and self-medication.

- Community and opinion leaders[5] can be mobilized for motivation in planning and policy formulation to raise awareness in this sector. This can be supported by undertaking awareness campaigns for prevention of diseases through education, information dissemination and regular bulletins about health issues and family planning.

5 An opinion leader is an individual recognized by his/her own community as a clinical expert with well developed interpersonal skills and humanitarian attributes.

- Improper medical practice by spurious medical practitioners, sale of substandard drugs and availability of medication without prescriptions must be curtailed immediately. These are enforcement issues, directly related to governance. Timely supply of medicine to public hospitals and health outlets could be one major step in this direction; it can be reinforced by ensuring the mobility of the district health managers.

- Essential medicines, life-saving drugs and vehicles, especially ambulances, are immediate requirements for the District Health Department to create an enabling environment for service delivery. The district government has an obligation to assess these needs and initiate serious efforts to address them in the shortest possible time.

Medium-term Interventions

- Health centres are required in remote and needy areas to cater to marginalized communities. This needs specific focus on improvement of governance and administration in health centres.

- In order to ensure medical health for women, there is a need to provide special incentives for women doctors to serve in remote rural areas.

- Immunization programmes must be implemented up to WHO standards for polio, TB and DPT for children and TT for pregnant women. Hepatitis B immunizations should also be carried out for the entire adult community in due course.

- Relevant staff must be recruited in Badin's health sector. There is a need for postgraduate women doctors. The problem of absenteeism can be eliminated through incentives and benefits. Training and refresher courses for staff must be conducted on a regular basis.

Long-term Interventions

- The allocation for health in the district budget must be increased and resources must be provided for the acquisition and promotion of the latest technology and equipment for proper medical practice. There is also a need to certify proper utilization of existing health resources. Furthermore, incentives may be given to ensure proper functioning of existing health facilities.

- It must be ensured that all new health outlets are established on the basis of need and in consultation with stakeholders with increasing health cover as the principal criterion of all such interventions. Community involvement in management and operation should form an integral component of these interventions, along with equitable user charges based on the principle of capacity and ability to pay. The long-term goal for all such units should be to attain a level of self-sufficiency, so that government funds can eventually be channelled into development and expansion work.

- Emergency relief mechanisms must be installed. There is a need to maintain provisions for casualties and medical staff must be trained to enable them to handle extreme cases caused by natural disasters.

6.3 Drinking water

Water is one of the basic determinants of the quality of life of the human population with far-reaching impact on a number of other sectors. The provision of clean drinking water is an intrinsic part of the implementation mechanisms outlined in the Poverty Reduction Strategy of Pakistan (PRSP) and the National Conservation Strategy-Mid-Term Review (NCS-MTR). It is also a part of the commitments made by Pakistan under the UN Millennium Development Goals. Hence the provision of clean, safe drinking water is a key goal for the district government.

Mohammad Ali Qadri

Handpumps are a major source of drinking water in rural areas of Badin.

The majority of rural households fetch drinking water from wells, ponds and via hand-pumps. The benefits of providing a safe water supply include savings on the opportunity cost of labour for fetching water, savings on health-related expenditure and improvement in the quality of life. A survey on willingness-to-pay to find the value of providing drinking water is advocated. The government should adopt measures to improve the drinking water supply. There is also a need for improvement in the quality of water. It should be protected from various pollutants. Simultaneously, improvements in the system will need to be made to prevent wastage due to leakages.

6.3.1 Status and Issues

The main sources of drinking water for villages as well as urban water supply schemes are canals and water courses. Owing to the shortage of freshwater downstream from Kotri Barrage, one of the major problems being faced, especially by coastal communities, is the severe shortage of drinking water. Most coastal communities usually purchase water in jerrycans at high prices, thus making them more economically vulnerable. The water purchased and consumed is very unhygienic and causes many water-borne diseases.

According to the 1998 Population Census, overall, 13 percent of households have piped water (nul), 15.73 percent have hand-pumps and 6.17 percent have wells as sources of drinking water.

Water supply schemes serve only 3.3 percent of the rural population, most of whom (about 65 percent) still fetch drinking water from wells, ponds, depressions and hand-pumps installed outside their houses. The number of hand-pumps has recently risen to 8 825 although most of these supply brackish water. The open wells, ponds and other waterbodies generally receive agricultural runoff and drainage effluents which are unhygienic and harmful to human health. Unreliable and decreasing flows of freshwater downstream from Kotri Barrage have created severe shortage of drinking water in many urban localities in Thatta and Badin districts in recent years. This trend is likely to continue, necessitating an integrated plan for the development of potable water resources in the coastal districts, including Badin.

In Badin Town, the water supply system provides tap water to only 30 percent of the households while the rest of the town receives water either from community taps/stand posts, hand-pumps or directly

from the Qazi Wah Canal and the Kazia Minor Canal, which pass close to the southern boundaries of the municipality. Only half of the town households receiving tap water obtain treated water while the rest get partially treated water, which may not be safe for drinking purposes.

6.3.2 Measures for sustainable development

Immediate Action

- Water supply, sanitation and waste management are juxtaposed. Their related issues need to be addressed holistically. Badin is an unfortunate case of neglect on all three counts. Scarce drinking water resources are subject to contamination and pollution by wastewater. The district government needs to comprehensively examine the issues of water supply in qualitative as well as quantitative terms. This can be done by assigning major responsibility and lead roles to the succeeding entity of the public health engineering department at the district headquarter level for initiating consultations, starting from the *taluka* municipal administrations and going down to the union council level. This process should graduate into articulation of issues with possible options for solution.

- Based on the assessment, the district government should formulate a detailed action plan with specific time-bound targets in terms of input and output. The resource component of the action plan must be clearly laid down for every entity in the local government so that the actions stipulated in the plan are not distorted or abandoned due to lack of management or resources.

- Immediate improvement of the sector needs the collective efforts of all stakeholders. The district government should initiate the process of engaging civil society, NGOs, CBOs and consumer associations for consultation on water-related issues, conservancy, water charges and means for improvement. This engagement should aim at creating an effective advocacy forum for expounding the sector-related issues, disseminating information and soliciting input for better management of the sector. Even students can be engaged by integrating water issues within their curricula with a focus on

Nasir Ali Panhwar

Only half of Badin town receives piped water.

