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Northern Areas Strategy for Sustainable Development

Background Paper

Health and Environment

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TABLE OF CONTENTS

LIST OF ACRONYMS

AIMS	Accelerating Income through Mobilizing Skills
AKCS	Aga Khan Cultural Services
AKDN	Aga Khan Development Network
AKHS	Aga Khan Health Services
AKRSP	Aga Khan Rural support Program
BACIP	Building and Construction Improvement Program
BCS	Balochistan Conservation Strategy
CA	Contractor's Association
EE	Environmental Evaluation
HRD	Human Resource Development
IFAD	International Fund for Agricultural Development
ISO	International Standard Organization
ISSD	International Institute for Sustainable Development
IUCN	International Union for Conservation of Nature and Natural Resources
KADO	Karakoram Area Development Organization
KANA	Ministry of Kashmir Affairs and Northern Areas
LB & RD	Local Bodies and Rural Development
LPG	Liquid Petroleum Gas
MW	Mega Watts
NA	Northern Areas
NAC	Northern Areas and Chitral
NACC&I	Northern Areas Chamber of Commerce and Industry
NACS	Northern Areas Conservation Strategy
NASSD	Northern Agreas Strategy for Sustainable Development
NAPWD	Northern Areas Public Works Department
NATCO	Northern Areas Transport Corporation
NCS	National Conservation Strategy
NGO	Non-Governmental Organization
NRM	Natural Resource Management
Oil/Gas	Petrol, Diesel, kerosene Oil, and Liquid Petroleum Gas
P&D	Planning and Development
PIDC	Pakistan Industrial Development Corporation
PMDC	Pakistan Mineral Development Corporation
PS	Private Sector
PTDC	Pakistan Tourism Development Corporation
SDPI	Sustainable Development Policy Institute
SME	Small and Medium Enterprise
VO	Village Organization
WASEP	Water and Sanitation Extension Program
WO	Women Organization
WWF	World Wide Fund for Wildlife

FOREWORD

The Northern Areas have a unique and critical role to play in the sustainable development of Pakistan. Although they span a relatively small geographical area, the Northern Areas serve as a vital catchment for the Indus River, upon which a majority of Pakistan's irrigated agriculture and hydroelectricity depends. The Northern Areas also contain the nation's most important natural forests, extensive mineral reserves, and a wealth of biodiversity. Dramatic scenery, some of the world's highest mountains, and a rich cultural and archaeological heritage make the Northern Areas one of the most visited tourist destinations in the country.

Over the last several decades, however, many of the Northern Areas' natural resources have come under increasing pressure, as a result of a growing human population and the opening of the Karakoram Highway. At the same time, it has become increasingly recognised that the isolated nature of many of the region's communities, coupled with the Northern Areas' high-altitude and fragile environment, poses special constraints and challenges to development. Perhaps more so than in any other part of Pakistan, there is a need in the Northern Areas to ensure that social and environmental considerations are fully integrated into the development process.

In response to these concerns, the Northern Areas Administration began the preparation of a Northern Areas Strategy for Sustainable Development in 1999, with the financial assistance of the Swiss Agency for Development and Cooperation, and the Norwegian Agency for Development Cooperation; technical support has been provided by IUCN–The World Conservation Union. The Strategy addresses a broad range of social, economic and environmental issues, and seeks to provide a comprehensive policy framework for the sustainable development of the region. It responds directly to the provisions and recommendations of the National Conservation Strategy, adopted by the Government of Pakistan in 1992.

In parallel, *The State of the Environment and Development in the Northern Areas* summarises in a single volume the key information gathered during the preparation of the NASSD. It is the first report of its kind to be produced for the Northern Areas, which provides a succinct, up-to-date and readily accessible analysis of the status of the most important environment and development sectors in the Northern Areas, including information on major trends and issues, the responses taken by both government and civil society to date, and strategic options for the future. It also provides a baseline against which future change can be measured and establishes the context and foundations for the Northern Areas Strategy for Sustainable Development.

During early consultations at the tehsil level, and with key governmental and non-governmental organizations 16 areas of intervention were identified as being critical for the NASSD. These include sectors like: water; agriculture; forestry; biodiversity; rangelands and livestock; the private sector; energy; urban

environment; and cultural heritage and sustainable tourism. In addition, some crosscutting themes were identified as crucial to each sector, including population, poverty and environment; communication for sustainable development; environmental education; NGOs; gender, environment and development; environmental health; and governance.

To address the needs of each of these areas, basic information was gathered through consultations and literature reviews. This data was analysed through background papers commissioned on each of the sectors and themes identified. The draft of each paper was shared with the larger community of stakeholders of the NASSD as well as experts in the relevant field of knowledge.

The papers follow a similar format: analysis of the current situation; issues; past and present initiatives in the sectors and thematic areas along with the lessons learnt; stakeholders; and recommended policy and action measures. The authors have also addressed cross-sectoral linkages and environmental concerns for the sake of more integration in planning for sustainable development.

There were constraints to developing these Background Papers and in some cases these hurdles were only partially overcome. These included the fragmented and scattered nature of information, the prevalent culture of not sharing information, contradictory and unreliable data, lack of thinking on cross-sectoral linkages and integrated planning, and lack of expertise in developing linkages with the environment.

Parts of the information of the papers were then incorporated into the State of the Environment and Development (SoED) and the main strategy, i.e., NASSD. However, since the Papers contain a wealth of extremely useful information, a decision was taken to produce a series of NASSD Background Papers.

Considering the need and importance of timely sharing information with the stakeholders, these papers are being produced without extensive editing. The authors have sole responsibility for the views expressed and data presented.

EXECUTIVE SUMMARY

The Northern Areas of Pakistan are facing a number of social, economical, environmental and natural resource management problems, because of its peculiar location and isolation from rest of the country. These problems are increasing steadily with the passage of time due to lack of financial and human resources and more importantly due to lack of any sectoral strategies and interest. Despite the initiatives taken by the NA Administration to address these issues there still remains a dire need for a strategic framework to prioritise and guide activities, promote cross-sectoral co-ordination and ensure the incorporation of environmental considerations into the development process.

The NACS Support Project intends to provide a strategic framework in the form of the Northern Areas Strategy for Sustainable Development (NASSD). In this connection NASSD has prepared background papers on various sectors identified and prioritised during the public consultation process of the project. The background papers contain current status, issues and trends, and recommendations for the specific sector. The process-oriented development of background papers ensures greater participation of stakeholders through extensive consultation.

"Environmental health'" would supply baseline information for state on the environment report as well as health of the Northern Areas and would be helpful to formulate strategic guidelines for each sector to incorporate in future development projects. In the report general information regarding demography, scope and environment at global, national and regional level has been discussed. Further more, prevailing socio-economic conditions and status of health of NA is also discussed, due to its paramount role in development.

During consultations and literature review, the issues raised were related to basic provision of infrastructure of health service therefore in this report an effort is made to provide the current status of health service. Environmental issues like drinking water, solid waste, hospital waste sanitation and food safety have been discussed. Current capacity and role of various government departments have also been discussed being a vital counter part of development.

Main issues related to service utilities and institutional strengths have been discussed. Major issues came up during public consultations, meeting with relevant stakeholders include lack of financial and human resources (both skilled and un-skilled), lack of co-ordination among various stakeholders in the development sectors vis-à-vis political influences and ambiguous roles and responsibilities that often led to unsatisfactory utility services.

What could be the impacts of environmental degradation have been discussed. It is obvious that absence of an appropriate sanitation system and unavailability of safe drinking water is associated with health, therefore health problems related to water

and sanitation have been discussed, data at national and regional level have also been presented for future considerations.

1. INTRODUCTION

1.1. Demographic Characteristics of NA

The Northern Areas of Pakistan are located between 35-37° N and 72-75° E. The majority of the area is mountainous and covers over 72,500 square kilometres with a population of 870,347 in 650 villages scattered all over the area. . The area is mostly covered by The Himalayas, the Karakoram, Pamirs, and the Hindu Kush. K-2, Nanga Parbat, Gashbrum-1, 2, Broad peak, and numerous world ranking peaks majestically stand above the heights. Outside the Arctic World's largest glacier, Siachin, is located here. Also the highest battle ground in the world being manned by the soldiers in temperatures close to minus fifty. It also houses in its folds mammoth glaciers like, Batura, Baltoro, Biafo etc. Mighty Indus flows out of these to irrigate the entire country" (Khan, 2001). KKH is the main communication link, joins China with Pakistan and also connects Northern Areas with the rest of the country.

NA physical and cultural diversity is unmatched in its serene beauty and majestic grandeur. In many parts of the region, economic development is most active in marginal zones, putting enormous pressures on ecosystems. Problems include widespread poverty; declining agricultural productivity from over-harvesting, and loss of habitat; increasing environmental damage through development, land reclamation, and pollution Human settlements are on alluvial fans and terraces from 4000 ft to 11500-ft elevation on either side of the Indus and its tributaries where water is available for agriculture. Population density is of 14 person/km2. Roughly 0.86 per cent area is under agriculture, double of this is arable, 4.0 per cent under forest and rangelands, glaciers and mountains cover the rest. Small land holdings (2-4 kanals) and existence of 75 per cent agricultural land in single cropped area and 25 per cent in double-cropped area in the arid mountains confine the production below subsistence level. Agriculture is irrigated owing to scanty precipitation and subsequent aridity all over the mountain region. Land holdings in the Northern Areas are small, reported to be below one hectare. People of the area live a very hard life.

The mountain ecosystems tend to be relatively unstable, un-resilient, and of low inherent productivity. The area is also subject to sudden mudslides and rock falls which frequently block roads and irrigation channels. Within this fragile environment there are a variety of ecological niches upon which people base their livelihoods. These include old river terraces and fans on valley floors where sparse soils have accumulated. These terraces lie between unstable screen slopes on valley side, and high elevation forests and alpine meadows on the other. Surface water supplies are available from seasonal river flow, springs, glacial streams and seasonal snowmelt. Meadows and forests exist where snowfall, shade and terrain allow soil to retain some moisture, but the cultivated lands lower down depended on irrigation with water derived from melting glacial ice, snow and springs. Agriculture is therefore constrained by scarcity of land and water, but where these limitations can be overcome, pockets of high agricultural productivity are found.

Rivers and streams fed by springs are the most dependable sources of water for irrigation Soils are relatively low in organic matter, very free draining, contain virtually no clay, and have low natural fertility. As a result, water and nutrient retention is very poor. The amount of farmyard manure available is limited.

