Green Jobs: Towards Decent Work in Sustainable, Low-Carbon Economy

GREEN JOBS
In the
CONSTRUCTION SECTOR

Empowering Vulnerable Groups through Education, Employment and Training

ILO Country Office for Pakistan
GREEN JOBS

In the

CONSTRUCTION SECTOR

November 2010

ILO Country Office for Pakistan
The primary goal of the International Labour Organization (ILO), a specialised agency of United Nations, is to promote opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity. The ILO is devoted to promoting social justice and internationally recognized human and labour rights, pursuing its founding mission that labour peace is essential to prosperity. Thus, the ILO considers gender equality in the world of work as a key element in its vision of Decent Work for All Women and Men for social and institutional change to bring about equity and growth. The main focus or thematic areas of the ILO on gender equality coincide with the organization's four strategic goals, which are to: promote fundamental principles and rights at work; create greater employment and income opportunities for women and men; enhance the coverage and effectiveness of social protection; and strengthen social dialogue and tripartism. The ILO believes that investment in gender equality and women empowerment is not only a right thing to do but a Smart thing to do.

Today, Pakistan faces multiple challenges of low economic growth, humanitarian crises, internal and external security issues, and low social development indicators. Women in Pakistan continue to face constraints due to the prevalent socio-cultural norms that deny them equal access to facilities and opportunities. Pakistan still ranks 128 out of 182 on Human Development Index (2010), 124 out of 155 on Gender Development Index (2009) and 132 out of 134 on the Global Gender Gap Report (2009). Pakistan women have limited access to resources; restricted rights, limited mobility and somewhat muted voice in shaping decisions make them highly vulnerable.

Women are increasingly joining the work force but often in the informal economy dominated by low paying and poorly protected jobs that pose threats to their reproductive health and consequently to the welfare of their families. During the reporting period waged and salaried employment increased by only 2.4 percentage points of the unemployed (15+), whilst own-account workers decreased by more than 7 percentage points. The proportion of those working excessive hours has declined slightly since 1999-2000 but only because the proportion of females in total employment, who work less than 30 hours has increased. The proportion of males working excessive hours has risen by 1.4 percentage points since 1999/2000.

Despite recent gains in terms of employment and unemployment a clear gender gap is evident. The female labour force participation rate is 19.6 per cent as compared to males at 69.5 per cent. Women continue to be under-represented and under-utilised in the economy and labour market and tend to predominate as unpaid family workers in agriculture, and hold low paid, low skill jobs and at the lowest tiers of the industrial labour force in urban areas.

Women counted as employed include employees, self employed, unpaid family workers and those generally engaged in low skilled, low wage economic activities. More than half of these women earn less than 60 per cent of men's incomes. The bulk of the female labour force is employed in the informal economy, and is not covered under legal protection and labour welfare institutional mechanisms. In the urban informal sector 67.5 per cent of women work as home-based or casual workers on low wages, or as domestic workers with...
extremely low remuneration. Women generally appear to be mostly unaware of labour laws and do not have a collective voice, therefore unable to exercise their rights.

For the ILO, Pakistan has been an important and active member and the government of Pakistan has ratified 34 ILO Conventions including C 100 and C 111, which indicates its commitment to pursue the attainment of high standards for its people, particularly for women. Pakistan's Government, Employers' and Workers' representatives have also repeatedly expressed their commitment to work for promotion of a right-based work environment.

The ILO approach is grounded in the rights-based argument and the economic efficiency rationale: not only is gender equality in the world of work a matter of human rights and justice for workers, it also makes good business sense for employers and is instrumental in achieving economic growth and poverty reduction at national levels.

The ILO is pleased to present to you the study named GREEN JOBS In the CONSTRUCTION SECTOR carried out by the ILO project entitled “Towards Gender Parity in Pakistan (TGP)” as part of its knowledge-creation for its tripartite constituents in Pakistan. One major objective for this project was to establish benchmarks from gender-perspective regarding various aspects of employment and to work more effectively towards achieving a marked change in the policies and practices.

It is understood that decreasing poverty and inequalities is like chasing a moving target where with the ever increasing population there is a need for more efforts to uphold principles of social justice and rights-based decisions. For this to happen, joint efforts by all the partners, collaborators and institutions would be required and I am glad that the ILO has taken lead in forging such collaborations and coordination among key stakeholders.

I would also like to extend my gratitude to the Government of Pakistan, Employers' Federation of Pakistan, Pakistan Workers' Federation and other partner organizations for their demonstrated commitment and immense support to us in our efforts for promotion of Decent Work in Pakistan.

I congratulate the TGP project team of on their successful initiatives to develop a much-needed knowledge base on Pakistan labour market from gender perspective. I am sure these efforts would help ILO and its partners in taking steps towards taking gender equality endeavours to new heights.

Thank you,

Francesco d'Ovidio
Country Director
ILO Office for Pakistan
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**INTRODUCTION**  

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A green job, also called a green-collar job is, according to the United Nations Environment Program, “work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute(s) substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution.”

Green jobs need to be decent work, i.e. good jobs which offer adequate wages, safe working conditions, job security, reasonable career prospects, and worker rights. People's livelihoods and sense of dignity are bound up tightly with their jobs. A job that is exploitative, harmful, fails to pay a living wage, and thus condemns workers to a life of poverty can hardly be hailed as green. There are today millions of jobs in sectors that are nominally in support of environmental goals—such as the electronics recycling industry in Asia, or bio-fuel feedstock plantations in Latin America, for instance—but whose day-to-day reality is characterized by extremely poor practices, exposing workers to hazardous substances or denying them the freedom of association.

In 2007 the United Nations Environment Programme (UNEP), the International Labor Organization (ILO), and the International Trade Union Confederation (ITUC) jointly launched the Green Jobs Initiative. The International Employers Organization (IEO) joined the Initiative in 2008.

One of the fastest growing international industry 'sectors' is environmental goods and services. For example world demand for renewable energy is predicted to grow by 82% in the period 1990 to 2020. Worldwide demand for organic agricultural produce has grown 20% every year for the last 10 years, and is anticipated to grow from US$ 11 billion in 1997, to US$ 100 billion by 2006.

This growth means more ned to fill this information gap by identifying:

- emerging jobs in new categories;
- training needs;
- current and projected skill shortages; and
- impediments to growth in the environmental sector.

Buildings are significantly altering the environment. Building construction consumes 40% of the raw stone, gravel and sand used globally each year, and 25% of the raw timber. Buildings also account for 40% of the energy and 16% of the water used annually worldwide. Negative environmental impacts arise from these activities.

Green Construction was founded upon the ideals of building more efficient, healthier buildings and homes. In Green Construction, we are trying to balance energy efficiency and cost effectiveness while conserving resources and keeping maintenance as low as possible. In other words, green building design involves
Let us look at some of the studies carried out in the world for the purpose of situation analysis of green jobs in the construction sector. The studies on green jobs industries across Australia have shown rapid growth rates. The major ACF/ACTU survey of 1994 showed green employment grew by 81% between 1988 and 1993 in the 361 companies surveyed.

The 1994 survey revealed a young industry sector with 33% of private sector firms surveyed beginning their operations between 1988 and 1993. The Sustainable Energy Industry Surveys of 2000 and 2002 also indicated continuing upward trends in growth rates and employment in their industry. They estimated that the sustainable energy industry in Western Australian alone employed 4,900 people in 2000 – 2002 with an expected increase of 6.5% for the following year.

The ACF/ACTU survey 1994 showed employment in the green jobs sector was spread across the 7 ABS occupational categories with 'professionals' being the largest single group at 21%. Demand for all occupations was increasing with strongest growth being in the professional category. The Western Australia sustainable energy industry survey confirmed this conclusion with 71% of those employed being managers, professionals or technicians.

A 1997 review of training needs in the environmental management field in Western Australia conducted for the Department of Education and Training also found that many firms in this industry are classified as small businesses with unique training needs. The review found that:

- There was a need for environmental awareness training across all skill levels.
- Business expressed a preference for technicians with management skills rather than managers with technical skills.
- Practical in-house training was the preferred mode of delivery.
- Training that supports the greening of jobs was supported above the creation of new green jobs.
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- This growth means more employment opportunities and training in the skills needed for these emerging industries.
- In the world on the whole there is very little information about the current state of the green jobs sector. This survey was commissioned to fill this information gap by identifying:
  - emerging jobs in new categories;
  - training needs;
  - current and projected skill shortages; and
  - impediments to growth in the environmental sector.

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finding the delicate balance between homebuilding and the sustainable environment.

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CHAPTER 1
Piloting UN reform in Pakistan is in the stage of full-scale engagement of stakeholders in the process of change with tangible advancement on the ground. The Government has provided the necessary support in terms of leadership and ownership of the process; Line Ministries are actively and systematically engaged in the process; the donor community has reiterated its support to the process: concepts and modalities of joint programming have been established, and in various cases, interventions have started on the ground. It is necessary for the sustainability of joint programs that these are founded on the principles of social justice and a decent work agenda so that the dividends of development are fairly distributed among all relevant beneficiaries.

This Project is part of the One-UN Joint Program (JP) and it provides a foundation for mainstreaming the ILO's Decent Work Agenda in all relevant development programs along with supporting the One-UN Program by enhancing its relevance and effectiveness. An important component of the project is the identification of the potential for and promotion of Green Jobs in Pakistan which is part of JP-Environment that contributes to:

1. Strengthened and operational institutional mechanism for integrated environment management; and
2. Support for green industries, waste management, energy and jobs.

For the ILO, the notion of green jobs summarizes the transformation of economies, enterprises, workplaces and labour markets into an environmentally sustainable, low carbon economy providing decent work. Green jobs reduce the environmental impact of enterprises and economic sectors, ultimately to levels which are sustainable. They are, in particular, direct jobs in sectors that contribute to reducing the need for energy and raw materials, to avoiding greenhouse gas emissions, to minimizing waste and pollution, and to restoring ecosystem services like clean water, flood protection and biodiversity. The concept of green jobs is evolving and will change over time.

In the developing world, new jobs that are being created in sectors such as construction, food, agriculture and recycling to address climate change and other environment problems leave much to be desired and can hardly be considered as decent. Climate change is also having a negative impact on jobs in some areas. Sectors consuming large amounts of energy and natural resources are likely to see a change in employment quantity and quality.