Nasir Ali Panhwar

Provision of drinking water needs immediate attention.

what can be done to mitigate and redeem the situation.

Medium-term Interventions

- The *taluka* municipal administration in line with the manifestations of the action plan should focus on improving the existing lines, creating efficiency in the distribution network and addressing the repair and replacement issues of the supply lines. Public sector entities should be obliged to keep water quality high on their development agendas.

- Creation of infrastructure for satisfying water supply needs and continuing with satisfactory management of the system demands resources. This requires focus on venues for revenue generation. The local governments need to examine trends in revenue generation to pursue new options that might become available. With the consolidation of devolution, it is possible that local charges will no longer be fiercely resisted as their positive trickle-down effects will have contributed to gradual improvements in living conditions.

- The collection system for water supply must also be improved.

- There should be at least two water tanks with predetermined capacity in villages with 1 000 or more inhabitants. These tanks may be located near water courses. Hand-pumps must be installed in villages that have fresh groundwater resources.

Long-term Interventions

- The alignment of investment in water supply with poverty alleviation initiatives to make full use of the synergies that exist between poverty reduction, nutrition and disease prevention programmes should be given serious consideration.

- The introduction of fines and other punitive measure must be considered to tackle waste-related pollution of drinking water, dealing severely with persistent violators. Sewage and sanitation facilities must be improved and the construction of water treatment plants with funds generated through user charges and fines should be pursued.

6.4 Infrastructure and Housing

Infrastructure plays a crucial role in the development of other sectors of the economy as well as in improving the standard of living of the people. Electricity, gas and roads are basic requirements, and increase business activities by improving market access, information services and mobility. Badin District has inadequate infrastructure and requires major investments. The development of the district will need to focus on improving the infrastructure and making substantial investments. There is also a need for good planning and implementation of these investments. These plans should be made with attention to the environment and sustainability.

6.4.1 Status and Issues

Infrastructure

Roads link Badin District headquarters with all *taluka* headquarters. The total length of good quality and basic roads was reported to be 2 019 kilometres in 1999/2000. All-weather good quality roads cover approximately 460 km only. The length of road per square kilometre of geographical area is 0.30 km, which is insufficient. Dependable roads are required, especially in coastal areas.

A railway line connects Badin with Hyderabad passing through Matli and Tando Mohammad Khan. All trains running on this line carry both passengers and goods. A new railway line is in the planning and design stage; it will connect Badin town with Mithi and Islamkot Coalfield via Diplo town of Tharparkar District.

Electricity is available in approximately 77 percent of the housing units in urban areas and 28 percent of the units in rural areas. From the 1 547 rural settlements surveyed during the 1998 Census, only 578 villages had electricity. More than 70 percent of the housing units use kerosene for lighting in rural areas. Fuelwood use for cooking is very high (93.64 percent) and little kerosene (3.52 percent) is used in this respect in rural areas. In urban areas, wood is also used for cooking fuel (49.83 percent), followed by gas (22 percent) and kerosene. Thus, owing to few gas connections, the pressure on the already limited forestry resources in Badin is unduly high, generating deforestation and denudation of the rural landscape.

In Badin town, 3 600 PTCL telephone connections were available in 2002. This number increased to 4 821 by 2003. There was only one connection for 265 persons or 52 households in 2003. Telephone facilities are in high demand in rural areas. The Internet is available in all *talukas* of the district. Rural areas generally do not have these facilities.

There were 11 police stations in District Badin in 2002 - one police station for about 113 859 inhabitants. This shows that there is a need for a more effective police force as the police department recommends at least one police station for a maximum of 50 000 people.

The major infrastructure issues include constraints in the financing and maintenance of infrastructure. The ADP (Annual Development Plan) projects remain underfunded and projects scheduled for a specified period take longer, which impedes the development process and reduces social benefits. Due to indifference towards repair and maintenance, there is huge damage to valuable public assets. Governance and effective accountability are weak, resulting in inefficient public service.

Housing

According to the 1998 Census, there were 101 669 housing units in total: 11 553 Pucca houses (about 11 percent); 10 501 Pucca/Katcha houses or about 10 percent; 40 986 Katcha (mud and wood) houses (about 41 percent); 36 478 Jhugies or huts (wood, straw) (about 36 percent); and only 2 151 temporary

housing units such as tents and wandhs were recorded or about 2 percent. The pressure on housing can be judged by the average household size, persons per room and rooms per housing unit. Housing units with two, three, four and five rooms and more comprised only 5.30, 4.08, 1.30 and 0.63 percent respectively, while housing units with one room only accounted for a staggering 81.82 percent in 1998. In urban areas, the proportion of 10 or more persons per housing unit is 15 percent. This serves as an indicator of the widespread poverty in rural Badin.

6.4.2 Measures for Sustainable Development

Immediate Action

- The existing network of roads in the district requires major repairs and improvement to support the pressure of the ever-increasing number of vehicles. Important roads that require immediate attention include Badin to Hyderabad, Badin to Tando Bago, Pangrio, Malkani, Badin to Deplo, Badin to Bughra Memon, Mataro to Korwah, Talhar to Haji Sawanand and Talhar to Tando Bago. The district needs to prepare a detailed inventory of the road network in the district and map out a detailed plan for their upkeep, routine maintenance, annual repairs and special repair according to standard operating procedures.

- The housing sector will require meticulously worked out innovative approaches for a rapid and qualitative change. Encouraging people to use credit facilities, introducing low cost technologies in the housing sector, undertaking housing schemes for the homeless population and investment in town planning could be considered by the district government.

- The district government should also advocate the establishment of fish jetties and harbours in Badin. An industrial zone on the coastal highway between Sujawal and Badin could be another initiative to augment uplift efforts.

Medium-term Interventions

- Badin town needs better connections with all union councils. This will provide impetus to commercial activity in the town.

- Bus terminals in Badin must be constructed. These should be located on the outskirts of the town. Bus stands must have the necessary facilities for men and women including toilets, water supply and telephone booths.