1.1.1. Population Demographic Change and Migration

According to the 1998 census the total populating of the six districts in Northern Areas was 783,103 of which 368,969 were women and 414,135 were men. Annual growth rate is 3. The relatively high rate of population growth is due to high level of fertility combined with the relatively high but decreasing mortality specially children under 5. The demographic pyramid is broad based which indicates that the population of the region will continue to grow at a high rate for a considerable time even if fertility declines. The under 5 population constitutes 10 to 16% of the population. The average household size is 09 for the Northern Areas.

1.1.2. Urban Management

During the last several decades, migration has occurred from rural to urban areas. The chief factors responsible for this migration are: slow progress in the agriculture sector, low crop yields, lack of alternate employment opportunities and environmental degradation due to water logging / salinity, deforestation and desertification. The large rural influx has, in turn, contributed to the overburdening of urban infrastructure and urban services. There has not only been a rapid decline in the quality and availability of basic urban resources and amenities, such as housing, potable water, transportation, electricity, gas, drainage and sewage but also mushrooming of katchi abadis (squatter settlements), often located on the most marginal land. Squatter settlements account for about 25 to 30% of urban population. The municipal institutions do not have sufficient resources and technical capacity to accommodate the needs of increasing urban population. Municipal administrations for improving health, sanitation, education, shelter, employment and income generation of the poor.

The natural resources are pressurized in the villages, which has led to socio-economic differentiation. An other factor in the level of differentiation is the degree to which a valley or villages link to the outside world by road and has access to irrigation and electricity.

In the wake of the growing population and increasing economic activity, the level of contamination is growing at rapid pace in the northern areas. Their adverse impact cannot be registered unless a baseline data exists. Although use of economic environmental and social indicators such as literacy rate, unemployment, health care and availability of water supply and sanitation is common in the 5-year development plan, the concept of indicators should be incorporated in the environmental health strategy.

1.2. People of Northern Areas

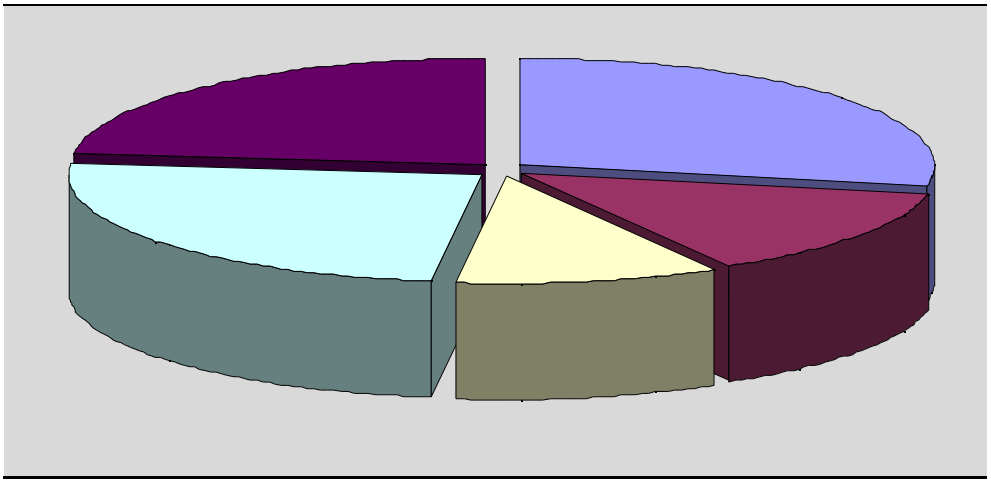
Human population in the northern areas is concentrated in the valleys although pastures in the upland regions are used in the summer months. The region has a rich mix of people, who are diverse in culture and languages. Major ethnic

groups are the Shins, Yakhuns, Balti and Pathans. Minority groups are Kalash, Dom, and Gujar. The major sects of Islam – Shia, Sunni and Ismailis are equally represented.

According to the 1998 census the total population of the five districts in Northern Areas was 783,103 of which 368,969 were women and 414,135 were men. Annual growth rate is 3 as compared to the national rate of 2.8%. The relatively high rate of population growth is due to high level of fertility combined with the relatively high but decreasing mortality specially children under 5. The demographic pyramid is broad based which indicates that the population of the region will continue to grow at a high rate for a considerable time even if fertility declines. The under 5 population constitutes 10 to 16% of the population.

The average household size is 9 for the Northern Areas. Per capita income varies, ranging from Rs. 4,000-6,000 (Malik, D. 1996) agriculture and livestock production provide the main source of livelihood., accounting for 60% of the income Remittances from migrant labourers account for 15% of the net income. A roughly equal proportion of income is derived from the small enterprises small roadside shops , hotels , and tourist outfits.

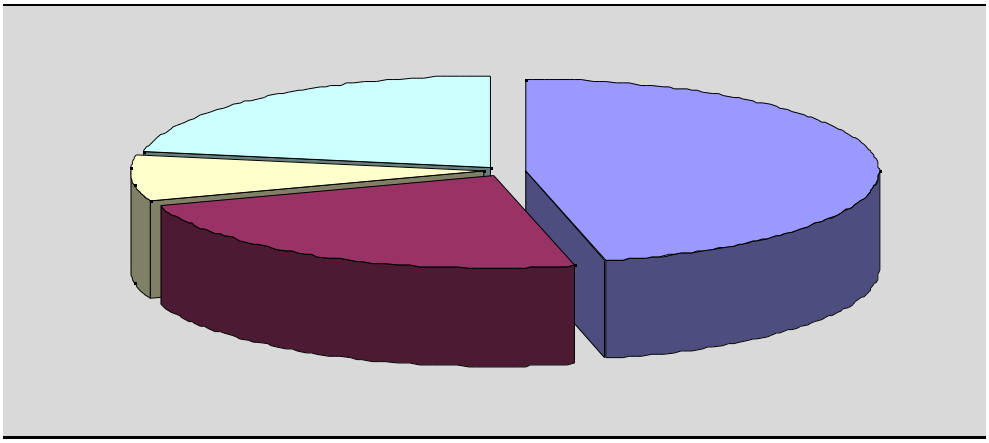
During the last several decades, migration has occurred from rural to urban areas. The chief factors responsible for this migration are: slow progress in the agriculture sector, low crop yields, lack of alternate employment opportunities and environmental degradation due to water logging / salinity, deforestation and desertification. The large rural influx has, in turn, contributed to the overburdening of urban infrastructure and urban services. In urban areas, health problems are closely associated with pollution and degraded environment. For example, Gilgit, the administrative headquarter of NA, is faced with massive air pollution partly due to road building and other construction. During public consultations, women cited an increase in the incidence of respiratory problems and diseases such as skin allergies. These health issues are affecting both genders but pregnant women and young children are more prone to fall prey to these illnesses. Pollution due to improper waste disposal along riverbanks, improperly managed slaughterhouses, clotted sewerage systems, and hospital disposal is causing serious health problems and ecological disintegration. Although, medical facilities have become more available due to government's and NGOs' interventions, health related expenses



still pose stress on family's income and women recognise this as an important reason for environmental conservation and pollution control.

In contrast, the rural women cited unavailability of health facilities as a major issue for them. Although, civil society and government interventions have achieved a marked increase in health facilities, remoteness of areas and difficult terrain still derive local women to rely upon traditional practices for pre-natal and post-natal health. Awareness about health and hygiene is still under achieved among remote communities and therefore is a strong focus of interventions by authorities and projects.

There has not only been a rapid decline in the quality and availability of basic urban resources and amenities, such as housing, potable water, transportation, electricity, gas, drainage and sewage but also mushrooming of katchi abadis (squatter settlements), often located on the most marginal land. Squatter settlements account for about 25 to 30% of urban population. The municipal institutions do not have sufficient resources and technical capacity to improve health, sanitation, education, shelter, employment and income generation of the poor.



The natural resources are pressurized in the villages, which has led to socio-economic differentiation. An other factor in the level of differentiation is the degree to which a valley or villages link to the outside world by road and has access to irrigation and electricity.

In the wake of the growing population and increasing economic activity, the level of contamination is growing at rapid pace in the northern areas.

The only expenditure that poor people incur on health is on the purchase of pharmaceutical or secondary health care. Although the govt health facilities are free, the lack of drugs and services is poor. The female staff is very short which is a major constraint to the women clients. However, LHWs and LHVs are now making a difference. The deliveries are mostly carried by local midwives who are un-hygienic and is one of the reason of MMR (500 to 800). The govt. services for out reach patients are very poor.

Very high female mortality has led to an abnormally low female to male sex ratio C933 and 904 women per 1,000 men respectively in 1981. In urban areas, health

problems are closely associated with pollution and degraded environment. For example, Gilgit, the administrative headquarter of NA, is faced with massive air pollution partly due to road building and other construction. During public consultations, women cited an increase in the incidence of respiratory problems and diseases such as skin allergies. These health issues are affecting both genders but pregnant women and young children are more prone to fall prey to these illnesses. Pollution due to improper waste disposal along riverbanks, improperly managed slaughterhouses, clotted sewerage systems, and hospital disposal is causing serious health problems and ecological disintegration. Although, medical facilities have become more available due to government's and NGOs' interventions, health related expenses still pose stress on family's income and women recognise this as an important reason for environmental conservation and pollution control.

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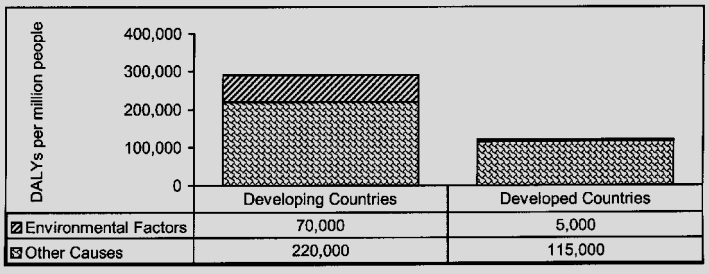
2. ENVIRONMENT AND HEALTH

The environment in its broader sense covers all natural, physical, chemical and human resources. The human environment is usually defined by ecologists as the conditions and processes affecting the life and the development of human beings. The environment is affected in several different ways-beneficial and harmful, desirable and unwanted-by the development process and many of these effects have important health implications. Changes in health conditions directly affect development prospects and the chances for eradicating poverty. Environmental change can dramatically improve urban health, as in European cities in the 19th century, when piped water and treated sewerage eliminated the threat of cholera.

Burden of disease and environmental risks



Source: Lvovsky and others 1999.

Environmental conditions help determine whether people are healthy or not, and how long they live. They can affect reproductive health and choices, and they can help determine prospects for social cohesion and economic growth, with further effects on health. Changes in the environment pollution and degradation, climate change, extremes of weather also change prospects for health and development.