The most important potential climate change threats to Pakistan include increased variability of the monsoon; rapid recession of glaciers threatening water inflows into the Indus River System; increased risks of floods and droughts; severe water-stressed and heat-stressed conditions in arid and semi-arid regions, leading to reduced agriculture productivity and power generation; increased upstream intrusion of saline water in the Indus delta, adversely affecting coastal agriculture, mangroves and breeding grounds of fish; and the threat to coastal areas due to sea level rise and increased cyclonic activity due to higher sea surface temperatures. These threats lead to major concerns for Pakistan in terms of its Water Security, Food Security and Energy Security.
Promoting Green Jobs in Pakistan

In Pakistan the ILO has initiated some groundbreaking activities to promote the concept of and activities for green jobs in the most demanding sectors. A process of consultation was initiated at the beginning of 2010 to identify those sectors where green jobs could be effectively integrated. The following four sectors topped the list: Construction, Energy, Tourism and Agriculture.

It is important to understand how the shift to environment-friendly and low carbon technologies can and should be used to create and improve employment opportunities. There is a need to understand how companies can and should prepare themselves and their workforce in terms of new skills to better address the emerging requirements arising from these changes in construction and agriculture.

Study methodology

The study methodology was dependent upon the Terms of Reference by the ILO and upon a number of key steps which are:

A: Literature review has been carried out for following:
   1. The policies of construction related organizations and Government Ministries including both construction oriented and labor oriented entities.
   2. The Constitutional provisions for labor in Pakistan.
   3. The laws related to labor in Pakistan.
   4. The views and attitude of stakeholders in Pakistan.
   5. Case studies related to construction of buildings in Pakistan and abroad for comparison of current practices.

B: Questionnaire based Survey on green jobs status in Pakistan and in what way a transition to low carbon technology in consideration will affect employment and working conditions.

C: Analyses of the survey results.

D: Conclusions and recommendations

Summary of Findings as per Terms of Reference

The study was carried out to find out the current situation and future prospects of green jobs in Pakistan with reference to construction sector. According to the Terms of Reference the following observations and conclusions have been reached:

Identify job creation opportunities and threats

The survey findings present a picture of current operations/jobs in an average construction related stakeholder organization. The details are given in the survey chapters according to which each job/operation has been classified: i.e. as environmentally friendly, neutral or as having the potential to cause negative impacts on the environment. A number of mitigation measures are also given against each negative impact. Each operation needs a skilled work force which, if not available, could be a threat to the workers and the environment.
The findings indicate bright prospects for introducing and promoting green jobs and decent work in the construction sector. The cost effectiveness and profitability would ensure the expansion of green jobs and decent work in this particular sector of the economy.

All of the operations of a construction stakeholder which have negative impacts could be avoided through implementation of some mitigation measures, as described in the report. Implementing those mitigation measures needs more skilled labor and therefore the prospects are good for creating green jobs by construction related stakeholders. The type and number of green jobs to be created depends upon the construction work each stakeholder is implementing on a regular basis.

Respondents do recognize that adopting green jobs and decent work initiatives would increase the profitability of those organizations engaged in construction. Some awareness and information, in addition to model projects would help in creating awareness.

**Assessment of Employment Dimensions in Policies/strategies/plans and stakeholders**

The subject of green jobs in not directly dealt with in current policies, plans or strategies in Pakistan, although indirectly the policies and strategies do emphasize decent employment opportunities. The policies and strategies focus on workers' rights, wages and safe working conditions and cover employment as a general term. On the other hand 'green jobs' is a particular term used for some specific jobs that promote environmental protection.

An analysis of policies and strategies for green employment is presented in this report in subsequent chapters. Some recommendations for policy formulation have also been given for expanding green jobs and decent work in Pakistan.

**Identify jobs to be eliminated, transformed, substituted or created**

Pakistan is a developing country with a population of nearly 170 million. Finding any job is becoming a real problem, as resources are limited and companies are finding it difficult to expand their businesses and increase the employment base. The construction related stakeholder organizations are already working with very limited staff. There is hardly any job that can be eliminated altogether. The contractors normally use a minimal number of workers to complete construction contracts.

The survey chapter provides a Table about jobs that can be substituted for or created in construction companies. The Table indicates a wide scope for introducing new green jobs, transforming a few jobs into green jobs and eliminating some jobs.

**Role of different stakeholders in promoting and integrating green jobs**

The role of various stakeholders is discussed later in the report. The Ministry of Environment, EPAs and the Ministry of Labor and Manpower are the main stakeholders to step in to promote green jobs in Pakistan. The role of the ILO would be a key intervention to technically assist the stakeholders in this regard.

**Selected Case Studies**

This report presents two case studies, one from Pakistan and one from abroad: these provide details on how
the construction companies have made their construction and buildings environment friendly and energy efficient. These examples are very important and function as a model for construction related organizations in Pakistan to make their constructions environment friendly. The status of Pakistani Engineering firms has been discussed to provide an understanding about the current practices and strategies being followed by Pakistani construction firms while executing construction projects.

**Determine the intervention points**

The conclusion and recommendations chapter and also the survey chapter highlight the intervention points by various stakeholders to promote green jobs through policies, strategies, individual efforts and company level interventions. A strategy for implementation by the ILO has been proposed with timelines. A training program has been developed and proposed in this regard as well. The study highlights the important role to be played by the ILO for promoting green jobs and decent work. A number of intervention points have been provided in this report which will serve as guidelines for moving ahead.

**Background issues**

The background issues related to green jobs in Pakistan are discussed in subsequent chapters through discussions on the Labor Market in Pakistan, the current employment situation, the green jobs initiative, the ILO's role in promoting green jobs in Pakistan, the policies and strategies of the Government of Pakistan and the role of stakeholders. A brief introduction to Labor Laws, Constitutional provisions and stakeholders involved is also presented.

**Specific Issues**

The specific issues are addressed mainly in survey chapter and thereafter in the conclusions and recommendations portion of this report. These specific issues include understanding the level of knowledge within respondent organizations about green jobs and decent work. Based on this section, a comprehensive strategy has been developed and presented, for which the ILO must take the lead and implement as soon as possible, in part because after the floods of 2010 the construction industry is expanding rapidly.

Recommendations with implementable strategies have been provided at the end of the report, highlighting the key interventions that the ILO should initiate primarily through its technical assistance for promoting green jobs and decent work in Pakistan with particular reference to the construction sector.
A number of Government Ministries, Departments, private sector agencies and NGOs are involved in job related issues in Pakistan. The description and background of relevant stakeholders is given below:

1. **Ministry of Labor and Manpower**

The Ministry of Labor & Manpower is mandated to perform the functions broadly related to policy formulation regarding labor, administration, manpower, planning and employment promotion. As the subject of labor and employment under the Constitution of the Islamic Republic of Pakistan (1973) is on the concurrent legislative list, the Ministry functions in close coordination with the Provincial Governments in these fields.

2. **Ministry of Communications**

The Ministry of Communications functions as the central policy making and administrative authority on Communications and Transport Sector in the country. The Ministry of Communications consists of one Division (Communications Division).

3. **Ministry of Environment**

In pursuance of the Cabinet Division's notification number SRO.826 (1)/2002, the Ministry of Environment, Local Government and Rural Development was bifurcated and an independent Ministry of Environment was established on 22-04-2002. The Ministry of Environment is the focal point on the subjects of Environment, Ecology, Human Settlement and Forests in Pakistan.

The Government has allocated the following business to the Ministry of Environment:

1. National policy, plans and program regarding:
   i. Environmental Planning, Pollution and Ecology;
   ii. Housing, Physical Planning and Human Settlements including urban water supply, sewerage and drainage.
2. Dealings and agreements with other countries and international organizations in the fields of Environment, Housing, Physical Planning and Human Settlements.

4. **National Transport Research Center**

The National Transport Research Centre (NTRC) was established in June 1974 in the Planning and Development Division, as one of its Technical Sections, to provide much needed research and development (R&D) support for planning and appraisal of transport sector projects/plans in a coordinated and cost effective manner. NTRC was transferred as such to the Communications Division in November 1992. It is effectively functioning as an R&D Wing of the Ministry of Communications.

5. **Pakistan Housing Authority**

The Government is committed to alleviating the miseries of the common man and to improving economic conditions. Paragraph (d) of Article 38 of the Constitution of the Islamic Republic of Pakistan requires the
State to provide the necessities of life, including housing, to its citizens. Conscious of its responsibilities to its citizens the Government of Pakistan is determined to provide shelter to the shelterless and particularly to low income groups, the poor and the needy.

The Pakistan Housing Authority has its Head Office in Islamabad with the Managing Director as its Chief Executive and Principle Accounting Officer. In the Head Office there are five Wings/Sections namely: Construction & Project Management, Architecture & Planning, Finance & Administration, Land Management, and Marketing and Allottees Services.

6. National Highway Authority

The National Highway Authority (NHA) was created in 1991, through an Act of Parliament, for planning, development, operation, repair and maintenance of National Highways and Strategic Roads especially entrusted to the NHA by the Federal Government or by a Provincial Government or other authority concerned. The total length of the federalized roads under the NHA now stands at 8,780 Km: this accounts for 3% of the entire road network and 75% of the commercial road traffic in the country.

The NHA is the custodian of the Highway assets of Pakistan's road network. It is committed to provide a safe, modern and efficient transportation system. As the cornerstone of tomorrow's Highway network, National Highways function as the backbone of Pakistan's transportation system, play an important role in the development of the micro and macro economies and also enhances national integration by increasing the social and economic inter-dependence between the Provinces.

7. Pakistan Engineering Council

The Pakistan Engineering Council is a statutory body, constituted under the PEC Act No. V of 1976 and amended vide Ordinance No. XXIII of 2006, to regulate the engineering profession in the country such that it shall function as the key driving force for achieving rapid and sustainable growth in all national, economic and social fields. The Council shall as its mission set and maintain realistic and internationally relevant standards of professional competence and ethics for engineers.

Its main statutory functions include the registration of engineers, consulting engineers, and constructors/operators and the accreditation of engineering programmes run by universities/ institutions, ensuring and managing of continuing professional development, assisting the Federal Government as a think tank, establishing standards for engineering products and services, besides safeguarding the interest of its members. The Council shall encourage, facilitate and regulate working of professional engineering bodies as learned societies for creativity and custodians of technology under the umbrella of the Council. PEC interacts with the Government, both at the Federal and Provincial levels by participating in Commissions, Committees and Advisory Bodies. PEC is a fully representative body of the engineering community in the country.