- The coastal areas of the district have the potential for developing into a vibrant commercial zone. This could be accelerated by prioritizing the streamlining of the coastal highway project. Connecting Badin and Karachi via a coastal highway is a possibility for rapid development of the area. Completion of the Sujawal-Karachi road may be another option to generate economic activity. The Badin-Karachi railway line should be operational. All of this will require sustained advocacy by the district government to attract investment in these areas and suggestions from all stakeholders should be taken on board.

Long-term Interventions

- The district government must ensure that key environmental considerations are incorporated into all future infrastructure development plans. Initial Environmental Examination (IEE) and Environment Impact Assessments (EIAs) must be carried out before and after development projects commence.

- Farm-to-market roads must be given priority to address the needs of rural residents who require an efficient distribution network for their largely perishable agricultural products.

- Air service to Badin must be revived.

- The district government should view all future road development projects from the perspective of their potential contribution to sustainable development, including considerations such as poverty alleviation in rural areas, promoting the livestock industry, catering to tourism needs, mitigating pollution and congestion and reducing negative environmental impacts.

6.5 Ecotourism

6.5.1 Status

Badin has a rich cultural and historical heritage. It is the land of spiritual leaders who have influenced many people. Some of the historical shrines include Dargah of Luari Sharif, Saman Sarkar, Ghulam Shah Qadri, Sajjjan Sawai, Dodo Somro, Sawan Fakir, Shah Trial Ahmed Rajo, Roopa Marri, Wagah Kot and Yousif Fakir. The coastal areas and deserts of the district have their own attractions. There are many opportunities for ecotourism. (See Appendex 3: Potential Tourisum sites).

6.5.2 Measures for sustainable development

Immediate Action

- Establish an office of the Tourism Department.

- The district government and other organizations must undertake the publication and circulation of information brochures on tourism as well as tourist packages in collaboration with the private sector.

- Local handicrafts and ornaments must be promoted by providing incentives and training to the local communities that produce them. Facilities must be provided for marketing.

- Schedules of festivals, cultural events and congregations may be circulated to enhance participation. Publicity of the schedules through electronic

Abubaker Shaikh

Remains of an historical mosque.

Abubaker Shaikh

Archaeological sites needs preservation.

media, newspapers and tourist information centres can be a useful tool to reach the target groups.

Medium-term Interventions

- Important archaeological sites need to be protected such as Ropa Marri, Rarri, Aghan Kot. Information on these sites may be disseminated through special features, supplements, awareness-raising campaigns and specially convened sessions.

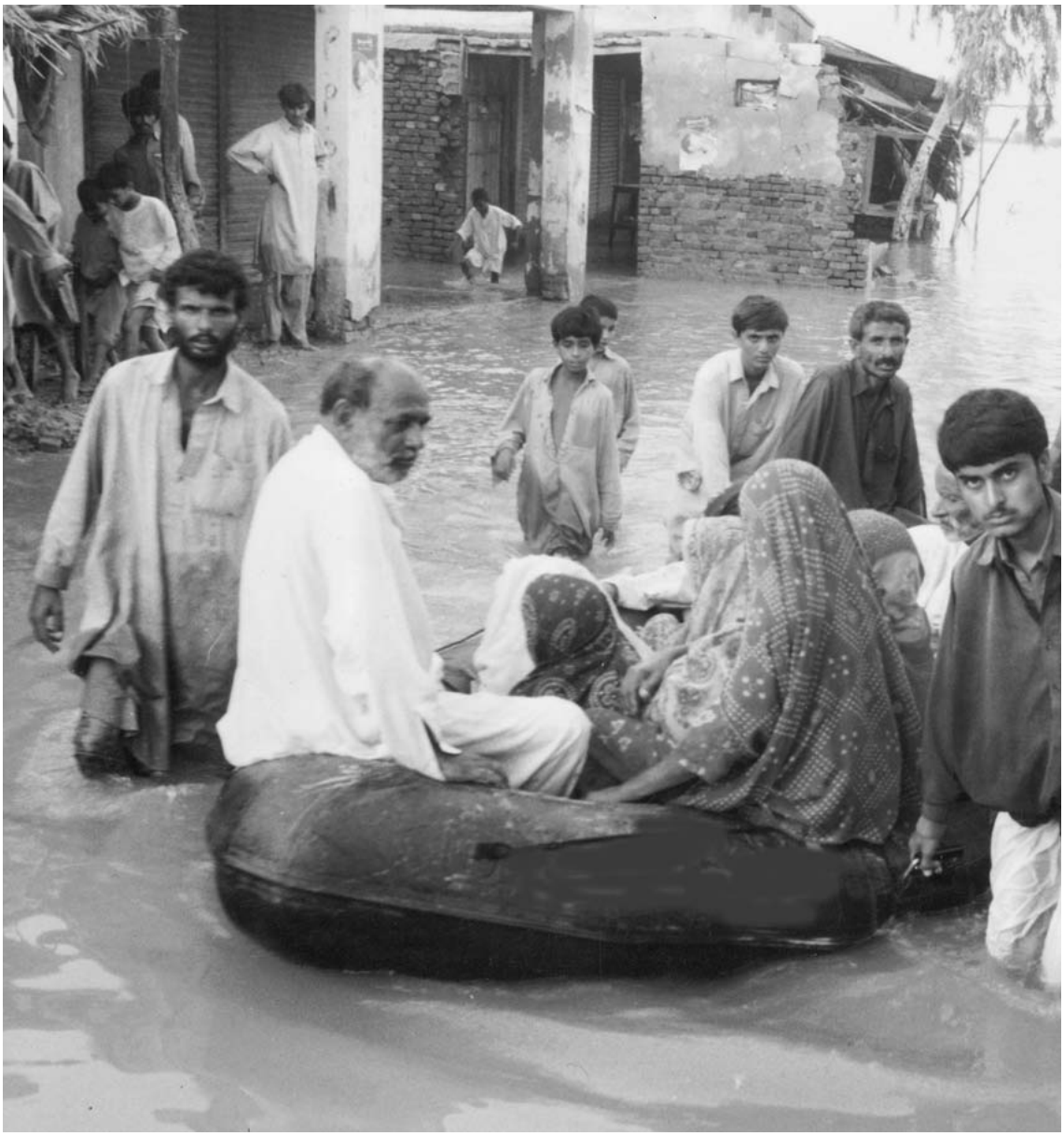
- There is a need to rehabilitate historical monuments and sites

Long-term Interventions

- Coastal areas have great potential for attracting tourists. The possibility of developing Badin coastal area into a tourist resort must be examined, keeping in mind conservation and sustainable development aspects. This will include provision of infrastructure, private sector engagement with supplemental activities such as hotels and recreational facilities, provision of power supply lines in the coastal areas and upgrading the water supply between the coastal areas.