Environmental conditions contribute significantly to communicable diseases, which account for about 20-25 per cent of deaths annually. The illnesses most closely related to environmental conditions infectious and parasitic diseases and respiratory infections and diseases endanger development prospects, particularly in poor.

A myriad of definition of environmental health exist; In its broadest sense it is concerned with understanding, assessing and controlling the impact of people on the environment and the impact of environment on them (Moeller 1997)

Environmental health relates to human activity or environmental factors that have the potential to increase human disease, injury, and death, especially among vulnerable groups, mainly the poor, women, and children under five.

Environmental health aims to prevent health risks through control of human exposure to:

- biological agents, such as bacteria, viruses, and parasites;
- chemical agents, such as heavy metals, particulate matter, pesticides, and fertilizers;
- disease vectors, such as mosquitoes and snails; and

- physical and safety hazards, such as traffic accidents, fire, extremes of heat and cold, noise, and radiation. Human exposure pathways are air, water, land, and food.

Environmental health strives to consider individual problems in as broad a context as possible from which to set policies and develop reasonably practicable and cost-effective preventive remedial measures. The broad context should include the driving socio-economic determinants leading to physical and mental stress, such as:

- Population movements (population growth, rural-to-urban migration, resettlement, and so forth)
- General lack of access to basic services (transport, water, sanitation, energy)
- Inordinate time spent compensating for lack of basic services (hours devoted to fetching water and household fuels or to getting to school, work, or health services).

Environmental health preventive remedial measures complement health care system interventions to optimise health benefits. The broad context also allows for more efficient cross-sectoral intervention.

Unclean water and associated poor sanitation kill over 12 million people each year. Air pollution kills nearly 3 million more. It has been estimated that roughly 60 per cent of the global burden of disease from acute respiratory infections, 90 per cent from diarrhoeal disease, 50 per cent from chronic respiratory conditions could be avoided by simple environmental interventions.

2.1. Health Indicators of Northern Areas

The information given is on an aggregate basis for all Northern Areas, which have diverse ethnic and cultural norms and consequently understandable variation in health parameters in different regions. The districts of Ghizar and Gilgit have strong presence of an NGO, Aga Khan Health Services – and its positive contribution is reflected in better health indices of these districts. Chilas, sub division of the district of Diamir has characteristics of a tribal society and possess all the attributes that distinguish such a society. The Health care provision in the Northern Areas is the responsibility of the Government. But the service provision is poor as the doctors are not available and there are no drugs.

Table 1: Vital Statistics

Statistics	Northern Areas	National
Crude Birth Rate (CBR)	24/1,000 live births	86/1000 live births
Crude Death Rate (CDR)	3/1,000 live birth	8.7/1000 live births
Infant Mortality Rate (IMR)	27/1,000 live births	137/1000 live births
Maternal Mortality Rate (MMR)	59/100,000 live births	300/100,000 births

Source: MIS, AKESP, and Gilgit

2.1.1. Primary Health Care Indicators: Baseline Health Survey (1999)

The health status of the people in the Northern Areas is generally poor as compared to the rest of the country. The terrain is hilly and population is concentrated in

valleys, therefore the health centres are few and far off and are not well stocked with drugs.

The worst sufferers in the population are the women, who have poor nutritional status; and are exposed to indoor air pollution right from the birth. Early marriage, frequent childbirths in the women lead to deteriorating health. Due to lack of awareness sanitation and hygiene is not practiced. Fetching water and gathering fuel wood is a woman's job. There is a considerable drain on the women' energy and the same work when carried out during pregnancy and lactation, leads to poor nutritional status. 81% of the deliveries are carried out at home by untrained formal birth attendants (Dais) The tetanus immunization rate, in the pregnant females has improved and is 51% due to the rigorous campaign of the public sector and the door to door provision of primary health care by the lady health workers.

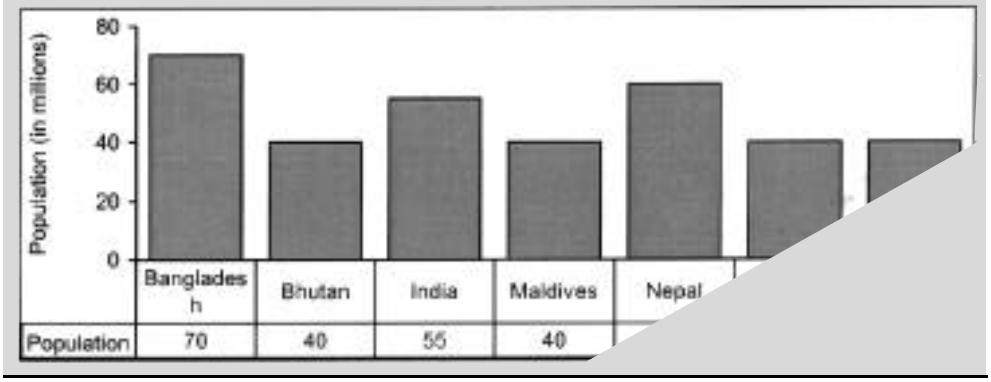
Table 2: WHO Basic Health Indicators for Pakistan (1994-97)	
Life expectancy at birth - Both sexes	63.0
Life expectancy at birth - Male	62.0
Life expectancy at birth - Female	64.0
Infant mortality rate - Both sexes	86.0
Annual population growth rate (%)	2.8
Total fertility rate	5.7
Crude birth rate	34.0
Crude death rate	8.7
GNPper capita (US$)	470
Adult literacy rate (both sexes)	39.0
Adult literacy rate (male)	51.0
Adult literacy rate (female)	26.0
% of newborns weighing at least 2500g at birth	75.0
% of population with safe drinking-water available - Total	62.0
% of population with safe drinking-water available - urban	85.0
% of population with safe drinking-water available - rural	56.0
% of population with adequate excreta-disposal facilities - Total	39.0
% of population with adequate excreta-disposal facilities - urban	75.0
% of population with adequate excreta-disposal facilities - rural	24.0
Total government health expenditure as a % of GNP	2.4
Total government health expenditure per capita (US$)	11.0
% of pregnant women attended by trained personnel during pregnancy	27.0
% of deliveries attended by trained personnel	35.0
% of women of childbearing age using family planning	22.0
Maternal mortality rate (per 100 000 live births)	300

The prevalence of anaemia in women is 24% as in the rest of the country and the Asian women in general. The women take poor quality food, as they are the last ones to eat, after serving the men and children. The Gender biased norms of the Eastern Society prevail in the Northern Areas as well. The Daughter in law is the last one to be given the food and she is the one who needs the most nutritious diet.

2.1.1.1. Nutrition

The data on this topic is scarce. According to two main surveys conducted in 1993, Anaemia is common in women due to frequent child births, lack of iodine is also a problem. The causes of mal-nutrition in the region include lack of knowledge about what food to take and availability of foods that may be seasonal or gender related. A survey conducted in 1993 by AKHSP and FAO shows that the average age of giving birth is 16.3 years. 39.2% of females give birth between 14 and 16. 74.7% of mothers don't eat any special food during pregnancy and lactation.

Child Malnutrition in South Asia



The major nutritional deficiency diseases are protein-energy malnutrition (PEM), iron deficiency anaemia, iodine deficiency disorders (IDDs), and Vitamin A deficiency. All four show gender differentials in prevalence and severity, with three of the four representing a more serious problem for women than men: the prevalence of PEM is significantly higher among women in; both iron deficiency anaemia and goitre are more prevalent among adult women than men, although vitamin A deficiency appears to be more prevalent among boys than girls.

Women generally consume only about two-thirds of the WHO recommended daily allowance for energy. Other studies have established that the energy-intakes of pregnant and lactating women only marginally exceed those of non-pregnant, non-lactating women. The long-term negative reproductive consequences of childhood PEM are fairly widely accepted. It is well established that stunted women are at higher risk of obstructed labour, itself a major cause of maternal mortality.

Iron deficiency anaemia is the most widespread nutritional problem among women, and has severe consequences for both their reproductive and productive roles. Maternal mortality rates are significantly higher among anaemic women, as are pre-maturity and infant mortality rates. Although there is limited direct evidence concerning the effect of anaemia on women's physical work capacity, research on men shows a clear association between iron deficiency anaemia and reduced work capacity.

Because low-income, rural women experience the highest rates of iron deficiency anaemia, and also some of the most physically demanding work responsibilities (including weeding, threshing, pounding, fetching fuel and hauling water), it is probable that anaemia among women accounts for a significant loss of productivity, and therefore of family welfare.

Iodine deficiency disorders are of particular concern since they can result in severe negative reproductive outcomes for both mothers and infants. Evidence from 19 studies shows that prevalence of goitre appears to be higher among women, with the gender differential first appearing in adolescence and becoming much more pronounced among adults.

Low food intake during pregnancy is common. Studies have shown that women consume little or no extra food during pregnancy, and may even consciously limit their intake for fear of large foetuses and difficult labour. Food taboos not only deprive women of protein and iron sources, but also reduce calorie intake. Very high female mortality has led to an abnormally low female to male sex ratio C933 and 904 women per 1,000 men respectively in 1981.

The other cause of iron deficiency anaemia is the prevalence of worm infestation not only in women but also in men and children. As water is scarce in summers and more so in winters, general hygiene is poor, hand to mouth behaviours of children and proximity of animals and their faeces promotes worm infestation. The women while working in the fields often have the children at their back or playing in one corner. They manure used is a mix of dried excrement of the household and the farm animals, heavily polluted with the micro organisms and eggs of the worms passed out by the infested animals. Unless washed properly with running water and soap, these germs are easily transmitted to the children and the household food.

The inherent deficiency of iodine in the water and food had led to a very high rate of goitre. According to a Baseline survey done in 1999, for the northern Areas Health Project, the prevalence of goitre is 22% in children 6-11 of age.

The Aga Khan Health Services (AKHS) is rendering considerable services in the provision of primary health care. They aim the services at the women and children: most vulnerable sections of the household. The interventions have reduced the IMR and MMR in the Northern Areas as compared to the national figures. In AKRSP intervention area , the IMR has been reduced from 150/1000 live births to 50/1000 live births. Maternal mortality has been reduced from 550/100,000 to 300/100,000 where there is a referral facilty.17% pregnant women received immunization against tetanus in 1986. In 1996 this coverage has risen to 84%. The immunization of less than one year children is more than 80%.

The program of AKHS are rooted in the community. The supervising Health board is selected on honorary basis by the community, for 3 years. The community health worker CHW, and trained birth attendant TBA are trained by the Lady Health Workers on ongoing basis. The LHV role is important as they remain in the health centres to provide out patient care and for the rest they serve in the community for antenatal care, immunization and health education. The deliveries are mostly carried by local mid-wives who are un-hygienic and is one of the reason of MMR (500 to 800). The govt. services for out reach patients are very poor.