8. Capital Development Authority

The Capital Development Authority (CDA) came into existence on June 14, 1960, first by an Executive Order issued on June 24, 1960 entitled the Pakistan Capital Regulation, which was then superseded by the CDA Ordinance issued on June 27, 1960. The CDA Ordinance constituted the Authority, laid down its Charter and defined its power, duties, functions and responsibilities. Initially the administration of the Authority and its functions were handed responsibility to a Board consisting of three members: the Chairman, Financial Advisor and one other Member with the Commissioner Rawalpindi acting as an ex-officio Member. With time, experience and added responsibilities, the CDA Board is now composed of the Chairman and Members of
Planning, Finance, Administration, Estate, Environment and Engineering. Each Member is in charge of various Directorates comprising highly qualified, experienced and capable professionals in various fields and disciplines.

9. **Pakistan Public Works Department**

Pak PWD began its system of operation prior to Independence (i.e. before 1947). The functions of Pak. PWD are:

1. Acquisition and development of Federal Government lands.
5. To act as technical adviser to the Federal Government in Engineering matters.

10. **TRADE UNIONS**

Article 17 of the Constitution of the Islamic Republic of Pakistan states: "Every citizen shall have the right to form associations or unions, subject to any reasonable restrictions imposed by law in the interest of sovereignty or integrity of Pakistan, public order or morality". Of the eight ILO core conventions, only C.138 on the Minimum Age has not been ratified by Pakistan. However various laws, for instance the Industrial Relations Ordinance of 2002, the Banking Companies Ordinance of 1962, the Civil Servants Act (CSA) of 1973 and the Essential Services Maintenance Act of 1952, have provisions that place certain restrictions on the independent functioning of labor unions. The Government's authority to ban strikes deemed to be potentially harmful to the economy; restrictions on union activity in sectors determined to be "essential" such as government services and public utilities, as well as the compulsory arbitration of labor disputes by the authorities, have been variously criticized by the ILO and the international trade union movement.

In its Annual Survey of Violations of Trade Union Rights (various issues), the International Confederation of Free Trade Unions (ICFTU) has documented a number of cases in which the authorities and employers have consistently violated workers' rights. These violations have included union busting, denial of the right to form or belong to unions, curtailment of the right to strike, victimization of union leaders, denial of collective bargaining, arrests and torture of union leaders, suspension or banning of union activities and rejection of negotiations.

Despite assurances that Legislation concerning Export Processing Zones (EPZs), such as the Export Processing Zones Authority Ordinance (EPZAO) of 1980, and the Export Processing Zone Rules (EPZR) of 1982 would be repealed, this has yet to happen – in effect barring workers in EPZs from forming a trade union or bargaining collectively.

The most prominent of the former class is the right-wing National Labor Federation (NLF) which is allied with the conservative Jamaat-e-Islami (JI) political party. The NLF's power base is the steel and railroad industries, Pakistan International Airlines (PIA) and the Karachi Port. The other politically connected trade unions are the KP (formerly) NWFP-based Democratic Labor Federation (DLF) affiliated with the Awami National Party (ANP), the Pakistan People's Party (PPP), the People's Labor Bureau (PLB), and the Labor Wing of the Mohajir Quami Movement.

The two International Confederation of Free Trade Unions (ICFTU) affiliates comprise the so-called ICFTU-
Pakistan Council; and the recently formed Pakistan Workers' Confederation (PWC). The complete list of major federations is found below.

Section XX: LABOR LAWS, POLICIES, REGULATIONS AND STATUS OF LABOR MARKET IN PAKISTAN

The Constitution of Pakistan

The Constitution of Pakistan contains a range of provisions with regard to labor rights found in Part II: Fundamental Rights and Principles of Policy.

- Article 11 of the Constitution prohibits all forms of slavery, forced labor and child labor;
- Article 17 provides for a fundamental right to exercise the freedom of association and the right to form unions;
- Article 18 prescribes the right of its citizens to enter upon any lawful profession or occupation and to conduct any lawful trade or business;
- Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone;
- Article 37(e) makes provision for securing just and humane conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment.

The Labor Policy 2010

Since the creation of Pakistan, five labor policies have been announced by Governments in the years 1955, 1959, 1969, 1972 and 2002. All these policies basically laid down the parameters for the growth of trade unionism; the protection of workers' rights; the settlement of industrial disputes and redressal of workers' grievances. After 2002, no Labor Policy has been introduced although a number of developments took place in the intervening period, which would have necessitated the same. In this scenario the Prime Minister of Pakistan in his first speech (in 200X) emphasized the need to address labor issues and announced the lifting of the ban on trade unionism, the repeal of the Industrial Relations Ordinance, 2002; Removal from Service (Special Powers) Ordinance, 2000 and other anti labor laws. In pursuance of the Prime Minister's directions a new Labor Policy of the Government (2XXX) is now in place.

Of all the previous policies, the Labor Policy of 1972 taken out by Zulfiqar Ali Bhutto was the most progressive one, which reformed the labor laws and set out new benchmarks including a new administrative infrastructure to manage the workers' welfare: viz the Workers Welfare Fund Ordinance; Employees' Old-Age Benefit Act; amended Industrial Relations Ordinance with enhanced protection of workers' rights like imposing condition on the authority of employers to terminate workers' jobs. The scope of the labor laws was enhanced and benefits such as workers' participation in factory management; increase in workers' shares in company's profits from 2% to 4% and then to 5%; the nomination/election of shop-stewards to attend day to day workers' problems; settlement of disputes through Works Councils; Establishment of Workers' Children's Education Cess; Representation of workers on the Governing Body established under the Workers' Welfare Fund Ordinance; and increased profit-sharing, statutory bonus, group insurance scheme, group incentive scheme, were granted.
The present Government's vision for the new Labor Policy contents are entrenched in the four main guiding features. The process of globalization is posing a serious problem of economic survival for the developing country. Foreign investments demand restructuring and decentralization of the system and the new technologies demand that the new Labor Policy is supported by the four pillars outlined in therein.

The new technologies demand a high level of professional competence along with specialized skills. Considering the changing requirements of the time, it was imperative to re-establish technical training and human resource development programmes to train manpower in multiple trades. The new Labor Policy proposes to restructure training activities in order to meet the demand of new technologies.

To have a fruitful consultation with stakeholders, the Pakistan Tripartite Labor Conference under the Chairmanship of the Prime Minister was held on 16th February, 2009 after about eight years, which culminated in useful recommendations for legislative, institutional and administrative reforms to meet the emerging challenges of the time. These recommendations were further discussed in Provincial Tripartite Committees, and all these recommendations are the basis of the new Labor Policy. The objective before the Government is that the new Labor Policy should ensure a harmonious working relationship between workers and employers for improving performance and efficiency of the industry. The text of the Labor Policy that follows consists of four parts, Part-I: Legal Frame Work; Part-II: Advocacy: Rights of Workers and Employers; Part III Skill Development and Employment; and Part-IV: Manpower Export.

**DWCP AND ITS IMPLEMENTATION PLAN WITH ILO ASSISTANCE**

At the 13th Asian Regional Meeting of the ILO held in Bangkok in August 2001, the tripartite delegates accepted the basic concept of decent work, emphasizing that it would be the key concept that could integrate economic and social policies. In the conclusions of the meeting, delegates agreed that each country would prepare a National Plan of Action for Decent Work (DWNPA). At the meeting, the ILO was asked to provide assistance to its tripartite constituents in designing such plans. In this regard the Decent Work Country Programme for Pakistan has been prepared for implementation with the tripartite constituents' participation.

The DWCP-Pakistan is envisioned as a shared document to be prepared in consultation with the ILO and its tripartite constituents. However, since the Government of Pakistan has also prepared a Poverty Reduction Strategy Program with special mention of the Employment-Poverty Nexus, it is hoped that the DWCP will complement the PRSP framework.

The DWCP is also envisioned to be a dynamic document that is subject to revision and change as and when deemed necessary by the tripartite constituents. It covers a span of 3-5 years to be decided by the Decent Work Task Force (DWTF) and represents a framework of co-operation to be formulated jointly by the DWTF members.

**Labour Inspection Policy 2006**

Pakistan's Labour Policy 2002, Labour Protection Policy 2005, and the related legislation currently in the process of revision and consolidation, provide a framework for worker protection but also seek to encourage increased efficiency and competitiveness on the part of the nation's enterprises.

Policies and laws, although important in providing guidelines and legally enforceable standards, respectively, mean relatively little unless arrangements are in place to ensure the highest possible degree of compliance with legal provisions. Such is the purpose of this Labour Inspection Policy – to ensure compliance with the
nation's laws and regulations by all who fall within their provisions.

This policy document is consistent with ILO Convention 81 but also introduces a number of innovations directed at extending the coverage of labour inspection and related activities to segments of the working population previously untouched by labour protection and inspection services.

These innovations include the introduction of a unitary, integrated labour inspection system to replace the various specialist inspection services that have operated in the past. By its nature, an integrated system combines the work of several different inspectors under one general inspector. This can result in a dilution of expertise if not handled properly, but arrangements will be made to retrain inspectors to undertake integrated inspection work, as well as provide them with access to high quality technical expertise in cases where problems are detected that fall outside the abilities of the generalist.

The steps taken by the Government to curtail unemployment in the country

Against its estimated population of 160.97 million, Pakistan has a labour force of 51.78 million. Out of this, 2.69 million (i.e. 5.20%) is unemployed (Labour Force Survey 2007-08). Basic statistics on population, employed/unemployed labour force, are given in Annex-II to Annex-IV. The Government is aware of the situation arising from unemployment in the country and has taken a number of steps to contain it. As a result of the policy of the government, the overall unemployment rate has decreased from 6.20% in 2005-06 to 5.20% in 2007-08. The policy focus of the present Government is on the creation of decent employment, poverty reduction and human resource development. The importance of the attention to employment issues can be gauged by the initiatives taken by the present Government such as the construction of one million housing units, enhancement of residential facilities, regularization of Kachi Abadis, the doubling of Lady Health Workers to cover Kachi Abadis, adopting measures to enhance incomes of the livestock sector, raising of minimum wage from Rs.4,600 to Rs. 6,000, provision of workers’ pensions, and the restoration of Trade Unions. These steps will be helpful in employment generation and poverty reduction.

In terms of employment generation the government intends to concentrate on those sectors of the economy which are capable of generating employment such as agriculture, construction, services and small manufacturing industries. According to the Labour Force Surveys, from 2003-04 to 2005-06, 4.94 million jobs were created while during the period 2006-07 to 2007-08, 2.14 million jobs were created.

LABOR MARKET IN PAKISTAN

Employment and labour policies to promote opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity should be based on up-to-date and timely Labour Market Information and Analysis. The Ministry of Labour, Manpower and Overseas Pakistanis, in collaboration with the ILO and the United Nations Development Programme therefore initiated the development of a Labour Market Information and Analysis System, which became operational in the second half of 2006. The LMIA System aims to provide up-to-date and timely Labour Market Information and Analysis that serves as an input into the formulation and monitoring of labour and employment policies.