CHAPTER **7**

DISASTERS AND VULNERABILITY



District Vision – Badin

7.1 Historical Overview

Thatta and Badin are the two major hazard-prone districts of Sindh. Cyclones, heavy rainfall, droughts and floods follow each other often in quick succession. The intervening respite is normally short. Major disasters in recent years include the cyclone in 1964/1965, heavy rainfall in 1973, floods during 1988, torrential rainfall in 1994, the cyclone in 1999, an earthquake in 2001 and recent floods in 2003. The number of people affected in the latest floods exceeded 360 000 in Badin. In terms of damage to property, some 22 567 houses were destroyed, 160 villages were inundated villages and 80 937 hectares of standing crops were obliterated. More than 200 000 villagers were rendered homeless. The precipitation of 350 or 450 mm coupled with a huge surge of saltwater from the breaches of the LBOD, further aggravated the situation in Badin and Golarchi/Shaheed Fazil Rahu *talukas.*

There are two major dimensions of vulnerability in the settlements in Badin - structural and non-structural. The dwellings, hamlets and villages that are situated in close proximity to the Arabian Sea have been the most frequent subjects of recurrent disasters. The structure and placement of the houses, no disaster-resistant physical infrastructure and remoteness combine to constitute the physical vulnerability of the communities generally. Water resource mismanagement has also added to the problems. The dams, barrages and tributaries of the Indus River have destabilized the local ecological balance of low-lying areas. Three major dams, 18 barrages, 12 inter-river link canals, two siphons and 43 main canals have been constructed on the Indus River and its tributaries. Areas under cultivation have become saline and degraded due to successive floods and seawater erosion.

The less visible but most important set of vulnerabilities relate to how ownership of resources is redistributed among communities and how the available resources are used. The absence of land and fishing rights, lack of access to their productive resources and no formal protection or safety nets reduce social resilience and coping capacity against hazards. People can only opt for the repressive loan system and in some cases resort to begging as a survival strategy.

7.2 Livelihood Strategies

Hazards like floods, cyclones and droughts obviously have adverse effects on the agriculturally related livelihoods of communities. Livestock is considered as a contingency asset to be sold in the case of emergency. The price of livestock plummets during times of emergency when animals are also susceptible to various diseases

for which there are no veterinary arrangements.

7.3 Disaster Management Issues

The four major issues of food, water, habitat, and work security emerge from the vulnerability context and livelihood strategies for coastal area communities in Badin. Disaster relief is a popular and ready-made answer to all predictable and unpredictable disasters. This has, however, not helped the local communities significantly in the recent past. Even though Badin is prone to recurring disasters, no contingency strategy has been developed by the government. The post-event relief distribution mechanism is marred by various insensitivities, irregularities and bad planning. A disaster risk-reduction strategy could be developed by designing appropriate structural measures and devising need-based, non-structural measures to reduce the risk of disasters. Structural measures relate to engineering and technological answers to the problem, while non-structural measures are directed towards socio-economic concerns and development of the communities that are frequently at risk.

7.4 Disaster Management

Disaster management is currently an ad hoc activity undertaken only in the case of emergencies. There is a need to institutionalize it by establishing a disaster management and mitigation wing under the district administration. A master plan for disaster awareness and management should be prepared and a permanent system of reviewing and monitoring the implementation of various components should be introduced. Rehabilitation work for affected families may be executed and monitored on a regular basis. Close coordination between government, the private sector, local institutions, NGOs, opinion leaders and the international community may be promoted for effective response to disaster management initiatives. The District *Nazim,* under the provisions of the SLGO 2001 is obliged to assume relief activities during disasters, natural calamities and emergencies. Fulfilling this responsibility in an effective manner will largely depend on the level of readiness of the district administration. This readiness, in turn, is not possible unless the issues of disasters and vulnerabilities are kept high on the management agenda of the district government. The agenda's resource component requires the establishment of

Ishtiaq Hussain

Poor people are more vulnerable to natural disasters.

Ishtiaq Hussain

Temporary shelter for flood affectees.

a Crisis Management Fund to cater for emergency relief measures.

7.5 Measures for sustainable development

Immediate Action

- Proper appreciation of the magnitude of the disasters that usually strike the area is necessary. Effective planning and contingency measures for disaster management shall depend on correct and in-depth analysis of past emergencies and critical review and evaluation of response modalities. It is essential for the district administration to evolve a "Reflex Action Mechanism" to respond to emergencies.

- Science and technology have added some elements of certainty to predictions and forecasts. The installation of advance warning and information systems can minimize the magnitude of disasters. Investigation into the causes of disasters can also help remedial responses provided the lessons learned are translated into management plans and appropriate investment, wherever possible, is made to minimize negative impacts

Medium-term Interventions

- Training for disaster management, block allocations for emergencies, consistent availability of relief, equipment and mobility can facilitate response mechanisms. The civil defence is a devolved entity and grouped in the coordination group of offices at the district level. This requires the district administration to keep this entity in a state of readiness by providing essential funds, support, capacity-building inputs and mentoring as well as monitoring of its activities.

- Modern technologies/equipment may be ensured to cope with disasters.

Long-term Interventions

- Emergencies are testing times. They bring loss, misery and disabilities. They need collective and holistic efforts. The district government should create a collective defence line against disasters. This will require the continuous, sustained and meaningful engagement of all segments of society for the relief effort including efforts undertaken to forestall emergencies.