Very high female mortality has led to an abnormally low female to male sex ratio C933 and 904 women per 1,000 men respectively in 1981.

2.1.2. Women's Health

Mothers received antenatal care (ANC) during last pregnancy	51%
ANC by Hospital/Health Centre/Clinic	85%
TT vaccination during last pregnancy (2 or more doses)	48%
Place of delivery	
Home	81%
Health facility	18%
Assistance during delivery:	
Doctor / LHV / Nurse	21%
Trained Birth Attendant	18%
Traditional	59%
Anaemia in pregnant women (<10 G/dl)	24%
Contraceptive Prevalence Rate	20%
Children below 5 years	
Children <05 fully immunized	55%
Children fully immunized	41%
Prevalence of diarrhoea	42%
Prevalence of pneumonia	23%

2.1.2.1. Prevalence of Goitre

Goitre means thyroid gland enlarged more than normal. It indicates (generally) that the body has been trying to compensate for lack of iodine. The prevalence of goitre in children age 6 – 11 years reflects the current status of IDD (Iodine Deficiency Syndrome) in the general population. Thyroid enlargement is now recommended to be assessed on a simplified system of three grades as follows:

2.1.2.1.1. Goitre among children 6 – 11 years

Grade I Goitre was identified as palpable, but visually not perceptible - prevalence16%.

Grade II was palpable as well as visible- prevalence 6%(. (Northern Areas Health Survey 1999). (Northern Areas Health Survey 1999). Table 3 gives district wise prevalence of goitre in children between 6-11 years by grade. The prevalence – grade 1 + 2 – of goitre on an aggregate basis is twenty two (22) percent. There are inter district variations.

Table 3: Prevalence of Goitre among Children 6-11 years by Degree (in %)

Goitre Grade	Ghizar	Gilgit	Diamir	Skardu	Ghanche	NA
Grade 0	97.1	89.8	87.8	60.0	37.7	77.8
Grade 1	2.9	8.7	12.2	29.5	39.8	16.4
Grade 2	0.0	1.5	0.0	10.5	22.5	5.8

2.2. Environmental Status of the Northern Areas

Environmental deterioration is significant in the Northern Areas region for essentially two reasons. First, it rapidly becomes a serious life threat to the most

vulnerable groups and individuals and, second, resources for corrective actions are scarcer. Low educational level, chronic and seasonal malnutrition, high levels of morbidity and mortality in all age groups and particularly in children, and low agricultural productivity add to pronounce these effects. The quality of the environment is of fundamental importance for these people and the future development of their health situation.

2.2.1. Indoor Pollution

70-80% households in Northern Areas use biomass fuels (wood, dung, and crop residues) for cooking and heating. This fuel is typically used in open fires or simple stoves, mostly indoors, and rarely with adequate ventilation. The Bukhari is the stove used in the centre of the kitchen cum living room, where, all the family sits and at night sleeps. The cattle shed is just next-door to keep them warm. This situation leads to some of the highest ever recorded levels of air pollution, to which young children and women are exposed daily for many hours. (Indoor exposure causes half a million premature deaths every year globally).

According to the World Health Organization, indoor air pollution due to biomass smoke is one of the largest environmental risk factors for ill-health which needs attention. Indoor air pollution implicated in alarming health problems. Air inside homes gets heavily polluted with smoke that contains large amounts of toxic pollutants such as carbon monoxide, oxides of nitrogen, sulphur dioxide, aldehydes, dioxin, polycyclic aromatic hydrocarbons and respirable particulate matter. The resulting human exposures exceed recommended World Health Organization levels by factors of 10, 20 or more.

Prolonged exposure to biomass smoke is a significant cause of health problems such as;

- Acute respiratory infections (ARI) in children;
- Chronic obstructive lung diseases (such as asthma and chronic bronchitis);
- Lung cancer
- Pregnancy-related problems

Some key findings are presented below:

Exposure to biomass smoke increases the risk of acute respiratory infection (chest infections, coughs, colds and middle-ear infections) in children less than five years of age. Children on their mothers' backs as they cook over smoky stoves are six times more likely to develop ARI than unexposed children. In Nepal, the incidence of moderate and severe cases among 2-year-olds increased as they spent greater number of hours near the fire. A study in Tanzania found that children younger than five years who died of ARI were almost three times more likely to be sleeping in a room with an open cook stove than healthy children in the same age group.

Source: Sumeet Saxena, Tata Energy Research Institute.

The issue of indoor pollution has not been studied in detail in Pakistan; therefore, data taken from a neighbouring country has been utilized. Studies conducted as early as the 1980s in India found a higher occurrence of chronic bronchitis in women exposed to biomass stoves. Non-smoking women who have cooked on biomass stoves for many years exhibit a higher prevalence of chronic lung disease (asthma and chronic bronchitis). In Mexico, women exposed to wood smoke for

many years faced 75 times more risk of acquiring chronic lung disease, about the level of risk that heavy cigarette smoker's face. It is estimated that about 86% of the energy in NA is sourced from fuelwood while the remaining is generated from other sources.

In women exposed to coal smoke in homes, the risk of lung cancer is high. One study in western India found a 50 per cent increase in stillbirths in women exposed to indoor smoke during pregnancy. Considerable amounts of carbon monoxide have been detected in the bloodstream of women cooking with biomass in India and Guatemala.

Indoor air pollution is associated with blindness and changes in the immune system. 18 per cent of blindness in India is attributed to the use of biomass fuels. Further, a 1995 study in Eastern India found the immune system of newborns to be depressed due to the presence of indoor air pollution.

Interventions for reducing exposure to indoor air pollution are:

- Technical interventions
- Smoke removal - Flues attached to stoves, hoods and chimneys to remove smoke. Other stove improvements, which reduce emissions, through better combustion and more efficient heat transfer.
- Stoves with longer life-span.
- Housing design - Changes to kitchen design to increase ventilation and control the distribution of pollution.
- Fuels - Methods of cleaning existing fuels, for example bio-gas and other "clean" bio-mass products, or promoting fuel-switching to alternatives such as kerosene or LPG.
- Behavioural interventions - Promoting awareness of long-term health effects on the part of users. This may lead to people finding ways of minimizing exposure through better kitchen management and infant protection
- Policy level interventions - Local micro credit facilities for the upfront costs of switching to gaseous fuels, examination of targeted (as opposed to across-the-board) subsidies to enable low-income households to switch, income generation opportunities.
- Training - to develop skills and expertise for stove development, improved housing design, and better education about health risks.

2.2.2. Outdoor Air

Ambient Air Monitoring is undertaken to assess the quality of outdoor air for its suitability to human health and the environment. This includes measuring different air parameters such as levels of Sulphur dioxide (SO2), Nitrogen oxides (NOx), Carbon dioxide (CO2), Carbon monoxide (CO), Particulate Matter (PM) and toxic metals.

Since Pakistan does not have any Ambient Air Monitoring Standards of its own, the World Health Organisation (WHO), the World Bank (WB) and United States National Ambient Air Quality Standards (USNAAQS) are followed.

Table 4: Estimated Air Pollutants by Sector									
Sector	1977-78			1987-88			1997-98		
	CO_2	SO_2	NO_X	CO_2	SO_2	NO_X	CO_2	SO_2	NO_X
Industry	12,308	19	NA	26,680	423	NA	53,429	982	NA
Transport	7,068	52	NA	10,254	57	NA	18,982	105	NA
Power	3,640	4	3	11,216	95	10	53,062	996	76
Domestic	16,601	5	NA	24,054	16	NA	39,980	40	NA
Agriculture	845	5	NA	4,490	28	NA	6,368	40	NA
Commercial	1,726	11	NA	2,587	13	NA	4,261	25	NA

2.2.3. Vehicular Pollution

Pakistan imports almost 3.8 million tons of oil per annum at a cost of about US $ 581 million. These oil imports are further increasing proportionally to the ever-rising human and vehicular population and contributing to air pollution. Owing to the high proportion of old and poorly tuned engines and the dependence on buses and light commercial vehicles in metropolitan areas, air pollution along busy roads is increasing.

Air pollution is caused by suspended particulate matter, sulphur dioxide, carbon monoxide, nitrous oxides and lead. Motor vehicles account for 90% of the total emissions of hydrocarbons, aldehydes and carbon monoxide in cities, and for 75% of all sulphur dioxide and nitrogen oxides. The suspended particulates in air cause lung irritation, sinus problems, bronchitis and asthma, whereas lead emitted by gasoline vehicles causes liver dysfunction and impairment of mental health. A recent study conducted by the Aga Khan Medical University concluded that 80% of the sampled children in Karachi had less than normal IQ level. The main objective of the initiatives under this component is to help in minimization of pollution caused by automobile emissions.

2.2.4. Recommendations for Ambient Air Quality

Although the ambient air situation in NAis not alarming but certain measures still need to be taken to ensure that the situation does not worsen with time. Some recommendations are as follows:

- Improve the distribution of LPG in the NA. With the commissioning of the PARCO oil refinery, there is an excess of LPG in Pakistan. This excess is currently being exported. Instead of exporting it, it would be quite better if LPG is marketed in far-flung areas at lower prices. This would result in less fuel wood burning and would relieve pressure on natural resources.
- Promote engine tuning which is currently not practiced regularly. This would result in better combustion and thus less emission of CO, NOx and particulate matter. Awareness-raising campaigns should be initiated to educate the general public.
- Leaded fuel use should be discouraged in the NA. This would result in lessening the concentration of lead in ambient air and thus help improve the health of the general public.
- Efforts should be made to check fuel adulteration, which results in inefficient combustion and thus more emissions. Strict penalties should be imposed on those found guilty.

- The NA Government should lobby with the Federal Government to import or produce low sulphur diesel. The diesel used in Pakistan has 1% sulphur, which is considerably higher than other countries in the region. Most of the vehicles in the NA are run on diesel, which is the major source of SO_2 in NA.
- Strict control should be enforced on transport buses and other vehicles travelling to the NA. If a vehicle is found emitting excessive black smoke from its exhaust pipe, proper measures should be taken so that it does not happen in future.
- Traffic police should be provided with protective masks to ensure they do not inhale excessive amounts of toxic gases. Regular health checks should be conducted of the traffic police persons.
- Indiscriminate burning of solid waste should be strongly discouraged. Efforts should be made by the Municipal Committees to collect most of the waste generated and dispose it according to internationally acceptable procedures. Solid Waste Management Plans should be developed for all cities.
- Poor quality coal should not be used for domestic purposes. If used, proper measures should be taken to ensure proper burning and ventilation.
- Proper equipment to monitor vehicular emissions should be procured. Assistance in this regard should be sought from ENERCON and the Pak-EPA, who have extensive experience in vehicular emissions monitoring.
- Annual ambient air monitoring should be conducted to be aware of the levels of toxic gases and other pollutants in the air. SUPARCO's assistance may be sought in this regard.
- Awareness-raising campaigns should be started for the government staff and the general public on the hazards of air pollution and what measures need to be taken to reduce it. This may be done through media campaigns, seminars, workshops and posting banners at different locations in key cities.