The review of the labour market demonstrates the need for a greater investment in education and training in Pakistan, in particular for youth and women, as the female illiteracy rate of the population ten years and above stands at 59.4 per cent, 24.4 percentage points higher than that of males. Overall, Pakistan’s
competitiveness is hampered by poor human capital. Educational attainment levels and enrolment levels are still low when compared with other countries in the region, even though these have increased since 2000. Reforms are necessary to improve literacy and basic education, and education and training investments should be closely linked to economic and employment growth strategies and programmes. Responsibility for improving the state of skills should be shared between the Government, the private sector, workers and parents, as parents have a major responsibility to keep their children in school.

The analyses of labor market done in 2007 can be summarized as:

1. Labour force (15 years and above) with less than one year of education decreased from 53.3 per cent in 2000 to 46.2 per cent in 2006.
2. Female illiteracy rate of the population (10+) stands at 59.4 per cent, which is 24.4 percentage points higher than males’.
3. Overall low attainment and enrolment levels in the field of education have led to skills gaps and a shortage of skilled labor in the country.
4. During the period 2000 to 2006 educational attainment has improved across all levels. For example the labor force with pre-primary and primary education rose by 1.3 percentage points. The labor force with Matric but below intermediate education grew from 11.4 to 12.8% and educational attainment at degree level increased from 4.6 to 5.9%.
5. Enrolment rates for the population aged 15 and above slightly increased between 2000 and 2006 in almost all educational attainment levels. The biggest improvement of 0.13 percentage points could be seen in the enrolment of the population (15+) with intermediate education but without a degree.
6. The proportion of the labour force with formal/vocational training declined or remained unchanged in 25 of a total of 43 provided training types. The highest decrease with -4.8 percentage points could be recorded in computer courses followed by a -3.8 decrease of people with formal/vocational training in auto mechanical courses. The largest increase is seen in electrician courses with an increase of 2.3% points from 1999-2000 to 2005-2006.
7. The analysis of data demonstrates that highly skilled occupations are on the rise, which is in line with Pakistan’s economic development in general and the decline of agriculture as a source of employment in particular. Highly skilled occupations accounted for 19.9 per cent of the employed in 2005-2006, with an increase of 1.8 % points over 1999-2000.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>28.97</td>
</tr>
<tr>
<td>Male</td>
<td>47.63</td>
</tr>
<tr>
<td>Female</td>
<td>9.29</td>
</tr>
<tr>
<td>Urban</td>
<td>27.14</td>
</tr>
<tr>
<td>Rural</td>
<td>29.82</td>
</tr>
</tbody>
</table>

Pakistan’s macroeconomic performance and renewed employment policy framework provide the basis for a move towards the achievement of decent employment objectives. The review of labor market developments in this report aims to establish to which extent this is happening, and to make recommendations on how better labor market outcomes can be achieved making optimal use of labor market information and analysis. Need to say how this relates to ‘green jobs’

Examination of labor market developments since 1999-2000 using Labor Force Survey and other data provides evidence that improvements have been achieved in opportunities for work and equity in work. Labor force participation, employment and unemployment indicators have changed in line with higher economic growth rates in recent years. The labor force participation rate has increased by 3.2 percentage points since
the beginning of the decade; the employment-to-population rate increased by 3.6 percentage points and the
unemployment rate decreased by 1.6 percentage points. Women benefited in particular from the
improvement in labor market performance, with the female unemployment rate registering single digits for
the first time, while an important part of the improvement is explained by the labor market position of the
youth (aged 15 to 24). Overall, an average annual employment growth rate of more than four percent was
achieved during 2000-2006, which exceeds the targeted growth rate of the MTDF for the second half of the
decade (projected at around three per cent).

Section X: SURVEY FOR SITUATION ANALYSES AND JOB
CREATION

A survey has been carried out to assess the current status of understanding of various stakeholders with
regards to green jobs in construction sector. The methodology adopted was dependent upon the rapid
analysis of green jobs’ status in a number of stakeholder organizations. A questionnaire was developed and
filled during interviews with the key persons in the relevant organizations working in the construction sector.
The questionnaire is given as Annex-VI with this report.

Besides filling of questionnaire during interviews the respondents who needed time were briefed about the
questions and given enough time to fill the questionnaire and return the format at their earliest. The other
approach adopted was group discussions within each organization to have an understanding of what is the
general perception about green jobs in the organization.

Contents of Questionnaire:

The major contents/questions of survey were:
i. Functions of the respondent organization
ii. Some basic statistics of the respondent organization
iii. The concept of green job in respondent organization
iv. Key occupations of the respondent organization
v. The impacts of the occupations on
vi. Environment friendly construction material usage
vii. Environmental considerations during construction of buildings and roads
viii. Promotion of green jobs in respondent organization
ix. Opinion of the respondent organization on various issues
x. General comments by the respondent organization.

Within various questions there were a number of sub-questions to get more details on various relevant
issues. This included:
i. Recommendations for policy measures
ii. Successful strategies adopted by respondent organization
iii. Problems faced by the respondent organization in green jobs promotion.
Overall conclusion

Completing the questionnaire presented some facts about the understanding of various respondent organizations of the ‘green jobs’ concept. The results are not very encouraging. There is a complete lack of understanding about green jobs in respondent organizations. Some were unable to properly fill the questionnaire and some were reluctant to complete it.

Stakeholders consulted during survey

1. Pakistan Housing Authority.
2. National Highway Authority.
3. Pakistan Public Works Department.
5. NESPAK.
7. Pakistan Environmental Planners and Architectural Consultants.
8. Ministry of Labor and Manpower.
10. Ministry of Communications.
12. Pakistan Workers’ Federation.
13. Labor Unity Pakistan (Labor Union).
15. Sohni Dharti Development Foundation (NGO from Khyber Pakhtoonkhwa province).
16. STEPS Society (NGO from Punjab province).
17. Human Development Foundation (Islamabad based NGO).
Concept of green jobs in respondent organizations:

In public sector organizations:

a. The only scope of this job is to obtain NOC from concerned EPA. When asked to explain this, the respondent replied that most of the construction firms consider only conducting IEE and EIA which is the legal requirement in which many such promises like energy conservation, waste minimization and workers' training are normally mentioned. However that commitment is only for seeking approval from relevant government agencies to start the project activities and the requirements are never met as proposed.

b. Some respondents were of the view that green jobs are related to workers who are supposed to ensure saving energy, resources and materials.

In the NGO sector the green job means:

c. Working for environmental protection; clean, green and peaceful Pakistan and bringing awareness about climate change.

d. Environmentally friendly construction employees are involved are termed as green jobs.

e. Jobs that promote environment friendly technologies.

f. The workers that pay due consideration to environmental protection during execution of their work. The job they do is a 'green job'.

The percentage of organization's operations involved with environmental sector:

On average the respondent organizations have less than 15% involvement in environmental considerations while executing various operations. The small percentage indicates that only legal formalities for basic requirements are being done, which include IEE and EIA reporting by construction firms. This low percentage also favors the introduction of green jobs and decent employment in construction related companies and organizations. Support for this statement?

Potential Impacts of construction activities:

With the help of the questionnaire and mainly through discussions it is observed that some understanding exists among respondent organizations about the impacts of construction on the environment. Assessment of impacts depends on the nature and magnitude of the activity being undertaken and also on the type of pollution control measures that are envisaged as part of each construction related project.

The potentially significant environmental impacts from construction project can be grouped as:
Air

- Impact on ambient air quality
- Impact on ambient noise

Water

- Impacts on surface water quality and ground water

Land

- Impacts on land use
- Impacts on soil fertility

Ecological Impacts

- Impact on trees and vegetation
- Impacts on forests and wildlife

Socio-Economic Impacts

- Impacts on other infrastructure
- Impacts on employment
- Impacts on public health and safety
- Impacts on cultural resources
- Impacts on aesthetics
- Sustainability of the building.

Sustainability of the building depends upon the design features, location of the building, its usage and the value of the property. All these aspects are covered during planning and design phases. Hence, this has no impact on the environment but the results of inappropriate planning and design would show negative impacts during operation of the building. Therefore, careful planning is expected from the engineers and architects.

Pressure on Local Infrastructure

During the construction stage of a project, demand for basic amenities such as water, power, etc. for the construction labor along with the requirement of construction activities, put pressure on the existing infrastructure. Considering the nature and the magnitude of the project, impact should be short term and low in magnitude and limited to construction phase only.

Contractor's and Worker's Camp

The contractor and workers' camp is usually established inside the boundary wall of the site. The site should
be converted into a green belt after the construction is completed so that there is no impact of the camp on the environment.

**Contamination of Soil**

The spillage of oil from the machinery or cement residues from concrete mixer plants might contaminate the soil if not properly collected and safely disposed of.

**Water Quality Degradation**

The most susceptible locations for contamination of water during construction are:

- Waterlogged areas during the construction period
- Surface and ground water resources close to construction material storage yard, concrete mixer plants and maintenance sites of construction vehicles; and
- Surface water bodies close to labor camps.

**Impact on Air Quality**

Potential impacts on the air quality during the construction stage will be due to the fugitive dust and the exhaust gasses generated in and around the construction site. Dust is a major component of air pollution, generated mainly from the following construction activities:

- Site clearance and use of heavy vehicles and machinery/equipment at the construction site;
- Procurement and transport of construction materials such as sand and cement to the construction site;
- And other gaseous emissions during construction result from operating construction vehicles, plant and equipments.

**Noise Pollution**

Noise is perceived as one of the most undesirable consequences of construction activity. Though the level of discomfort caused by noise is subjective, the most commonly reported impacts of increased noise levels are interference in oral communication and disturbance in sleep. Due to the various construction activities, there will be short-term noise impacts in the immediate vicinity of the project corridor. The construction activities include:

- Operation of Diesel Generator sets, concreting and mixing
- Excavation for foundations with driller (if used);
- Construction plant and heavy vehicle movement.

**Traffic Congestion**

Traffic congestion could happen in the construction site is near a busy road and is on a small pieces of land. Management of machinery movements and operational schedule could help in reducing the traffic congestion.
Stacking and Disposal of construction waste

Stacking of construction materials shall be confined to the project site only and also a suitable enclosure shall be provided, hence no impacts on surrounding residential blocks should happen. Siting or disposal of construction waste is likely to envisage unaesthetic view, unhygienic condition and choking of nearby drains. Such impacts are short term. The severity of such impact will depend upon the magnitude and type of construction waste.