CHAPTER **8**

IMPLEMENTATION AND FUNDING MECHANISMS

District Vision – Badin

Limited resources, lack of capacity, rapidly changing scenarios, policy shifts and, above all, unconventional approaches to development hamper the understanding and pursuit of sustainable development concepts. Short cuts are the most common way to address development needs. Democracy, devolution and decentralization of functions and responsibilities are still passing through the most sensitive phase of transition which has its own fluid and rapid dynamics. Rule transitions always result in functional pauses that adversely affect efficiency, efficacy and performance levels. It is essential that these limitations are taken into consideration. The District Government and *Zilla* Council Badin are obliged to steer this process. The DVB is a long-term prescription that needs sustained commitment for realization. It cannot provide hasty solutions and as such it needs to be seen in its real context. Its implementation will certainly depend on the complete and proactive commitment of the District Government. It will not be possible for it to pursue sustainability either in compartments or in isolation. Almost all interventions in every sector will require an element of integration and focus in consonance with the parameters indicated in the DVB. This, in turn, will require the District Government to remain continuously engaged in objective debate, meaningful dialogue and purposeful consultations with all institutions associated with planning and implementation of development interventions in the district.

The sectors covered in the DVB include functions that are not yet devolved and are not going to be devolved in the near future. Some sectors pertain to the mandate of the TMA. This mix will naturally require the District Government to put in place certain institutional arrangements to effectively coordinate the resultant issues. These arrangements must cater to the advocacy component of the Vision so that requisite support is gathered around the themes of the document. Given the enormity of problems, issues and genuine needs of the district, it becomes much more important that they are addressed in a comprehensively efficient and efficacious manner. This cannot be done without indicators to monitor implementation and ensure accountability. The indicators need to be sector- and area specific, establishing baseline positions and setting annual targets with clearly assigned responsibility.

Devolution reforms have created an array of institutions at local and provincial levels for addressing and managing issues at the local level. Starting from the provincial Finance Commission and proceeding down the line to the Neighbourhood Council and *Anjuman Musalihat* is a series of institutions performing functions related to local governments that have been created for improvement in governance, efficiency in service delivery and transparency in decision-making. The DVB has to be implemented through the institutional arrangements that are in place at the

moment. The SLGO, 2001 as amended from time to time, has "elected and accountable local governments" as its mainstay with the District Government as the most prominent entity. The *Zilla Nazim* is responsible for District Government and obliged to provide a vision for district-wide development and leadership. The *Zilla* Council is the forum to approve long- and short-term development plans, annual and supplementary budgetary proposals of the District Government and fiscal transfers. The council is required to review the performance reports of the District Government presented by the *Zilla Nazim* at least twice a year, besides considering the quarterly reports of the monitoring committees and reviewing the monthly reports of the *Zilla* Accounts Committee on the financial statements of the District Government.The Council has an explicit obligation to require the District Government to undertake measures for good governance and improvement in the delivery of services.

The Local Government Commission is the macro level institution at the provincial level responsible for organizing consultative planning meetings of national and provincial legislators, *Zilla* and *taluka Nazimeen* of the district on a periodic basis. They participate in the development activities of the district as part of the consultative process of the ADP; formulate procedures for utilization of the legislators' development grant; assess implementation of the decisions of these meetings; and review development schemes. The Commission has an additional responsibility of facilitating the performance of provincial departmental functions of the decentralized offices relating to policy analysis, oversight, checks and balances, capacity building and coordination. These functions make the Commission a strategically placed institution to support the DVB. The *Zilla Mushavirat Committee* is required to meet at least once every three months and is mandated to crystallize vision for integrated development of the district; prioritize and coordinate inter-*taluka* development plans; and set direction for realizing the economic potential of the district. The Committee can substantially contribute to the ideals set out in the Development Vision for Badin District.

The District Coordination Officer as coordinating head of the district administration is required to exercise general supervision over programmes, projects, services and activities. He is required to prepare reports on the implementation of development plans for presentation to the *Zilla* Council in its annual budget session. He is also required to concentrate on coherent planning, effective and efficient functioning of District Government institutions and synergistic planning. Creation of a Coordination Unit under the District Coordination Officer to oversee the effects of interventions is a natural requirement for the diversity of approaches contained in this document. The EDOs and District Officers must use human and material resources at their disposal optimally for improving governance. Enforcement of rules and regulations, preparation of development plans, proposals for expenditure necessary for proper conduct of programmes, projects and services, implementation of approved plans and supervision of activities for efficiency in service delivery are some of their responsibilities in the arena of planning and development.

The concept of the "Committee of Executive District Officers" at the district level should be linked to the creation of a district level focal entity to coordinate and review development interventions. The vertical void in relationship between the District Government and *taluka*/TMA has been plugged with the latest amendments in the LGO. The interventions pertaining to municipal services need to be steered through the *taluka*/TMA. This requires institutional arrangements for ensuring enhanced interaction among the District Government and municipal administration. Ultimately, it is the consistency of resolve of the District Government to set the development process in the right direction.

Civil society is playing an important role and trends are indicative of a steep increase in this role. The District

Government has to accommodate this segment of stakeholders. An objective and meaningful engagement with civil society, NGOs and CBOs will provide strength and impetus to the advocacy endeavours of the district government.

Resource requirements to implement the Vision have human and material components. The elected leadership, public functionaries, opinion leaders, intelligentsia and civil society all hold assets that can contribute to the realization of the Vision. Taken collectively, this resource pool holds the master key to give the DVB a practical shape. Primarily it will be for elected leadership of the district to provide common ground for this resource to make contributions. The public functionaries performing in the district are obliged to carry forward the sustainable development agenda of the district through conscientious efforts. Tailor-made capacity building is required to inculcate requisite skills. A "round table" drawing representation from all stakeholders with clearly articulated terms of reference could provide strategic leads to the functional entities in carrying forward the DVB.

Fiscal decentralization is central to devolution. The SLGO, 2001 contains detailed mechanisms for resource allocation, distribution and utilization. The long-term DVB has acquired the requisite qualification to seek additional allocations from the provincial consolidated fund to support Strategy priorities. Accessing this potential window will need consistent efforts by the district Finance and Planning Department to place the Vision on the priority list of the provincial Finance Commission for additional resources.