2.2.5. Solid Waste Management

Municipal Corporation is extremely short of manpower, and indispensable equipment such as collection vehicles. Lack of monetary assets, the existing infrastructure cannot be maintained, skilled professionals cannot be hired, and equipment and other necessary procurements cannot be made.

Co-ordination between the institutions that could play a role in SWM is unsatisfactory. There is plenty of room for cooperation between the Municipal Corporation, the newly established Environment Directorate within P&DD, NA Chamber of Commerce, Anuuman-e-Tajiraan, medical facilities, the Department of Industries and Directorate of Health. This results in overlaps and wastage of pecuniary and human resources.

Gilgit is the largest city of NA and faces more severe solid waste related problems than other cities. Very little flat land is available, making SWM a challenge for the Municipal Corporation. A strategy is proposed to tackle this growing problem with emphasis on institutional strengthening of the line departments, making SWM financially sustainable and raising awareness among the general public, so that they can assist the Municipal Corporation. A detailed separate strategy each for municipal waste, hospital waste and slaughterhouse is desirable.

At present the Municipal Corporation has active interaction with the NAPWD since some of its key duties are being undertaken by the NAPWD. However, the

interaction needs to be further improved. This can be done through joint planning since there are areas where both can effectively collaborate with each other. The Municipal Corporation may require NAPWD's assistance in implementing the SWM plan. If Municipal Corporation is to continue the collaboration with NAPWD, it is important that the NAPWD be strengthened. Creating a separate cell within the NAPWD with an environment mandate can do this. The cell should ensure that all the projects the NAPWD undertakes are environment friendly. All the projects should first go to the Environment Cell, which vets the project for environmental concerns.

2.2.5.1. Hospital Waste

The health care waste is a public health issue as risk waste if not properly managed and disposed of can result in injury by contaminated sharps and infection with Hepatitis 'B', 'C' and AIDS. Almost 20 – 30% of Hepatitis 'B' cases are occurring due to use of contaminated syringes. The scavenging being carried out on the hospital waste management is a public health risk. Waste management is now being brought under legal cover as health waste management guidelines and the Environmental Health Unit has developed rules, Federal Government and they will be enacted after approval from Chief Executive. Accordingly the management consists of segregation of risk waste from non-risk waste at the point of generation, transportation, collection and disposal in engineered land fill or incinerator. The hospitals have to establish the hospital waste management in their day-to-day operations.

2.2.5.2. Municipal Solid Waste Management

Solid waste management systems only exists in large urban settlements like district head quarters, though the service level is not satisfactory due to many reasons mentioned in previous chapters. According of IUCNP survey at moment only in Gilgit town 25 tones of solid waste is generated per-day. Following criteria is proposed for designing of municipal solid waste management:

- Awareness raising campaigns utilizing 3 R strategy , reuse, reduce and recycle
- Community based pilot projects to find-out a practical, self-sustainable, and environment friendly, and practical approach
- Identification of type of MSW its categories and opportunities for reuse, recycling and dispose of materials
- Capacity building of staff handling MSW
- Opportunities for involvement of private sector related to health, Automobile, wood for on site disposal of infections/radioactive material..
- Legislation regarding MSW generation and handling may be prepared with close consultation of health, NAPWD, Municipalities and public.
- Identification of suitable sites for disposal of MSW
- Motivation of health department to establish incinerators for disposal of infectious material
- Execution and construction of landfills sites/ incinerators for MSW disposal

2.2.6. Provision of Safe Drinking Water

Water for people is needed for drinking and other domestic uses including sanitation. Out of the total domestic water use the drinking water is most important, as quality concerns are serious.

2.2.6.1. Domestic Water Supply

Presently, in Pakistan only 80% of the urban population has access to the piped water supply, whereas 11% of rural population is benefiting from this facility (GWP 2000). The situation is not better in the Northern Areas as the coverage of piped water supply claimed is only 40% but in reality it might be less than half. However, these systems are becoming more common in the Northern Areas as most settlements are established on slopes and thus the piped water supply systems can be operated by gravity. The observations indicated that many of the systems are either completely out of order or need some sort of rehabilitation (WSHHSP 1996).

The water supply systems in the urban centres of the Northern Areas are based primarily on the utilisation of surface waters. Groundwater use for domestic water supply is not common except in the low lying settlements in Gilgit town and a few riverside villages in Skardu and Chitral, where people draw water from shallow wells.

Water sources are contaminated with human and animal wastes. The contamination levels in the delivery systems are comparatively lower during the winter season but higher in household water storage pits. (WSHHSP 1996)

Table 5: Micro-biological Quality of Drinking Water in Water Delivery Systems of the Northern Areas

Category (E. coli per 100 ml)	In Percent of Samples Collected	
	Before Intervention	After Intervention
0	11	65
1-10	5	17
11-100	18	16
101-1000	48	2
>1000	18	0

Water quality at the source of the system is better but the faecal contamination level increases as these water channels enter into the inhabited area. High levels of contamination were observed in samples collected from the tail ends of the delivery system. Spring water was found to be safe compared to other traditional water sources. However, some of the springs were highly contaminated with chemical and biological contaminations (WSHHSP 1996).

The capacity of the Public Health Department and the Water Users' Organisations has to be enhanced for the provision of safe drinking water to urban and rural communities. WASEP has already introduced the tariff collection system in its partner's villages. The introduction of water tariff system would also reduce the quality and demand issues. Rather demand water management will be much easier. The WSHHSP of the AKPBS can provide the technical backstop support in this regard. The following options are attractive for improving quality of drinking water and its availability:

- Improving the conveyance of water in the Kuhl system constructed for supply of water for drinking purposes by avoiding entry of sanitation and agricultural effluents and other wastes;
- Introduction of sand filters to filter sand and silt particles from the Kuhl water and appropriate water treatment to control the biological impurities. Filtering

of water in pipeline systems is much effective and easier compared to surface channels;

- Effective design, construction and monitoring of pipeline water supply systems in the urban areas;
- Introducing water fee for cost recovery to maintain the water supply systems on sustainable basis.

The explosive growth in populations and economies has had the greatest impact on the region's freshwater resources. Freshwater withdrawals increased more in Asia during the past century than in any other part of the world, and these withdrawals have resulted in supply and water quality problems. Lack of an adequate supply of clean water is the most severe environmental problem in many parts of the region, and the lack of clean water impacts human health and slows the development of economies. Water utilisation rates will increase further in many other parts of the region in the next quarter century as populations and economies grow.

During the last several years, Hepatitis-Ais on the rise in major cities, which is mainly due to the mixing of sewage with the drinking water. Likewise, recent studies have revealed the presence of residues of pesticides, nitrates and nitrites in drinking water above the NEQS limits. During 2000, a bone deformity disease appeared in the form of an outbreak in the peripheries of Lahore, which is attributed to the contamination of groundwater by fluorine. These cases warrant regular monitoring of the groundwater quality, especially the drinking water to minimize the health risks.

Source: Main Source of Drinking Water for Rural Households (1998-99)

Table 6: Sources of Drinking Water in Rural Households

Source	Share
Tap	45%
Hand pump	1%
Dug Well	14%
Tube Well	0%
River/Canal/Stream	39%
Others	0%

Source: Social Action Programme, SAPPMid Term Review.

Table 7: Rural Population having Access to Clean Water and Sanitation (1998-99)

Access to Clean Water	46%
Toilets in House/Compounds	60%
Drainage System	2%

Source: Social Action Programme, SAPPMid Term Review.

In Asia's rivers, the median faecal coliform level, an indicator of the health risk from human waste, is three times the world average and 50 times higher than the level recommended by the World Health Organisation (WHO). As a result, one in three Asians have no access to a safe drinking water source (that operates at least part of the day) within 200 meters of the home. Access to safe drinking water is worst in South and Southeast Asia, where almost one in two Asians has no access to sanitation services and only 10 percent of sewage is treated at a primary level (ADB 1997).

Water quality has been steadily fouled by sewage, industrial effluent, urban and agricultural runoff.

2.2.7. Sanitation

The coverage for sanitation in Pakistan is lower than the water supply coverage i.e. 60% and 14% in urban and rural areas, respectively. In most of the cities in Pakistan, the wastewater from the municipal areas as well as the effluent from the industries are disposed of untreated to the natural water bodies (GWP 2000). The situation in Northern Areas is not better than the rest of the country.

In some of the urban centres of the Northern Areas, sewerage system consists of sewage collection and disposal. Sewage is collected through RCC pipes and open drains. The collected sewage is disposed to nearby water bodies through gravity. In areas where sewage collection system is non-existing, sewage is discharged into groundwater through soakage wells, sometimes even without passing through septic tanks. In rural areas the proper collection and disposal system is almost non-existing.

Presently, the treatment of effluent waste in the Northern Areas is almost non-existence on the municipal front. Even in other areas of Pakistan, where such treatment plants have been constructed those are not in operation due to high O&M cost, especially due to the higher energy cost.

2.2.8. Drainage

In almost all urban settlements there is no any proper drainage system exists. Due to lack of any proper drainage systems waste water such surface run off in rainy seasons, grey water from households, and waste water from the fields either directly enter into the fresh water bodies or become stagnant in nearby flat areas causing severe health and aesthetic problems.

The stagnant water sites are could be the potential sites for vector born water related disease like malaria etc. Similarly, absence of any proper drainage systems also effects on the water-table of the area. For instance currently Gilgit town is facing problems of high water-table which is high and creates problems for building and construction projects in the down town areas. Similarly the current drains along roadsides can not capture the storm water in rainy seasons.

In almost all urban settlement in NAare situated at higher elevations ranging form 3000 to 1000 feet above the mean sea level. Each settlement slopes towards nearby rivers or streams. Drainage systems can work to carry storm as well as wastewater that will eventually be converted into separate storm water drainage system with the induction of sewerage system.