Public Health and Safety

Construction activities near human settlements could cause health problems for the residents of the area. The main reason is the dust produced during construction activities. This can be reduced by water sprinkling and performing activities during the time when most of the people are away from houses and at their place of business.

The labor is usually in direct exposure to dust generation, which is likely to cause health related impact. This shall be minimized by providing suitable respiratory personal protective equipments (PPE) such as nose masks with suitable filters.

Social Impacts

The social impacts during the construction stage could result from the influx of migrant workers and associated induced development. This will ensure a rise in the consumption of consumer goods in the local area, which will tend to boost the local economy.

Environmental Impacts of Construction

In broader categories of construction the environmental impacts identified during the discussions are provided in the following table:
### Table 2: Environmental impacts and concerned departments

<table>
<thead>
<tr>
<th>Issue</th>
<th>Environmental Impact</th>
<th>Type of impact</th>
<th>Concerned Ministry/ Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>No impact but could be responsible for future impacts if not properly planned</td>
<td>Environmentally neutral</td>
<td>EPA, Ministry of Environment and Client</td>
</tr>
<tr>
<td>Architectural design</td>
<td>No impact but could be responsible for future impacts if not properly planned and designed</td>
<td>Environmentally neutral</td>
<td>Ministry of Environment and Client</td>
</tr>
<tr>
<td>Bill of quantities</td>
<td>No impact</td>
<td>Environmentally neutral</td>
<td>Client</td>
</tr>
<tr>
<td>Expression of interest, Tenders, Selection of Construction firm and Allotment of job</td>
<td>No impact</td>
<td>Environmentally neutral</td>
<td>Client</td>
</tr>
</tbody>
</table>
| Site clearance | 1. Loss of vegetation  
2. Loss of habitat  
3. Production of dust | Avoidable  
Controllable | Ministry of Labor, EPA, Client and Contractor  
In case of Roads Highways/Roads Department is also involved |
| Green belt construction | Environment friendly | Environment friendly | Client and EPA |
| Removal and demolishing of existing structures, parts of buildings (if any) | 1. Production of Dust in and around the premises.  
2. Removal of construction waste material.  
3. Temporary waste area to damage vegetation and soil.  
4. Production of dust during transport of construction waste to municipal waste site.  
5. Noise during demolition and reconstruction activities.  
6. Health impacts on labor like inhalation of dust, injuries, etc. | Controllable  
Controllable  
Controllable  
Unavoidable  
Controllable  
Unavoidable  
Controllable | Contractor, EPA and District Govt.  
In case of Roads it is Highways/Roads Department |
| Construction of sanitation facilities | 1. Digging to cause aesthetic nuisance.  
2. Construction waste material spreading. | Unavoidable  
Controllable | Contractor, EPA and Sanitation Dept of District Govt. |
| Preparation of construction material and mobility of labor and machines. | 1. Damage to the vegetation and trees.  
2. Compaction of soil.  
3. Drainage of water. | Controllable  
Unavoidable  
Controllable | Contractor and EPA  
In case of Roads Highways/Roads Department is also involved |
| Laying of pipeline for water supply. | 1. Digging of land will damage aesthetic value and could cause muddy situation.  
2. Storage and use of damaged pipes. | Controllable  
Controllable | Contractor and EPA  
In case of Roads Highways/Roads Department is also involved |
| Plumbing Works | 1. Metal pieces waste  
2. Injuries to workers  
3. Plastics, glues and rubber wastes | Controllable  
Controllable  
Unavoidable | Contractor and EPA |
| Electrical Fittings | 1. Plastic waste  
2. Wire cuttings and glass waste  
3. Potential hazards of electrical shocks | Unavoidable  
Controllable  
Controllable | Contractor and EPA |
Within a single construction firm/company many green jobs can be created, existing jobs can be transformed to green jobs or some jobs can be banned altogether. Table 3 presents recommendations for jobs to be eliminated, transformed, substituted or created.

In addition to the jobs listed below a job of Environmental Advisor/Scientist can provide policy guidelines (this is not mandatory but can be helpful):

**Table 3: Potential for green jobs in construction firms**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Environmental Impact</th>
<th>Type of impact</th>
<th>Prospects for green jobs</th>
<th>Potential for transformation or creation of decent jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>No impact</td>
<td>Environmentally neutral</td>
<td>Following green jobs can be created at this level: Environmental Engineer or Scientist A job of Urban Planner Environmental trainer; Green Material Training Specialists; Green Materials Construction Trade Instructors</td>
<td>HRD Manager Trainer on concept and practice of environmental protection Environmental quality assurance manager Environmental Auditor or Energy Auditor</td>
</tr>
<tr>
<td>Architectural designing</td>
<td>No impact</td>
<td>Environmentally neutral Environment-friendly/energy efficient house and school design and construction</td>
<td>Park Planner Landscape architect</td>
<td>This job can be transformed into Environmental Architecture Designing or Sustainable Community Designers</td>
</tr>
<tr>
<td>Bill of quantities</td>
<td>No impact</td>
<td>Environmentally neutral</td>
<td>Neutral</td>
<td>Environmentally safe materials sourcing</td>
</tr>
<tr>
<td>Expression of interest, Tenders, Selection of Construction firm and Allotment of job</td>
<td>No impact</td>
<td>Environmentally neutral</td>
<td>The environmental engineer job can be useful here</td>
<td></td>
</tr>
<tr>
<td>Site clearance</td>
<td>1. Loss of vegetation 2. Loss of habitat 3. Production of dust</td>
<td>Avoidable Controllable</td>
<td>A job of field environmentalist can be created at this level.</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Environment friendly</td>
<td>Environment friendly</td>
<td>A job of landscape architect can be created here.</td>
<td>The current job of site supervisor can be transformed into environment supervisor</td>
</tr>
<tr>
<td>---------------------------------------------</td>
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<td>-------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Green belt construction and restoration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction of water source</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removal and demolition of existing structures, parts of the buildings (if any)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Production of dust in and around the premises.</td>
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<td></td>
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<tr>
<td>2. Removal of Construction waste material.</td>
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<tr>
<td>3. Temporary waste area to damage vegetation and soil.</td>
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<td></td>
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<tr>
<td>4. Production of dust during transport of construction waste to municipal waste site.</td>
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<tr>
<td>5. Noise during demolishing and reconstruction activities.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Health impacts on labor like inhalation of dust, injuries, etc.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Controllable</td>
<td>Controllable</td>
<td>Unavoidable</td>
<td>Controllable</td>
</tr>
<tr>
<td>Construction of sanitation facilities</td>
<td></td>
<td></td>
<td>The job of sanitation engineer can be substituted by environmental engineer or a job of environment scientist can be created.</td>
<td>Health and environment inspectors</td>
</tr>
<tr>
<td>1. Digging to cause aesthetic nuisance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Construction waste material spreading.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation of construction material and mobility of labor and machines.</td>
<td>1. Damage to the vegetation and trees.</td>
<td>Controllable</td>
<td>A job of quality and environment control supervisor can be created here.</td>
<td>Operating engineers’ jobs can be transformed into Green Operations Engineers. Drivers and mechanics can be taught environmental standards and energy efficiency methods.</td>
</tr>
<tr>
<td></td>
<td>2. Compaction of soil.</td>
<td>Unavoidable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Drainage of water.</td>
<td>Controllable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various Construction works</td>
<td>Health hazards and wastes due to:</td>
<td>Controllable</td>
<td>A job of quality and environment control supervisor can be created here.</td>
<td>The job of plumbers can be transformed into Green Plumbers and Pipefitters. Quality inspectors’ jobs during construction could be transformed into Green Inspector. The job of HVAC engineer can be transformed into Green Systems and Retrofit Designers. The jobs of Welders, Cutters, Solderers, Brazers, Heating, Air Conditioning and Refrigeration Mechanics and Installers can be transformed into green jobs.</td>
</tr>
<tr>
<td></td>
<td>1. Construction of walls</td>
<td>Controllable</td>
<td>Jobs for Wastewater Plant Civil Engineers; Water Systems Designers and Engineers can be created.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Woodwork/framing</td>
<td>Controllable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Shuttering</td>
<td>Controllable</td>
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<td></td>
<td>4. Roof construction</td>
<td>Controllable</td>
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<td></td>
<td>5. HVAC works</td>
<td>Controllable</td>
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<td></td>
<td>6. Plastering</td>
<td>Controllable</td>
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<tr>
<td></td>
<td>7. Tile works</td>
<td>Controllable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Paints</td>
<td>Controllable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Construction of wastewater treatment facility</td>
<td>Controllable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laying of pipeline for water supply.</td>
<td>1. Digging of land will damage aesthetic value and could cause muddy environment.</td>
<td>Controllable</td>
<td>The job of environmental engineer can be created here.</td>
<td>The job of plumbers can be transformed into Green Plumbers and Pipefitters.</td>
</tr>
<tr>
<td></td>
<td>2. Storage and use of damaged pipes.</td>
<td>Controllable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Plumbing Works

<table>
<thead>
<tr>
<th>Wastes</th>
<th>Controllability</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal pieces wastes</td>
<td>Controllable</td>
<td>The job of supervisor can be transformed into environment supervisor</td>
</tr>
<tr>
<td>Injuries to workers</td>
<td>Controllable</td>
<td>or HSE supervisor</td>
</tr>
<tr>
<td>Plastics, glues and rubber wastes</td>
<td>Unavoidable</td>
<td></td>
</tr>
</tbody>
</table>

Electrical Fittings

<table>
<thead>
<tr>
<th>Wastes</th>
<th>Controllability</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic wastes</td>
<td>Unavoidable</td>
<td>Job of green architect and electrician can be created to cater to</td>
</tr>
<tr>
<td>Wire cuttings and glass wastes</td>
<td>Controllable</td>
<td>the energy efficiency</td>
</tr>
<tr>
<td>Potential hazards of electrical shocks</td>
<td>Controllable</td>
<td></td>
</tr>
</tbody>
</table>

Use of peter engines in various operations

| Noise                          | Avoidable       | The job can be eliminated & replaced by a skilled worker to operate diesel or natural gas operated engine. |
| Smoke                         |                 |                                                                      |
| Oil spills                     |                 | Mechanics trained in use of energy efficient machinery                |

Preferred Environment Friendly Construction Materials

The respondent organizations mentioned a few construction materials which they prefer due to their environment friendly properties. The following materials were identified:

1. Hollow bricks are preferred over normal bricks and solid blocks. They also trap air more efficiently.
2. Air tight windows and doors in order to make the construction energy efficient keeping in mind the “R” factor.
4. Solar panels and wind mills in Balochistan as well as biogas plants for energy generation.
5. Construction plot facing towards sun which is a factor for sunlight during summer and winter.
6. Thermopore usage in pre-fabricated structure for energy conservation.
7. Concrete street paths that are environment friendly.
8. Pavement of streets with concrete to prevent dust.
9. The energy efficient materials recommended by ENERCON Pakistan are introduced to replace traditional items.