The District Government is required to initiate the process of resource pooling for financing the Vision and its strategy by establishing a district fund for sustainable development and earmarking resources from the regular development budget of the district. As this fund will be open to inflow from sources other than government channels, it is essential for the District Government to evolve a comprehensive mechanism for its management. Mobilization of resources is a major issue. The district is heavily dependent on resource allocations from the Provincial Government. This dependence can be redressed to some extent by generating funds through other existing and potential sources, including special grants from the province to finance the priorities of the Strategy, savings through efficiency in public-sector programmes and imposition of new levies as mandated in the LGO. Additional resources could be made available by developing partnerships with NGOs, facilitating private-sector investment in key sectors and accessing projects and programmes aimed at sustainable development. Federal commitments under the National Conservation Strategy, a Poverty Reduction Strategy and the National Environment Action Plan could be other options for the District Government to explore for additional funding.

Appendices

APPENDIX: 1

Extract from the Resolution of District Assembly Badin on the Endorsement of District Vision.

EXTRACT FROM THE RESOLUTION NO: 03 DATED: 21.06.2005.
PASSED BY ZILA ASSEMBLY BADIN.

ايجنڈا : 03 .

رٿڻ ۽ تجويزن تي غور .

محترم اسپيڪر صاحب هائوس کي مخاطب ٿيندي چيو ته اسان وٽ کاڌ رٽ يا تحويز ڪنهن به ميمبر طرفان لکت ۾ موصول نه ٿي آهي پر ڪجهه آفيشل رٽون هن هائوس مان پاس ڪرڻ بعد اينڈ مالي سال ۾ شامل ڪرڻ جي هائوس طرفان منظوري ڏهرايل آهي .

(2) پيش ٿيندو DCO بدين جو لٽر نمبر NO: DCO/BDN:F&P:246 Dated : 04.06.2005 جنهن ۾ هن IUCN طرفان ترتيب ڏنل DISTRICT VISION BADIN ملاحظ ڪرڻ بعد هائوس جي منظوري لاءِ.

محترم اسپيڪر صاحب هائوس اڳ وضاحت ڪئي ته مذڪوره District Vision جيڪو نمبر بهترين تنظيم سان جوڙيو ويو آهي اهو هن هائوس طرفان منظور ڪرڻ جي تجويز آهي هن هائوس مان ان جي منظوري بعد اشاعت ٿيندي. هائوس صرفان ان لاءِ منظوري ڏهرايل آهي

هائوس ٻڌاءِ طور IUCN طرفان مذڪوره ترتيب ڏنل "District Vision Badin" جي منظوري ڏني.

TRUE COPY

NAIB NAZIM
ZILA BADIN

APPENDIX: 2

List of participations of consultative workshops

Name	Designation/Organization	Postal Address	City/District
A. Salam Arain	Naib Nazim TMA SFR		
A. Qasim Shaikh	CO TMA SFR		
A. Hafeez Abbasi	T.M.O Matli	T.M.A, Matli	Badin
A. Sattar Mallah	P.F.F., Badin		
Ahmed Khan Abro	TMO Badin	TMA Badin	Badin
Abdul Sattar Bhutto	E.D.O Agriculture	P. O. Badin	Badin
Agha Ahsanullah	DO-Roads, Badin		
Ali Bahadur	D.D.O Roads		
Ali Raza Rizvi	Head, Sindh Programme Office, IUCN	1, Bath Island Road,	Karachi
Abubakar Shaikh	President	National Resource Protection Programme NRPP, Seerani Road	Badin
Allah Bachayo Paras Kumbhar	Gen. Sec. Press Club, Badin		
Abdul Latif Zargar	Press Reporter-PPI & Media Coordinator PPF	Badin Press Club	Badin
Ali Hassan Arain	EDO Agri., Badin		
Abdul Majid Makah	Awami Awaz	Press Club, Badin	Badin
Abdullah Mallah	Education	Ward No. 04, P. O. Badin	Badin
Abdul Qader	D.O. SW-CDD, Badin		
Abdul Khaliq	SGA/General Secretary		
Allah Dino Abbasi	Principal, Abbasi Elementary School		
Abdul Ghaffour Mallha	P.F.F.F		
Abdullah Saraz	NRPP, Badin		
Aramandus Parmar	PSWA, Badin		
Abdul Razzak Khatti	Khabroon / Experss		
Abdul Hakeen	Joint Secretary	Young Sheedi Welfare Organization, Near Post Office	Badin
Abdul Majeed Lund	Vice President	BEACH, Talpur Manzil, 2nd floor, Mehran Chowk	Badin
Ashfaque Ahmed Memon	President	Council of Social Welfare Agencies & Naujawan Sanghat, Shahbad Road	Badin
Abdul Khalique	SAGA, Badin		
Abdullah Turk	Member	BDRO Badin, Gharibabad	Badin
Abdul Rehman Khashkeli	President	Young Khashkeli Welfare Organization, Bilawalabad, Hyderabad Road	Badin
Abdul Aleem Zargar	Social Worker	Behind UBL	Badin
Ameer Mandhra	Journalist	Awan-e-Sahafat, P. O. Badin	Badin
Abdul Ghaffar Khokhar	Social Organizer	NRSP, Regional Office	Badin