2.2.8.1. Sewerage System

Discharging the wastewater from the community as well as commercial areas into the nearby water bodies with out any treatment is a common practice in almost all urban settlements of NA. This practice is a great threat to health of people who are utilizing the same source at down stream for human consumption. A water quality survey conducted by WASEP-AKPBS of Gilgit River revealed that faecal

contamination levels in river water ranges from 100-500 E.coli/100 ml. According to figures calculated in the Mater plan for Gilgit town the waste water generation only in Gilgit town will be around 25 cusecs by the end of 2024 or may be earlier. At the moment only in Karimabad, AKCSP has constructed sewerage system with treatment facility (combination of septic tank and biological filters). Efforts for selection of an appropriate sewerage system with feasible treatment options must be started right now. AKCSP's module could be used as a case study.

- Collection of baseline data on wastewater generation and its consistency
- Selection of treatment systems
- Induction of sewerage systems at pilot scale
- Replication of pilot project at larger scale.

2.2.8.2. Safe Disposal of Effluents

Disposal of sewerage and agricultural effluents is essential to maintain the productive environments for people, agriculture and nature. The disposal of sewerage is crucial to protect the fresh water resources for agriculture and people. The following options are attractive for improving quality of drinking water and its availability.

- Proper collection and treatment of sewage and other effluents prior to their discharge into freshwater bodies;
- Sewage should not be dumped into the Kuhl system;
- Practical and economically feasible sewage treatment options be explored and applied.

2.2.8.3. Lack of Sewerage Systems

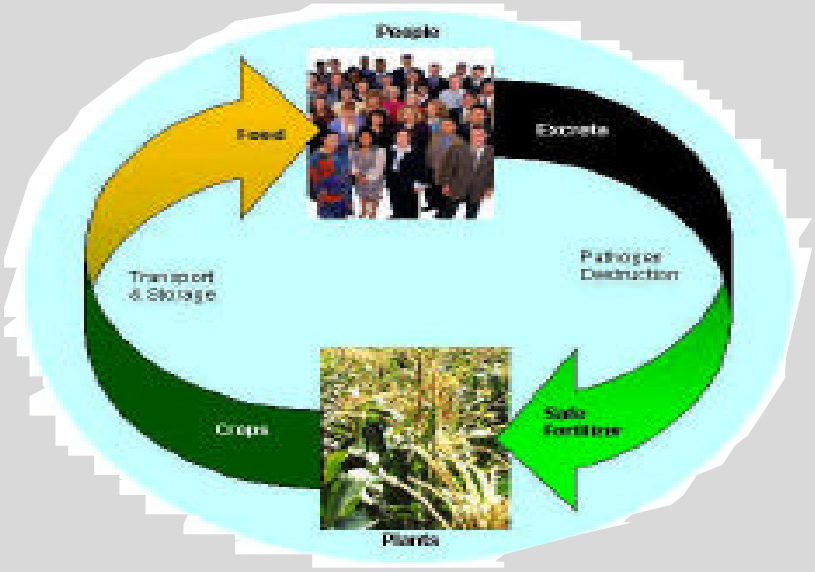
The extensive use of on-site disposal (soakage pits) in the urban settlements raises the water-table and contaminate with faecal matters. Due to lack of proper sewerage systems the waste effluents generated by households or hotels is more hazardous than other organic and inorganic effluents. Small and medium size industries e.g. automobile industries, flour industries, dry fruit industries. In Gilgit town there are more than 20 service stations are working the hazardous effluent from these service stations are directly ingress into the nearby small water rills and ultimately to water channels thus contaminate the water bodies.

In some of the urban centres of the Northern Areas, sewerage system consists of sewage collection and disposal. Sewage is collected through RCC pipes and open drains. The collected sewage is disposed to nearby water bodies through gravity. In areas where sewage collection system is non-existing, sewage is discharged into groundwater through soakage wells, sometimes even without passing through septic tanks. In rural areas the proper collection and disposal system is almost non-existing.

Presently, the treatment of effluent waste in the Northern Areas is almost non-existence on the municipal front. Even in other areas of Pakistan, where such treatment plants have been constructed those are not in operation due to high O&M cost, especially due to the higher energy cost.

A more holistic approach towards ecologically and economically sound sanitation is offered by the concepts referred to as "ecological sanitation". Environmental sanitation means keeping our surroundings (the environment) clean and safe and preventing pollution. It includes wastewater treatment and disposal, vector control and other disease-prevention activities. Ecological sanitation, on the other hand, is premised on recycling principles. The key objective of this approach is not to promote a certain technology, but rather a new philosophy of dealing with what has been regarded as waste in the past.

Ideally, ecological sanitation systems enable the complete recovery of all nutrients from faeces, urine and grey water to the benefit of agriculture, and the minimisation of water pollution, while at the same time ensuring that water is used economically and is reused to the greatest possible extent, particularly for irrigation purposes.



Circular Flows

Ecological sanitation is a safe method of recovering nutrients from human excreta, then recycling them back into the environment and productive systems (see diagram alongside).

A human being produces exactly the amount of nutrients that is needed for growing his or her food (measured in crops) – 7.5 kg of nitrate, phosphorus and potassium for 250 kg of crops. Urine hardly contributes at all to the spread of diseases (e.g. bilharziasis) and contains approximately 88% of the nitrogen, 67% of the phosphorus and 71% of the potassium carried in domestic wastewater. Faeces contain 12% of the nitrogen, 33% of the phosphorus, 29% of the potassium and also 46% of the organic carbon, as well as most of the pathogens.

If separated, urine can easily serve as a fertiliser after it has been diluted with water. After faeces have been desiccated (dried-out), they are free from pathogens, diseases and odour. They can then serve as a soil conditioner for agriculture, returning a significant part of the nutrients and trace elements to the soil.

The remaining treated grey water may be used for irrigation and also for recharging the local aquifer. This closes local cycle, helping to improve food security and to conserve soil fertility. At the same time, human health is improved due to the removal of disease sources from the domestic environment.

2.2.9. Pesticide Use

The non-judicious use of pesticides is another example. The consumption of pesticides has increased from 665 tons in 1972 to 44,872 tons in 1998. Despite the heavy use of pesticides in the country, outbreaks of pests occur regularly, causing billions of dollar loss to the economy, environment and human health. Several research studies conducted at the national and international institutions have revealed the presence of pesticide residues in soil, groundwater and food items, especially fruits, vegetables and edible oil. Women and children in particular, suffer from the residues of pesticides while picking cotton, which is heavily sprayed with pesticides (10-12 sprays per season).

Persistent organic pollutants, solid waste disposal, industries using hazardous chemicals, over use of pesticides and fertilisers pose serious threat to human and other living beings. It is of utmost importance that actions are taken to avoid harmful effect on the environment due to such elements.

In urban areas, health problems are closely associated with pollution and degraded environment. For example, Gilgit, the administrative headquarter of NA, is faced with massive air pollution partly due to road building and other construction. During public consultations, women cited an increase in the incidence of respiratory problems and diseases such as skin allergies. These health issues are affecting both genders but pregnant women and young children are more prone to fall prey to these illnesses. Pollution due to improper waste disposal along riverbanks, improperly managed slaughterhouses, clotted sewerage systems, and hospital disposal is causing serious health problems and ecological disintegration. Although, medical facilities have become more available due to government's and NGOs' interventions, health related expenses still pose stress on family's income and women recognise this as an important reason for environmental conservation and pollution control.

In contrast, the rural women cited unavailability of health facilities as a major issue for them. Although, civil society and government interventions have achieved a marked increase in health facilities, remoteness of areas and difficult terrain still derive local women to rely upon traditional practices for pre-natal and post-natal health. Awareness about health and hygiene is still under achieved among remote communities and therefore is a strong focus of interventions by authorities and projects.

2.2.10. Energy Dependency

People do not have sufficient energy for heating and cooking purposes, leading to health impacts. This is seen in places where women and children must walk long distances to obtain wood and other biomass fuels, expending considerable time and energy in the process. Nutrition is also negatively affected if families have to walk long distances to gather fuel. When seasonal changes result in longer fuel times, families are unable to compensate for this by reducing the time spent on agricultural activities. Rather the time is subtracted from resting and food preparation. Either inferior bio mass fuels substitute the fuel wood or fuel wood consumption is economised through less cooking.

2.2.11. Housing

Housing is of central importance to quality of life. The principle risk factors known to lead to unhealthy housing include defect in building, defective water supplies, defective sanitation, defective refuse collection and storage and defective storage and preparation of food. In Northern Areas, the winters are harsh. The houses that are warm and well ventilated and well lit are likely to have fewer illnesses than the ones that are cold, musty and dark. Thus improved domestic living conditions can be said to improve the typical family health.

BACIP, Building and Construction Improvement Program carried out a comparative study for the implications arising due to improved housing. The houses that had a BACIP intervention installed(especially designed stoves with exhausts, windows that would let in light without decreasing the indoor temperature), last winter had fewer illnesses (4.3%) than the non BACIP houses (9%) It can therefore be concluded that the burden of disease had been reduced by half.

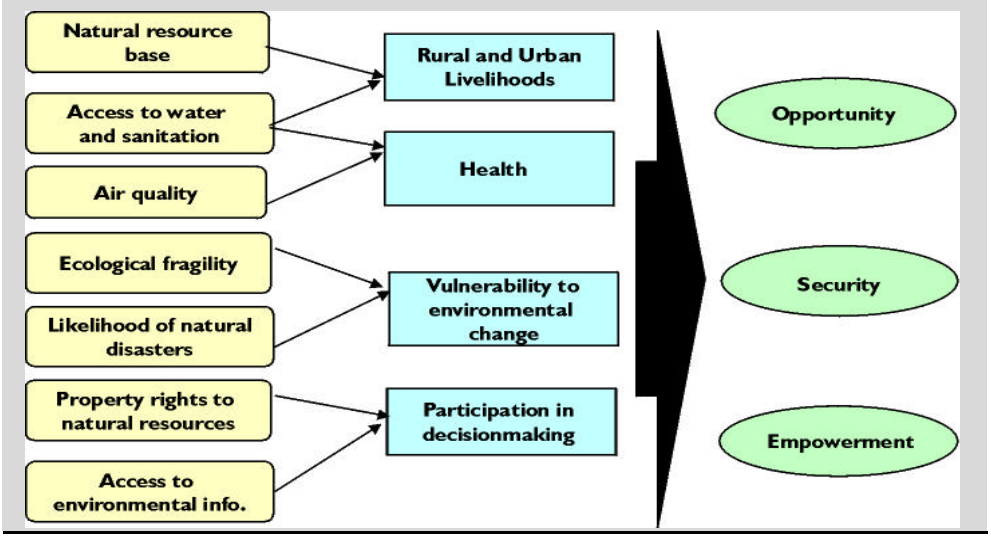
2.2.12. Climate Change

This change is slowly manifesting in the form of accumulation of green house gases in the atmosphere resulting from activities such as combustion of fuel, large-scale deforestation and rapid expansion of irrigated agriculture. Direct effects of climate include effects due to extreme temperatures. Indirect effects mediated by the ecosystem disturbance include changes in the food production levels, which affect nutritional status, and effects of air pollution.