There are a wide range of applications for recycled or secondary materials in replacing the need for virgin aggregates. Applications for earth fill, road sub-base fill and Type II material have made use of recycled material and crushed concrete for some years.

Secondary materials, which are wastes left over from industrial processes such as blast furnace slag, pulverised fuel ash (PFA) and incinerator bottom ash, can also be used as construction material. PFA, for example, is used in road construction and in several construction applications such as light weight aggregate manufacture, cement replacement, additive in concrete and brick manufacture.
Shortage of skilled environmental workers

A severe shortage of skilled workers has been identified in construction firms and with builders/contractors. The organizations also face moderate problems of skilled workers and often they are unable to find site engineers and supervisors who have an understanding of environmental issues. In such a situation, workers are not properly guided to take care of the environment while performing their duties.

Environmental Considerations during building construction

A number of respondents mentioned a few points which they consider while constructing buildings in an ideal situation:

1. All the environmental aspects are considered during the designing of project.
2. IEE/EIA of a project is must.
3. An environment management teams looks after the project.
4. Air tight windows and doors for energy conservation inside the building.
5. For the plots on wrong side, plantations are done in order to conserve energy.
6. Conditions set in Bill of Quantities (BoQ).

Environmental Considerations during roads construction

As far as road construction is concerned, a few environmental considerations mentioned by respondents are as follows:

1. Concrete street paths that are environment friendly.
2. Lining of water courses to control water losses.
3. Flood protection walls.
4. Retaining walls, check dams, delay action dams, can conserve water and prevent water pollution.
5. Covering water losses through drip irrigation.

Decent Work Deficits

During the survey it was observed that most of the construction firms face shortage of skilled workers. This results in a lack of capacity of firms to handle construction projects properly. It also creates the potential for transforming some vacant jobs into green jobs before being filled through establishing criteria relevant to the needs of green jobs. The vacant posts for skilled workers can be turned into green jobs if the skills that promote environmentalism in construction are integrated into the job descriptions.

In addition to shortage of skilled workers, the lack of decent work facilities is another main hurdle in promoting green jobs. The construction firms responded that they are facing funding problems to provide decent work opportunities to the staff they hire. The limitations in funds and uncertainty play a key role in hampering the increase in green jobs as well as decent work opportunities.

The workers have responded that they face uncertainty in continuity of jobs, primarily due to limited construction projects with their employers: there are also limited funds for available projects. The financial situation plays a negative role in spreading the concept of green jobs and decent work initiatives. Therefore, workers have to live with what has been offered to them.

A few respondents indicated that the recent disasters of the 2005 earthquake in Pakistan and flooding in 2010
created a vacuum for construction firms to fill the emergency demand of constructing houses and commercial buildings as well as structures like bridges, roads and canals. The immediate need of the community in Pakistan is considered as the main driving force for the construction industry's flourishing, which had been underemployed but is now employing workers to complete the projects. The immediate demand for and lack of skilled workers is one of the reason that hinders the process of expansion of green jobs in Pakistan.

Moreover, the traditional education at Technical Institutes for supervisors and workers lacks consideration for environmental protection or green jobs. There is little or no emphasis on quality environmental education for technical students. The technical Training Institutes can play a vital role in imparting green education to construction workers, ultimately contributing positively to expanding green jobs as well as the construction industry in Pakistan.

**Green Job Creation**

In view of the current situation, the respondents have identified many jobs that can be created in construction firms for the purpose of promoting green jobs in Pakistan, some of which have been noted in Table 3. These include:

Urban Planner: This might be the hottest growth area within the Green Construction industry segment. Urban Planners and Land Use Planners outline and develop cities and towns. They do much of the business planning and construction of many of the related projects. Government officials rely heavily on Urban Planners to ensure compliance with industry standards.

Parks Planner: A Parks Planner identifies, evaluates, and surveys parcels of land for potential use as recreational areas. They develop the site and manage all of the construction.

Landscape Architects: Landscape Architects create environmentally friendly parks and recreation sites. These might include outdoor spaces to be used for exercise, nature walks, family picnics, sports and recreation, and other activities. Landscape Architects and Environmental Scientists work hand-in-hand to find better ways to sustain our natural resources.

Green Architects: Green Architects focus on reducing the negative effects that construction projects can have on our environment. They do this by zeroing in on ways to most efficiently utilize resources and energy and minimize damage. The new approaches being brought about by Green Building has increased the need for Green Architects. This trend is expected to continue.

Among the many occupations that will be impacted by the green jobs movement few will provide as many opportunities as construction. Common jobs in the industry are being transformed by new technologies, new materials and new businesses that need a different understanding of existing processes.

A cement mason may, for example, begin using fly ash concrete, a fine glass-like powder derived from gases created by coal-fired electric power generation. The production of Portland cement causes as much as 6 to 8 percent of the world's CO2 annually. Using fly ash reduces the need for Portland cement and for having to bury it in a landfill.
Promotion of green jobs:

A few organizations are promoting green jobs based on their own understanding through:

1. All new construction based upon energy conservation with green jobs promotion.
2. Construction of model villages based on criteria to promote green jobs.
3. Minimizing the use of all forms of waste and pollution.
4. Awareness raising in stakeholder organizations.
5. Investing in federally funded green collar jobs programs, we can make a small investment go a long way. We can conserve energy, save tax payers' money, increase employment and provide new investment opportunities.

Factors responsible for limiting the growth of environment sector in organizations

The following factors have been identified by respondents as responsible for halting or slowing the promotion of environmental education and knowledge in the construction related organizations and firms:

1. Lack of funds for environmental considerations with organizations involved in construction sector.
2. The issue is not taken seriously but is instead limited to completing the formality of obtaining an NOC from the EPA.
3. Lack of funds to maximize the training of community members to engage them in green jobs.

Proposed policy measure for federal and provincial governments

The respondents have provided a number of policy measures which the Federal and Provincial governments may adopt to ensure the expansion of green jobs in the construction sector.

1. The promotion of solar cookers and tree plantations.
2. Promotion of alternate forms of renewable energy generation like biomass and biogas.
3. Promotion of green houses to seek carbon credits for the construction firms.
4. To make the issue of the environment more important as a problem.
5. Involve and encourage private sector and students.

Some successful strategies adopted by respondent organizations

1. One organization has made it a policy to base all construction on the concept of energy conservation.
2. One respondent is promoting green jobs through employing all engineers and workers who have good knowledge of and awareness about the environment.
3. Skills transfer to locals for awareness and promoting green jobs.
4. The IEE/EIA should address this issue as well.

Positive impacts of incorporating green jobs in respondent organizations

Only a few respondents were able to demonstrate any knowledge about the positive impacts the green jobs would have on the progress of their or other organizations. The responses were:

1. Green jobs would ensure construction of buildings based on energy conservation principles.
2. Technologically obsolete methods can be avoided which cause extensive damage to environment.
3. Carbon credits can be earned through promoting green jobs.
4. Can create awareness on environmental importance so that due consideration should be given to environmental conservation during construction activities.
5. Better environment for general public.
6. Controlling climate change to some extent.

**Negative consequences of incorporating green jobs in respondent organizations**

The respondents were also requested to identify any negative impacts the green jobs may have on their business. The replies are as follows:

1. Limited number of specialists in this sector which makes it less preferred.
2. Transfer of knowledge from higher level to lower levels is not possible if specialists are not available. This may result in decreased business opportunities.

**Technical assistance required by organizations to incorporate green jobs**

The organizations have requested the following technical assistance to enable them to incorporate and promote green jobs in their routine business:

1. Training sessions, with the Ministry of Environment to take a leading role in holding these.
2. Provision of funds to transfer the knowledge on green jobs to the grass roots level.
3. Information sharing among stakeholders is essential.

**General comments by respondent organizations:**

1. Due preference and consideration should be given to construction projects having provisions for environment protection and that have the least negative impacts.
2. Training on newly developed technologies should be provided through Ministry of Environment, Ministry of Labor and Manpower and PEPAC ensuring the technology transfer to Pakistan.
CHAPTER 4
Case studies on construction projects in Pakistan and other developed countries have been conducted to present the status of green jobs and decent employment in Pakistan in comparison to the same in the other countries. This chapter presents the conclusions drawn from the case studies and brief descriptions of two case studies.

The world has improved in a way that the construction industry, which comprises up to 60% of the development share around the world, has properly introduced and implemented the concepts of green jobs and decent employment to the workers at all levels. The construction firms, departments and public sector organizations have good control over the implementation of state policies and are efficient in drafting legislation in this regard.

Pakistan is a developing country where construction industry also shares up to 60% of the development programmes. The status of green jobs and decent employment needs to be studied and evaluated so that policies and legislation may be drafted and implemented in a proper way, thereby enabling workers to have increased access to green jobs and decent employment opportunities.

Construction firms in Pakistan are considering some measures to introduce energy conservation and green jobs with the aim of introducing decent jobs in their human resource in order to emerge as the most reliable and advanced engineering and construction firms in Pakistan. The case studies conducted for some building construction projects indicate that the following measures have been introduced in construction firms which are promoting the green jobs and decent employment opportunities.

Both case studies indicate that the higher management/owners of the buildings have shown a great deal of commitment towards environmental protection and constructing state of the art buildings. The owners have given their consent for various proposals by the architects and engineers to make sure that buildings are built on the principle of sustainable development. All the required resources were provided to the construction firms.

**Work Force Situation**

The contractors normally employ workers from local area and, if required, train them in the proper use of materials and machinery to avoid loss of materials, reduce waste, ensure the safety of workers’ health and keep the environment clean.

Workers employed in Pakistan are usually not previously trained to meet the requirement of contractors and be environment friendly workers. They need awareness and training which is currently being arranged on the spot by the contractors. The contractors claim that trained workers are not available in any part of the country. In Pakistan the employment of workers from local areas has increased in construction firms within their respective areas as well as in other areas with increased wages and salaries. They have the opportunity of decent work in various construction firms.

The case studies from Pakistan also indicates space for a number of new jobs in construction firms such as Environmental Architects, Environmental Engineers, Green Supervisors, Green workers, Engineers and
supervisors for HVAC and energy conservation. These firms have a broad scope for introducing new jobs, among which the most popular at the moment is Environmental Scientist, responsible for conducting Environmental Impact Assessments (EIA) and implementing the recommendations of this EIA.