Name	Designation/Organization	Postal Address	City/District
Abdul Haque	D.D.P.W.O	Population Welfare Dept, Cantt. Road	Badin
Aijaz Memon	ROM/D.C	HANDS, Near Population Office, Cantt. Road	Badin
Abdul Majeed Chaher	D.O. Fisheries	D.O Fisheries	Badin
Ahmed Hussain Nizamani	Assistant Conservator	Wildlife Badin, DFO Office	Badin
Abdul Waheed Nizamani	AXEN	AXEN Irrigation & Power Department, Akram Wah Division	Badin
Abdul Rahim	S.C.M.M.S.M		
Asif Ali Buledi	Accountant, SRDP	D.C.O Office, Badin	Badin
Brig. Maula Bux (Retd.)	Senior Vice President, Sindh Abadgar Board	P.O Luari Sharif Village: Khansabib Abdur Rehman, District Badin	Badin
Bahadar Khan Lund			
Bashir Ahmed		Ward No.4, Mashori House, Golarchi,	Badin
Dr. Akash Ansari	Chairman	BRDS	
Dr. Birjar Khan Leghari	D.O Animal Husbandry	C/O District Officer Livestock, Badin	Badin
Dr. M. Arif	D.D.O (HRD) Health		Badin
Dr. Chando Mal	Veterinary Officer		Badin
Dr. Muhammad Hussain	V.O. M. O		Badin
Dr. Najam Jojo	Sindh Aurat Development		Badin
Dr. Soomar Khori	D.S.O NICEP	EDOH Office	Badin
Dr. Akash Ansari	Badin Rural Dev. Society (BRDS)	P. O. Badin	Badin
Dr. Manzoor	EDOH		Badin
Dr. Bachal	D.D.O	E.D.O	Badin
Dr. Rajab Ali Memon	Consultant		Hyderabad
Dr. Khalida Sikandar	Medical Specialist	Mandhra Hospital	Badin
Dr. Mohammad Ali Chang	D.D.O(Admn)	E.D.O Health Office, Badin	Badin
Fazal-e-Kudia			
Fayaz Ali	District Literacy Coordinator, NCHD	Ward No. 04, P. O. Badin	Badin
Engr. Nazir Ahmed	SSG Chtd.		Badin
Ghulam Mustafa Memon	T.O (Infra)	T.M.A, Badin	Badin
G. Murtaza Memon	SCW		Badin
Ghaffer Khoso	Socieal Welfare Deptt.		Badin

Name	Designation/Organization	Postal Address	City/District
Gulzar Ali Wassan	Project Director, Family Planning Association of Pakistan	Golarchi Road, Badin	Badin
G. Mustaffa Jamro	N.R.S.P		Badin
Ghulam Hussain	LDA		Badin
Ghulam Ali Khaskheli	BP		Badin
Ghulam Shabir Kori	Programme Manager Education, SAFWCO	Near Primary School, Gharibabad	Badin
G. Fatima Soomro	Education Officer, NCHD	Ward No.04, P. O. Badin	Badin
Ghulam Mustafa Jamali	Journalist, Kawish, Aiwan-e-Sahafat	Press Club, Ward No.4, Seerani Road	Badin
Ghulam Mustafa Kazi	Works & Services Department	C-F/2 Ibrahim Terrace, Frere Town,	Karachi
Haji Mohd Iqbal	Sindh Abadgar		
Haji Muhammad Nawab Memon	General Secretary, Sindh Abadgar Board	C/o Amjad Rice Mills, Kadhan Road	Badin
Haji Mohammad Hafeezullah Awan	General Secretary, Sindh Abadgar Board	Golarchi Road, Badin	Badin
Haji Abdul Rahman	Sindh Abadgar		
Hamida Khaskheli	General Secretary, Sindh Aurat Welfare Organization		Badin
Haji Saleem Memon	E.D.O Education		Badin
Hanif Samoon	Reporter, The Star	Tando Bago	Tando Bago
Haji Abdul Ghafoor Nizamani	Chairman, Area Water Board Left Bank Canal	Nizamani Mohalla, Matli	Badin
Iqbal Junejo	NRPP		Badin
Irshad A. Junejo	FPAP		Badin
Iqbal Shah	SDRO		
Iqbal Rizvi			
Iqbal-ur-Rehman	D.D.O, F & P. Badin		Badin
Ishrat Qumbrani	Member, Young Sheedi Welfare Organization	Near Post Office, Badin	Badin
Javed Soz Halai	Field Coordinator, SPO	A 50, Muslim Housing Society, Qasimabad	Hyderabad
Jitheo Mal	PARBAT Social		Badin
Kamal Khan Charng	District Nazim		Badin
Khadim Talpur	Secretary	Shah Latif Public School	Badin
Khan Mohammad Bozdar	Program officer, NLHD		
M. Asghar Brohi	TMO TMA SFR		Badin
Munawar Hussain	T.O (Infra)	T.M.A Matli	Badin
M. Aslam Memon	T.M.O	T.M.A, Tazhar	Badin
Muhammad Ihsan Khan	EDO		Badin
Mirza Sohail Akber Baig	District Naib Nazim		Badin

Name	Designation/Organization	Postal Address	City/District
Mushtaquin Rajput	XEN LGD		Badin
Mumtaz Ali Shah	DCO		Badin
Mir Mohd Hassan	Sindh Abadgar		Badin
Muhammad Ishaque	D.O Forest		Badin
Muhammad Azeem Rind	President, GSS,	Matli	Badin
Major Omer Farooq Ahmed Khan (R)	Vice President, Sindh Abadgar		Badin
Mohd Qasim	P.F.F. Badin		Badin
Maqsood Chandio	Awan Sahfat, ARY City TV Channel		
Mohd Juman Mandhu Mohd Siddiqui	Chairman, ccbue III		Badin
Mohd Rahim Jamali	Coordination ccbue III		Badin
Mohd Khan Samoon	General Secretary, LRP BDRO, SPO	Seerani Road, Badin	Badin
Manzoor	S.G.A		Badin
M. Siddique Mallah	Mallah Welfare Organization	Seerani Road, Badin	Badin
Mustafa Ali			
Mohd Hayat	Young Shaadi Welfare Organization		Badin
Mohd Qasim Mallha	P.F.F.F.		Badin
M. Ismail Kumbhar	Sindh Agri. University	Deptt. Of Agri., Education Extension,	Tando Jam
M. Shakir	The Nation, Juraat,		Badin
M. Suleman Ansari	F.PAP		Badin
M. Ramzan Kumbhar	Bricks Company		Badin
Muhammad Asif Patoli	N.R.S.P		Badin
Maqbool Memon	President, Small Traders		
Muhammad Shabbir Lohar	Supervisor Primary Education	P. O Seerani, Village Deenai Khan Talpur	Badin
M. Ishaque Junejo	D.F.O	C/o D.C.O., Badin	Badin
Mohammed Sadiq Rajar	D.O.	D.C.O, Badin	Badin
Munawar Hussain	Taluka Officer	T.M.A., Matli	Badin
Mohammad Aslam Memon	Taluka Municipal	P.O. Talkaz	Badin
Mian Tasneem Raza	Deputy District Officer, E. Works	D.D.O. Education Works, Badin	Badin
M. Rasool Bux Chakrani	D.O. College	Office of the D.O.E College	Badin
Naushad Ali Abro	T.M.O.T. Bago		
Nusrat Khatti	Social Organizer, NRSP	Hyderabad Bus Stop	Badin