2.3. Cost of Clean-up for Environmental Pollution

Environmental change affects poor people's well being both positively and negatively, namely opportunity, capability, security and empowerment. Poor people depend upon various activities for their livelihoods in the following inter-linkages:

Pakistan currently spends about $17 million per year on pollution-related cleanup; however, $84 million is needed to correct the country's environmental problems, and $1.8 billion per year in added health care costs stem from pollution-related causes.



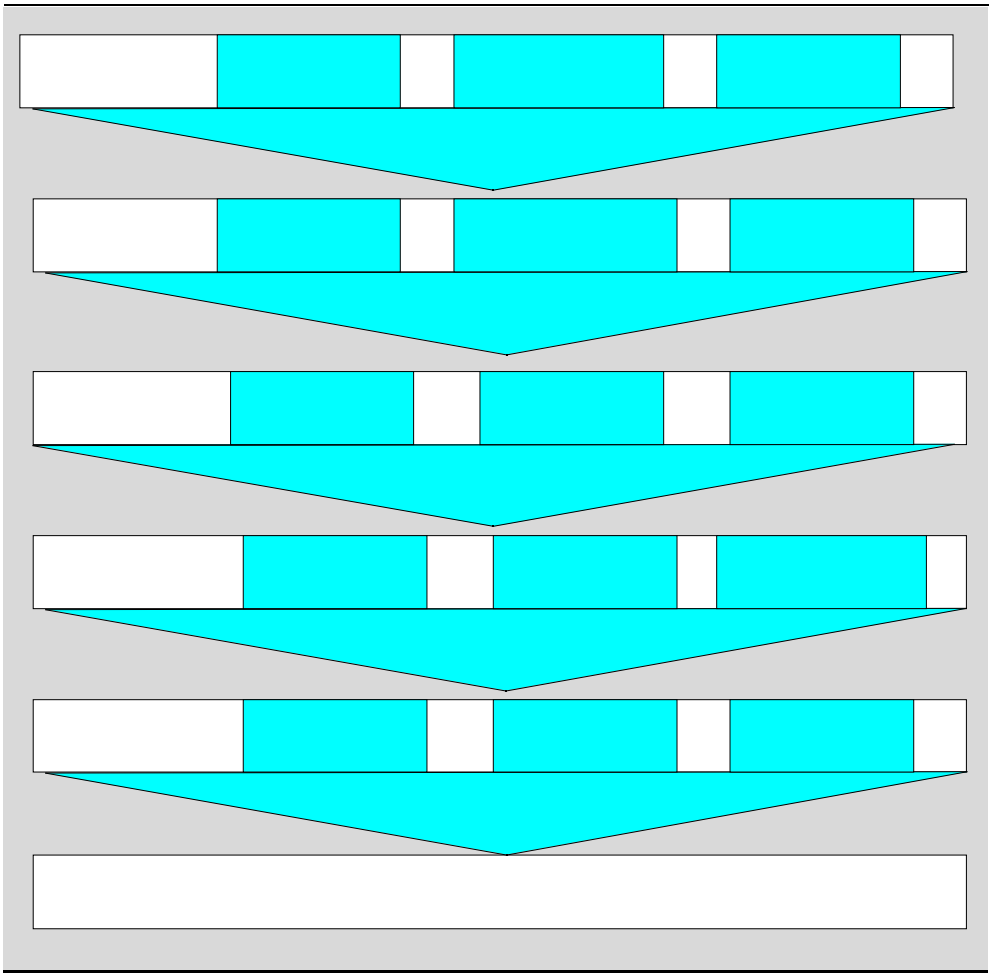
The environment affects the economic opportunity of poor people in both rural and urban areas. Poor people live in rural areas and tend to depend directly and/or indirectly on natural systems for income-generation. The very poor are often landless labourers. They depend on various natural resources for subsistence, for shelter and income generation. Often, they use wild food to complement their diet. Many use or sell products such as timber for fuel or convert it into charcoal as a way of supplementing their income. Thus environmental resources provide important inputs into the livelihoods of poor people and also contribute to their well-being.

Traditional Health risks relating to unsafe food, inadequate water and sanitation, infections from animals and vectors, and poor housing have a major influence on Health. Industrial development introduces modern environmental health risks relating to air pollution, chemical exposures and traffic accidents.

Risk transition is the reduction in the traditional risks and increase in the modern risks. If well managed, the traditional risks can be eliminated and the modern risks reduced through effective prevention strategies. (WHO, 1997).

Traditional hazards related to poverty and insufficient development include:

- Lack of access to safe drinking water
- Inadequate basic sanitation in the household and the community
- Food contamination with pathogens



- Indoor air pollution from cooking and heating using coal or biomass fuel
- Inadequate solid waste disposal
- Occupational injury hazards in agriculture and cottage industries
- Natural disasters, including floods, droughts, and earthquakes

Modern environmental hazards to humans are related to development that lacks health and environmental safeguards, and to the unsustainable consumption of natural resources, including:

- Water pollution from populated areas, industry, and intensive agriculture
- Urban air pollution from motor cars, coal power stations, and industry
- Solid and hazardous waste accumulation
- Chemical and radiation hazards following introduction of industrial and agricultural Technologies
- Emerging and re-emerging infectious disease hazards
- Deforestation, land degradation, and other major ecological change at local and regional levels

Climate change, stratospheric ozone depletion, and trans-boundary health and environment cause effect framework inspired by work on sustainable development indicator. The framework recognises that exposure to a pollutant are environmentally mediated health hazards may be immediate cause of ill health, the driving forces and pressures leading to environmental degrading may be the most effective points for controlling the hazards.

The generally driving forces create the conditions in which environmental health hazards develop or be averted. Driving forces include policies that determine trend in economic development, technological development, consumptions pattern and population growth, and hence exert pressure on the environment. Example being waste from human settlements, emission of pollutants due to mining/ transport. These pressures can be to changes in the state of the environment such as when land uses change, in deforestation or when chemicals increase in air soil or water.

3. CURRENT INITIATIVES

3.1. The Social Action Program (SAP)

In spite of steady improvements, the health indicators in Pakistan are very poor as compared to the countries at the same level of economic growth. The focus of health care in Pakistan was primarily on tertiary and secondary health care, which could only benefit 19% of the population.

Keeping this approach in mind the policy of SAP was to improve the quality of basic services, increasing community involvement and building gender equity. An important element of SAP was to bring grass root level changes in population welfare, water and sanitation and reproductive health, involving community workers e.g. LHWs and LHVs. This approach has been successfully adopted by Aga Khan Health Services in Northern Areas.

The Northern Areas Health Project (NHP) has made special provisions for women's health concerns with increased focus on training Traditional Birth Attendants (TBAs) and Lady Health Workers (LHWs) in the remote parts of NA. Astatistical depiction of improved health facilities due to NHP interventions is presented in Table 8.

Table 8: The Northern Health Project Portfolio over Four Years

Facility to # of People	Before (NHP-1995)	After (NHP- 1999)
One Doctor	6,261	3,974
One paramedical	830	610
One bed (hospital)	1,285	1,190
One LHW	40,000	14,500

Table 9: Planned Activities for Health in the Northern Areas (amount in million rupees)

Sector	Total Schemes	Estimated Cost	Expenditure up to June 2000	Allocation for 2000-01	Schemes Targeted by June 20001
Basic Health	14	Local: 331.990 FPA: 436.800	446.710	Local: 112.840 FPA: 30.000	7
Rural Water & Sanitation	4	106.045	89.677	16.663	4

3.2. PM's Program for Family Planning and Primary Health Care (PHC)

This program is operative for last three years. Under the aegis of this program local girls are to be trained for provision of non-clinical Family Planning services and

drugs for PHC. About seventy three (73) percent of the mothers on overall NAbasis know about the presence of LHW. (Northern Areas Health Survey 1999).

Contraceptive use is currently (20) Percent of eligible couples i.e. married women of age 15 – 49 (Northern Areas Health Survey 1999) as compared to the national figure of 22% (WHO 1997).

Table 10: Medical Establishments (Public Sector)

Name	Gilgit	Skardu	Diamir	Ghizar	Ghanche	Northern Areas
Hospitals	6	6	5	4	4	25
Basic Health Units	4	4	5	2	3	18
Dispensaries	22	36	16	11	20	105
First Aid Posts	36	27	26	29	25	146
Bed Strength	269	223	95	40	50	677
Doctors	59	49	30	14	13	165
Medical Officers	27	17	20	9	6	79
Lady Medical Officer	4	9	2	0	3	18
Specialists	16	14	2	0	0	31
Dental Officers	7	6	6	4	3	26
Paramedics	308	308	182	113	127	1038
Lady Health Visitors	370	308	230	169	143	1220

Source: Health Department Northern Areas, June 1999.

3.3. Other Programmes of Partner Agencies

After the approval of NCS in 1992, the World Bank gave US $ 29.2 million for the Environmental Protection and Resource Conservation Project (EPRCP). CIDA had supported of NCS its implementation in the form of Pakistan Environment Programme were followed EC-funded watershed rehabilitation project (included in the EPRCP) he Food and Agriculture Organization (FAO) is collaborating with UNDP in several on-going projects, such as Area Development Programme AJK, food security, rational use of pesticides, etc. FAO is also implementing a programme on integrated pest management with the assistance of European Union.

The main activities of UNIDO in Pakistan, in collaboration with UNDP, are in the area of pollution control in industrial and environmental policy. UNIDO also plans to initiate. UNICEF supports the Prime Minister's Lady Health Worker's Programme, Vitamin-A Supplementation Programme, establishment of database on out of school children in selected districts, and water sector development in the country. UNICEF's high-level social policy advocacy is the major activity that has given an impetus to policy dialogue on water and sanitation sectors in Pakistan.