The construction firms in other countries take care of each aspect of construction and employ proper work forces for each step, such as Environmental Architects and Environmental Engineers. They have the resources to fund these jobs and these firms take advantage of the investment through increased profitability and building better buildings.

In Pakistan the construction firms have limited financial resources and investors/owners of projects/buildings do not have enough money to fund each step of construction by specialists. Therefore, they emphasize the role of the Environmental Scientist who is supposed to manage the overall environmental aspect of construction. This makes room for the introduction of more jobs in this sector with proper awareness creation, training and explanation to the firms and owners about the benefits associated with introducing the specialist jobs.

When approached, a number of workers in Pakistan confirmed that they are enjoying the benefits of improved skills through increased wages and continued work opportunities without breaks between jobs. The analysis of the wages of workers during the survey revealed encouraging results for the promotion of green jobs in Pakistan, as can be seen from the table below:

**Table 4: Daily wages of workers in PKR date?**

<table>
<thead>
<tr>
<th>Unskilled workers</th>
<th>Traditional workers in construction firms</th>
<th>Skilled or Green workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>300</td>
<td>500</td>
</tr>
</tbody>
</table>

Different types of workers also have varying opportunities for work with regard to the number of days per month. Skilled or green workers have maximum opportunities for work days per month while traditional workers have less opportunities and unskilled workers even less. Most of the construction firms in Pakistan prefer traditional and unskilled workers due to lower wages. This is may be because of the lack of awareness about green jobs and green workers.

A very few construction firms have taken the initiative to employ trained workers and are enjoying the benefits of those workers. The relationship between workers and firms has grown stronger and the first preference for work is always for the trained workers in these firms.

**Table 5: Average work days per month for workers in Pakistan date?**

<table>
<thead>
<tr>
<th>Unskilled workers</th>
<th>Traditional workers in construction firms</th>
<th>Skilled or Green workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 18</td>
<td>18 – 22</td>
<td>25 or more</td>
</tr>
</tbody>
</table>
Neighboring Communities

The buildings studied under case studies have taken care of the needs and rights of the neighboring communities. The workers have been taken from the local communities. Employment for local people increased considerably as well as improvement in skills of workers for advanced construction needs.

Building Design

Following are considered during design of a building:
1. Earthquake resistance as per building code.
2. Guidelines for building code.
3. Direction of front side of building to be southwards to tap more sunlight during winters.
5. Energy efficient and environment friendly construction materials.
6. Heating and air-conditioning systems.
7. Trained workers or training of workers.

Choice of Construction Material

1. Double glazed tempered glass is being used by the majority of construction firms. It becomes rounded granules on damage and causes no injuries. Hence it is safe to use.
2. The double glazed tempered glass absorbs heat during winter as sun moves southward in winter. This decreases fuel use (electricity, gas and diesel) to heat the building. This type of glass is an energy saver.
3. Advanced Centrally Air Conditioning Systems being imported from other countries which are energy efficient and very effective in the provision of fresh air and ventilation.
4. Increased percentage in use of lighting running on “energy savers”.
5. Wastewater treatment plant and sewerage treatment facilities are now becoming part of the construction plans.

Modern construction materials include Cellular Lightweight Concrete Blocks (CLC Blocks); High Performance Glass and Low VOC paints. The size of CLC blocks used for external walls is 500x200x200 mm and for the internal partition blocks is 500x200x100 mm nominal size. Any desired size as per the requirement is also being used. As noted above, double glazed tempered high performance glass is being used in buildings which is suitable for tapping solar energy and reducing the need for heating or cooling the building. The low Volatile Organic Compounds paints are being used to reduce health hazards. These paints are more efficient in reducing the transmission of heat from inside the building to the construction materials inside the walls. This further reduces the use of energy for heating.

Shadow and Reflection from the Building

The building blocks are being constructed away from neighboring properties and have limited heights so as to avoid shadow on the homes and properties of local residents. The location of buildings is usually away from residential areas.
Case Study No. 1: The Nature Conservancy New Headquarters Building

Overview

- Location: Arlington, VA
- Building type(s): Commercial office
- New construction
- 172,000 ft² (16,000 m²)
- Project scope: 8-story building
- Suburban setting
- Completed 1999

The Nature Conservancy's new headquarters is an eight-story 172,000 ft² (16,000 m²) office building in the Ballston area of Arlington, Virginia. The Conservancy occupies six floors and leases two floors, which provide room for growth. Parking is accommodated in a garage below the building; the remainder of the site has been transformed into a 1/2-acre (0.2 ha) landscaped park.

Environmental Aspects

The Nature Conservancy wanted their new headquarters to reflect both their commitment to protecting the environment and their conservative use of donated funds. As a private, nonprofit group that relies on donor support, the Conservancy is proud of the fact that most of its operating budget goes toward land conservation. Their goal for their new headquarters was to develop an environmentally responsible building design based on proven materials and technologies that would not increase the first cost of the building or compromise future re-marketability.

Owner & Occupancy

- Owned and occupied by The Nature Conservancy, Corporation, nonprofit

Finance & Cost

- Total project cost (land excluded): $16,250,000

The Conservancy's new headquarters was built within a standard speculative office building budget. No extra funds were allocated for green design. The cost of the building, exclusive of the parking garage, was about $64/ft² ($690/m²). The cost of the interior fit-out for the Conservancy space was about $21/ft² ($225/m²). Typically, a build-to-suit headquarters project would have a slightly higher budget; however, the Conservancy was eager to keep its costs within market rates.

Land Use & Community

The Nature Conservancy's new headquarters building occupies a full block in downtown Ballston. The principal exit of the Ballston Metro station is located on the southeastern corner of the site, with the Metro entrance and terminal diagonally across the street. The building design is essentially a simple rectangle in
plan, with a regular grid of deeply set windows in a precast concrete facade. The exceptions are the main conference room, which extends into the park on the north side of the building and the corner facing the Metro. On the corner facing the Metro, a three-story block marks the front entry, and the upper floors are pulled back 12 ft (3.7 m) from the street line. Ballston is a rapidly growing inner-ring suburban community. Convenient Metro access, an evolving street life, and considerable mixed-use development are transforming this bedroom community into an urban locale.

**Reduced Parking Requirements**

Though surface parking was permitted, the Conservancy built a below-ground parking structure. Because many employees take the subway or ride bicycles to work, the Conservancy’s requests to decrease the size of the garage were approved by the county. Use of "buddy parking," in which cars are parked behind each other, also helped to reduce the size and cost of the garage. The facility provides locked storage and shower areas for bicycle commuters and an on-site recharge station for electric vehicles.

**Green Strategies**

- Property Evaluation
  - Assess property for integration with local community and regional transportation corridors
- Responsible Planning
  - Ensure that development fits within a responsible local and regional planning framework
- Properties with Excessive Impacts
  - Avoid contributing to sprawl
- Support for Appropriate Transportation
  - Provide showers and changing areas for bicycle and pedestrian commuters
  - Provide storage area for bicycles
  - Provide access to public transportation
  - Provide for electric vehicle charging
- Property Selection Opportunities
  - Select Brownfield sites for development
  - Select already-developed sites for new development

**Water:**

Office buildings in northern Virginia, where summer water shortages are common, typically have in-ground irrigation systems. Because native plantings were used on the site, no irrigation system was required. This reduced construction and operational costs while also conserving water. All plumbing fixtures meet the water conservation requirements of the U.S. Energy Policy Act. A central water purification system distributes purified water to the pantry sinks and coffeemakers. This low-cost feature reduces reliance on bottled water and its associated costs and wasteful packaging.
- Lot size: 1.60 acres on previously developed land, Brownfield site
Water Conservation and Use

Green Strategies

- Development Impacts
  - Limit parking area
- Ecosystem Restoration
  - Convert turf areas to native desert, prairie, or woodland ecosystem
  - Remove ecologically damaging non-native (invasive) species
  - Replant damaged sites with native vegetation
- Runoff Reduction
  - Avoid contiguous impermeable surfaces
- Water Conservation Education
  - Educate building management and employees about water conservation
- Remediation of Damaged Sites
  - Decontaminate Brownfield sites
- Low-Water-Use Fixtures
  - Use low-flow toilets
- Site Planning
  - Site buildings so as to help occupants celebrate the natural beauty

Energy

Extensive energy modeling was done during design to seek out cost-effective, energy-efficient solutions. While significant savings were realized based on the use of daylight and efficient electric lighting, the relatively small size of the building and modest energy requirements made it difficult to economically justify many energy-efficient upgrades to the HVAC equipment.

Day lighting

The architecture and interiors were developed to create bright, daylit office areas. Large floor-to-ceiling windows with high-performance glazing draw in daylight while minimizing heat gain. The deep precast concrete facade and light shelves on the south, east, and west facades provide sun shading to further reduce heat gain. Architectural light shelves direct daylight onto the 9-foot-high (2.7 m) ceiling, which is finished with special high-reflectivity ceiling tiles to create a spacious, airy feeling.

Along the building perimeter, shades made of translucent cloth are mounted to the underside of the light shelf to control brightness. Above the light shelf, fixed louvers control glare from low-angle sun. Inside the office floors, systems furniture partitions surround the open-office workstations to enhance privacy. The bright ceilings and views of buildings and sky above the light shelf are important for maintaining an open feeling on the floor, given that many of the partitions are 6 ft (1.8 m) high.

To optimize the selection of the window glazing, Lumen Micro was used for daylighting analysis, while energy modeling monitored the impacts of the options on overall energy performance. The glass above the light shelf is clear, with no low-e coating on the south, east, and west facades and a standard low-e coating on the north facade.
**Electric Lighting**

The office areas use high-efficiency, low-brightness lighting with automated daylight dimming and occupancy sensors to maximize energy efficiency while creating an exceptionally comfortable work environment.

The open-office lighting consists of 2x2-foot (0.6x0.6 m), 16-cell-deep louver fluorescent parabolic light fixtures that conceal T-5 compact fluorescent lamps. The lights are connected to a daylight dimming system that adjusts lighting levels based on changes in daylight availability. Lighting in the inner perimeter offices and support spaces is connected to occupancy sensors. To differentiate the circulation space along the core from the opening office area, recessed 2x2-foot (0.6x0.6 m) uplighting fixtures provide brightness that compensates for diminished daylight levels.

**Green Strategies**

- **Light Sources**
  - Use high-efficacy T-5 fluorescent lamps
- **Heating Systems**
  - Use high-efficiency, condensing oil or gas boilers and furnaces
- **HVAC Controls and Zoning**
  - Zone the building for modular HVAC control

**Materials & Resources**

The team specified building materials that limit environmental impacts, waste, and pollution throughout their life cycles. This included natural materials, local materials, and materials made from renewable resources and/or materials with recycled content.