Name	Designation/Organization	Postal Address	City/District
Natho Khan Lund	Adadgar,	Sheekan Gari	
Naseem Palijo	SPO, Hyderabad		
Naheed Naz Jatoi			
Noor Hassan Mashori		Ward No.4, Mashori House, Golarchi, FHRRDA	Badin
Naheed Abro	President, Women Development Association	Abro House, P.A.F Road	Badin
Naqash Alwani	I.F.P.		Badin
Noor Mohd Soomaro	Sana News		Badin
Nasir Ali Panhwar	Coordinator, Sindh Programme, IUCN	1, Bath Island Road,	Karachi
Nasarullah Jarwar	Journalist, Member NRPP	Tando Bago	Badin
Nawaz Khatti	Pakistan Fisherfolk Forum (PFF)	Cantt. Road, Badin	Badin
Noor Jamali	AFS, HANDS	Cantt. Road, Badin	Badin
Nadeem Samnakay	IUCN	1, Bath Island Road,	Karachi
Naseeruddin Pirzada	Community Relations Administrator, BP Pakistan	Post Office Kario Gankmar, Base Camp Khaskheli, Taluka Golarchi	Badin
Rana Shabir Ahmed	Asstt. Gen. Manager, Pangrio & Mirza Sugar Mills	Taluka Tando Bago	Badin
Shazia Junejo	SPO, Hyderabad		Hyderabad
Syed Moinuddin	EDO (F&P)		Badin
Safdar Hussain Nensey	BP, Khaskeli		Badin
Sawai Khan Chalgri	DIO		Badin
Soofi Kaloo	Zamindar	Tando Baloo	Badin
Suhail Ahmed Samoon	Journalist,	Tando Bago	Badin
Sabeen Jatoi	Communications Advisor, BP Pakistan Exploration & Production Inc.	3rd floor, Bahria Companex, Moulvi Tamizuddin Khan Road,	Karachi
Syed Asghar Ali	D.D.O	District Officer Building	Badin
Syed Afsar Hussain	DDO-Education, NCHD	Hyderabad Road	Badin
S. M. Kashif	M & E Officer	D.C.O. Office	Badin
Tahir Qureshi	Director, Coastal Programme, IUCN	1-Bath Island, Karachi	Karachi
Tanweer Ahmed	Press - ARY		
Usman Nuhrio	Joint Secretary, Chamber of Journalists	c/o Chamber of Journalists	Badin
Usman Ghani	D.O (Finance)		Badin
Wahid Hussain			
Zafar Ali Talpur	DDPO-Edu. NCHD	NCHD Office	Badin
Zafar Khaskeli	CARE		Badin

Source: .....

APPENDIX: 3

Potential Tourism Sites

Potential Tourism Sites in Badin

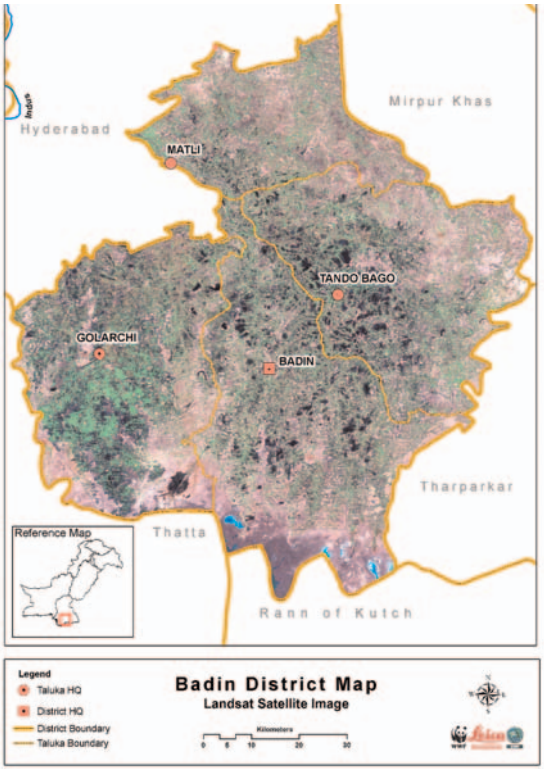
1.	Rupa Mari	F
2.	Nindkot	F
3.	Kath Banbhan	F X
4.	Veer Tahir	F
5.	Manji jo Daro	F
6.	Badeen	X
7.	Khan Shah	F
8.	Sindh Rani's grave (Mir Bago)	X
9.	Fateh Bagh	X F
10.	Joan	X F
11.	Karrio Ganhwar	F
12.	Mangrian jo Daro	F
13.	Shah Turab	F
14.	Shah Ghuriojo -daro	F
15.	Ibrahim Shahjo -daro	F
16.	Old Badin	X F
17.	Malhianjo-daro	F
18.	Kohalijo-daro	F
19.	Varjo-daro	F
20.	Pano Lunkijo-daro	F
21.	Kanjar Kot	F
22.	Rahim ki Bazar	F
23.	Lowari	X F
24.	Shah Kapur	F
25.	Ali Bunder	F
26.	Sindhri	F
27.	Agham Kot	B X F

Key for Categories:

- A Class sites: Can be promoted, with facilities like snack bars, rest rooms, souvenir and gift shops, guidebooks
- B Class sites: Can be suggested in guidebooks of the area, a site chowkidar/attendant can be recruited
- C Class sites: Relate to historic/cultural events that can be celebrated
- D Class sites: Relate to personality and can be developed as such
- E Class sites: Events, fairs etc. that can be developed into tourist attractions
- F Class sites: Require further research to explore tourism potential
- X Class sites: Image-lifting measures required
- Y Class sites: Require involvement of the private sector
- Z Class sites: In need of immediate conservation/protection

Source: Dr. Kaleem Lashari

Landsat Satellite Image



Population Dynamics

Transportation & Administration

Canal System and Wetlands