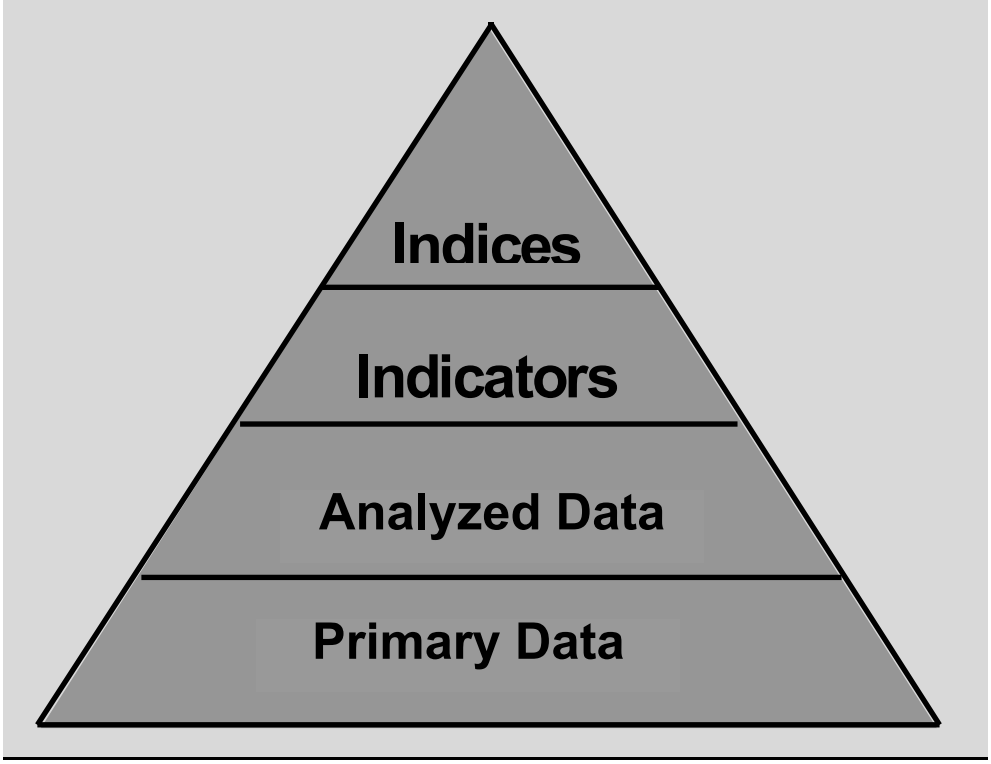
SUNFPA has formulated its 6th Country Programme (2000-2003). The overall achievements of the 5th Country Programme are reflected in the documented onset of the fertility decline. The Programme has played an instrumental role in bringing about a paradigm shift in the population policies from a narrowly defined family planning approach to the broader concept of reproductive health. The new Country Programme has three thematic sub-programmes: namely, Reproductive Health,

Population and Development, and Strategies and Advocacy. A major undertaking of the new programme is to bring about behavioural change conducive to improving the quality of life and the empowerment of women.

WFP in Pakistan provides food assistance to a variety of activities under the three main components of its current Country Programme: the environmental sector (natural resource management), the social action sector (promoting primary health care and girls education). IFAD has supported 16 projects in Pakistan, with a total loan commitment of about SDR 219 million. The IFAD's development strategy seeks to improve villager's opportunities, increase productivity and conservation of the environment and mobilize communities. UNDP is implementing IFAD funded projects in AJK and Northern Areas.

4. STRATEGY FOR ENVIRONMENTAL HEALTH INTERVENTIONS

- Basic data collection, storage, analysis and dissemination
- Results-based monitoring & evaluation of national and regional resource conservation and environment management policies and plans, including area-based management plans;
- Methods for stakeholders' participation in decision making geared towards efficient utilization of natural resources and the protection of the environment;
- Ecosystems management; and
- Continuous monitoring of the state of the environment



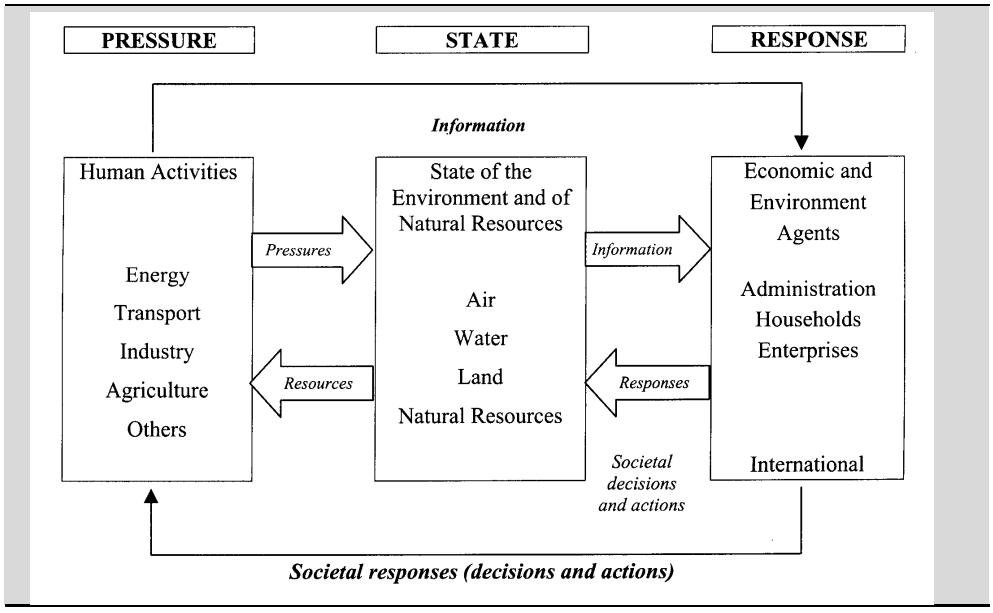
4.1. Environmental Health Information Base

- Primary data such about the water quality, air quality and amount and categories of solid waste, sanitation.
- Processing of this data, to get average water quality, average organic content in sewerage
- Formulation of indicators, e.g. water quality indicator, indoor air quality indicators
- Index could be defined which could be used as a reference point and compared with the other regions

The following parameters can be monitored for data collection to formulate the indicators:

1. ENVIRONMENT	
1.1. Air quality	Carbon monoxide, Nitrous oxide, sulphur dioxide, suspended particulate matter
1.2. Water quality	BO, Coliform count, chemicals dissolved
1.3. Chemicals and waste	Waste generation (Municipal, Industrial and Hazardous)
1.4. Urban environment issues	Air pollution, water availability, transport and solid waste
1.5. Energy	Efficiency and conservation, clean technologies, green house gas emissions
1.6. Forests	Assessment of forest resources
1.7. Biodiversity	Planning and management of protected areas
1.8. Land degradation	Causes of land degradation, food security, agro chemical management
1.9. Sanitation	Access to proper sanitation
2. SOCIAL	
2.1. Population	Population size and growth
2.2. Housing	Marginal settlements
2.3. Health	Mortality, life expectancy, health policy
2.4. Education	Literacy rate, enrolment, school drop outs
2.5. Status of women	Education of women, women in labour force

The Human activities exert pressure on the environment and change the quality and quantity of natural resources (the "state"). The society responds these changes through environmental, general economic and sectoral policies (the "societal responses"). The latter form a feedback loop to pressures through human activities.



4.2. Pre-requisites for Environmental Health

- Financial resources, mobilization, encourage private sector participation, polluter pay principles to be promoted. The poverty-environment nexus needs to be approached in a broader socio-economic development framework. This means that the:
  - Programmes/projects designed to address poverty alleviation should also give due attention to the national environmental management priorities;
  - Environmental management should be made an important and explicit feature of all programmes/ projects to be implemented by all Ministries (should not be limited only to the MoELGRD); and
  - Inter-ministerial coordination is essential to implement program and projects, which are cross-sectoral in nature and are characterized with significant spill-over effects.

	Pressure	**State**	**Response**
Indicator	Indicators of environmental Pressure	Indicators of Environmental Condition	Indicators of Environmental Response
Waste	Waste generation (S/M)		Waste minimization (L) Recycling Rate (S) Economic instruments and expenditures (M)
Water Resources	Intensity of use of water resources (S)	Frequency, duration and extent of water shortages (M/L)	Water prices and user charges for sewage treatment (M)

4.3. Gender Integration

Women are disproportionately affected by the degradation of natural resources, because of their particular dependence on communal resources. For instance, they are primarily involved in the collection of fuel, fodder and water. According to Agarwal (1997), they can be more severely affected by environmental degradation in at least six possible ways, namely, with respect to time, income, nutrition, health, social support networks, and knowledge systems.

Rural women must walk longer distances, and spend more time and energy in collecting fuel-wood as a result of deforestation. For instance, approximately 10% of women's time is spent on collecting fuel wood (Foster, 1986). This reduces their time spent on income generating activities, indirect income through crop production and time needed for taking care of household responsibilities.

Contaminated water in rivers and canals is one of the main vehicles for the transmission of diseases. Poor rural women are therefore more exposed than men to water-borne diseases because of the nature of the domestic and agricultural tasks they perform. These include fetching water for home and animal care, washing clothes in nearby rivers, ponds and canals, and rice transplantation that is mostly done by women in much of Asia and is associated with a range. Cavendish, W. (1999).

Based on the gender situational analysis report, public consultation reports, and interviews with a cross-section of stakeholders, the detailed analysis revealed that there are five distinct areas for strategic action for gender sensitive policy framework under NASSD. These are:

- Awareness Raising;
- Policy;
- Projects/Programmes;
- Capacity Building; And
- Service Delivery.

4.3.1. Education

There is wide disparity e.g. Gilgit has 37% literacy rate in females whereas Diamir has 1%. The community perceptions about female education are undergoing significant changes. Most community believes that educated girls have educated children and they are better homemakers. But there are disparities as male children are prioritised to get educated.

4.3.2. Health Care

Health care for women has largely been ignored except areas served by Aga Khan Health Services Network. The major health problems stem from the lack of hygiene. In villages situated at higher elevations the inhospitable climate and water shortage create problems for women. Anecdotal evidence suggests secondary infertility due to severe infections and anaemia.

4.3.3. Household Responsibilities

Participation of women in almost all on-farm activities except land preparation is common in the area even though their presence is not very visible. Women provide over 50 percent of the total labour used in farm activities. They are frequently responsible for collection of firewood for cooking and heating as well as collecting fodder and water for livestock and for supplies, and spinning wool. Women's only income-generating asset is their labour. Women have no access to official credit. In Gilgit women have small sums of money, but in Baltistan, women rarely handle money.

Women's status and living standards are below the national average. Several factors help to explain the low social indicators for women. One is their heavy work burden. Another is the lack of apparent public interest in social services. A third reason is the economic, cultural, and religious factors operating at the village and family level that further limit women's access to the few services that are available. In addition, women's lack of freedom to move outside the village and the fact that there are only male interlocutors mean that women have little or no access to health facilities (except on an emergency basis) or to family planning, agricultural extension, technical training, or markets for their products.

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