**Healthy Materials**

All paints, stains, and adhesives have low VOC content. All solder for basic piping fittings is lead-free. The team specified low-VOC joint and seam sealers for all mechanical joints and seams, as well as low-VOC gypsum board joint compound.

**Renewable Materials**

Cork flooring is used in typical office floor elevator lobbies, and linoleum is used instead of sheet vinyl for pantry and copy room floors. All wood material came from sustainably managed forests, as certified by a Forest Stewardship Council-accredited certification agency. The ash wood veneer doors use a “character-grade” wood, which makes use of wood that would otherwise be considered waste.

**Recycled-Content Materials**

Site furnishings are made entirely of recycled plastic. A formaldehyde-free, 100%-recycled cellulose fiberboard product serves as the backing for fabric panels in conference centers. Other materials with recycled content include ceiling tiles, insulation, steel, aluminum, and gypsum board.

Recycling
Each office floor contains a pantry and copy/fax/printer area with recycling and trash bins incorporated into the millwork base cabinets. The ground floor loading dock accommodates the storage and staging of recyclables.

A chute system was considered for recyclables but was not included in the final design because it had a negligible effect on maintenance costs and no real effect on recycling rates. It was determined that recycling rates would depend on the provision of convenient collection areas and the commitment of the staff, not the method used to convey materials to the ground floor.

**Green Products Used**

- Formaldehyde-Free, High-Impact, Wood-Fiber Acoustical Wall and Ceiling Panels

**Green Strategies**

- Job Site Recycling
  - Seek a waste hauler who can separate recyclables out of commingled waste
- Recycling by Occupants
  - Specify recycling receptacles that are accessible to the occupants
- Toxic Upstream or Downstream Burdens
  - Use true linoleum flooring
  - Use natural cork flooring
- Post-Consumer Recycled Materials
  - Use recycled-plastic benches or picnic tables
  - Prefer insulation with high recycled content
- Pre-Consumer Recycled Materials
  - Use gypsum board made with higher percentages of synthetic gypsum
  - Specify aluminum products made from high levels of recycled scrap
- Materials and Wildlife Habitat
  - Use wood products from independently certified, well-managed forests for finish carpentry.

**Indoor Air Quality**

The building was designed to comply with ASHRAE 62, the industry standard for indoor air quality, and ASHRAE 55, the industry standard for thermal comfort. Building materials were carefully selected to promote good indoor air quality. All interior materials—from the carpeting to the adhesives, paints, coatings, and sealant—have been screened to limit VOCs and other chemical content.

To reduce contamination during construction, the design team provided a suggested sequence of finish installation for the contractor. The sequencing is based on installation of wet materials that offgas as they cure prior to installation of dry, fleecy materials because the latter can adsorb contaminants and reemit them over time.

**Green Strategies**

- Visual Comfort and The Building Envelope
  - Use large exterior windows and high ceilings to increase daylighting
• Visual Comfort and Interior Design
  o Design open floor plans to allow exterior daylight to penetrate to the interior
• Reduction of Indoor Pollutants
  o Use only very low or no-VOC paints
  o Use only very-low-VOC carpet adhesives

Case Study No. 2

Environmental Impact Assessment of Quaid-e-Azam International Hospital
Rawalpindi, Pakistan

The project is a new construction of a modern hospital at Golra Morr, Rawalpindi. The project proponent for the proposed project is Global Health Services, Pakistan. The proposed project is a balanced combination of state-of-the-art, manual, semi-automatic and automatic health care systems. It is foreseen that the hospital will not only serve the surrounding area but the entire Islamabad and Rawalpindi districts owing to the plethora of services it will offer.

After completion of construction phase and during operational phase the hospital would provide 400 beds for patients with all medical departmental activities required in a proper hospital. The number of staff during operational phase would be over 2,000.

PROJECT LOCATION

Quaid-e-Azam International Hospital is ideally located near Golra Morr Rawalpindi at Latitude 33°37′29.74″ N and Longitude 72°58′25.49″ E. The hospital is not only conveniently located to serve the people of Rawalpindi and Islamabad but is also close to all the road exits to the rest of the country including the Motorway and the highway to Khyber Pakhtunkhwa, Punjab, Kashmir and Afghanistan. The available infrastructure nearby the site further makes the establishment of hospital feasible as all the basic requirements like energy, roads, transport, markets, etc. are available very close to the project location.

Project Initiation

The plan of the Quaid-e-Azam International Hospital was approved by the Cantonment Board, Rawalpindi on 26-08-2008. The work on the project started immediately after approval in 2008. Almost 60% construction work has been completed so far. The estimated time of completion of project is December 2011.

Cost of Project: The cost of project at the time of designing was Pak Rs. 3 Billion. Escalation in cost is expected due to price hikes in construction material.

Project/Land Alternatives

There is no other land available in the area which was to be considered as an alternative for the project. The project is being executed by a private party. Hence availability of land is limited. The parameters considered during purchase of land for hospital were:
  a. Enough open space for constructing a complete hospital.
  b. Easy approach.
  c. Located at moderate distance from road.
d. Least traffic noise and pollution.
e. Non-availability of similar facility in the area.
f. Least population adjacent to the plot.
g. Availability of utilities.
h. Least flora and fauna to be disturbed.
i. Availability of construction material close to the site.
j. Easy availability of local labor.
k. Good public transport system in place near the site.

Table 6: Hospital PROJECT INFLUENCE AREA

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<thead>
<tr>
<th>Selection Criteria</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude and Longitude</td>
<td>Latitude 33°37'29.74&quot; N</td>
</tr>
<tr>
<td></td>
<td>Longitude 72°58'25.49&quot; E</td>
</tr>
<tr>
<td>Elevation above mean sea level</td>
<td>500 meters</td>
</tr>
<tr>
<td>Climate Conditions</td>
<td></td>
</tr>
<tr>
<td>Annual Mean Max Temperature</td>
<td>The mean maximum temperature ranges from 39.4°C to</td>
</tr>
<tr>
<td></td>
<td>25.6°C (103°F to 78.1°F) in the month of June</td>
</tr>
<tr>
<td>Annual Mean Min Temperature</td>
<td>The mean minimum temperature ranges from 16.7°C to</td>
</tr>
<tr>
<td></td>
<td>3.2°C (62°F to 37.8°F) in the month of January.</td>
</tr>
<tr>
<td>Annual Rainfall</td>
<td>1,044 millimeters (41.10 inches) with more than 50%</td>
</tr>
<tr>
<td></td>
<td>occurring in monsoon season.</td>
</tr>
<tr>
<td>Surrounding Land Use</td>
<td>Mixed Land Use</td>
</tr>
<tr>
<td>Nearest Highway/Motorway</td>
<td>N-5, M1, M2</td>
</tr>
<tr>
<td>Nearest Railway</td>
<td>Rawalpindi Railway Station</td>
</tr>
<tr>
<td>Nearest Airport</td>
<td>Islamabad Airport</td>
</tr>
<tr>
<td>Hills / Valleys</td>
<td>None</td>
</tr>
<tr>
<td>Water Bodies</td>
<td>None</td>
</tr>
</tbody>
</table>

Table 7: GROUND COVERAGE

<table>
<thead>
<tr>
<th>S/NO</th>
<th>Block</th>
<th>Total Area -SFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Block A + 02 Parking Basements</td>
<td>380,000 /-</td>
</tr>
<tr>
<td>2</td>
<td>Block B</td>
<td>170,000/-</td>
</tr>
<tr>
<td>3</td>
<td>Parking Plaza</td>
<td>145,000 /-</td>
</tr>
</tbody>
</table>

Area covered by proposed hospital: Five (05) acres.
Climate

The climate of Rawalpindi area is characterized as sub-humid to sub-tropical. It receives rainfall from both monsoon and winds from the western direction. The maximum rainfall occurs in monsoon season from July to September. The average rainfall is about 1,044 millimeters (41.10 inches) with more than 50% occurring in the monsoon season. The summers are hot and winters are cold. The mean maximum temperature ranges from 39.4 °C to 25.6 °C (103 °F to 78.1 °F) in the month of June, while mean minimum temperature ranges from 16.7 °C to 3.2 °C (62 °F to 37.8 °F) in January. Extreme values of temperature in the Project area range from 46.1 °C to -1.1 °C (115 °F to 30 °F). Wind rows for Rawalpindi was studied to determine the prevailing wind directions. It indicates that there are no prevailing wind directions in the mornings rather wind direction is evenly distributed throughout the year. In the late afternoons, however, the winds are mainly from southwest whereas southeasterly winds dominate in July and August.

Topography

Rawalpindi falls in the Salt range and Potohar plateau. The area surrounding the City generally comprises of rolling to hilly terrain. The continuity of this hilly terrain is broken by regular hills and is cut up in all directions by ravines and Nullahs (waterways) running out from these hills. The highest areas are found in the northwestern and southeastern parts, 1,043 and 660 meters high above sea level respectively. The land of Rawalpindi gradually falls to Lai Nullah in the west and Kurang River in the east. Lai Nullah is the permanent physical feature of the City, which enters from the southwest into the densely populated areas and winds its way into the City. Consequently it joins Soan River in the South. Sometimes it overflows during the rainy season causing considerable damages in the City.

Seismicity:

Rawalpindi is situated in seismic Zone 2B i.e. moderate damage zone, corresponding to intensity VII of the Modified Mercalli scale.

Surface Water

A number of streams originating from the Margala hills join together to form the Lai Nullah, which is the principal watercourse for Rawalpindi city. It meanders approximately north to south through the developed areas of the city and finally joins the Soan River. Lai Nullah not only carries the stream water-run-off and sewage of large part of Islamabad, it also collects local city sewage, which is untreated. Domestic solid waste is also disposed of in the nullah. It is a perennial surface water channel with occasional flooding during monsoon season. Rawal Dam and Khanpur Dam are the two major surface water bodies in the vicinity of the City, which cater to about 50% of the present water demand of the City. The Soan River is the only major surface water body which passes about 800 meters from the proposed site.

Ground Water

The groundwater table for Rawalpindi is rapidly depleting. The average depth of the water table was 12 meters in 1980, which has now depleted to 52 meters in 2003. About 250 tube-wells are present in the City, which
cater for about 50% of the present water demand of the City. The groundwater of the congested areas of Rawalpindi is reported to be contaminated due to lack of sanitation facilities. As part of PPTA, water sampling for ground and surface water sources and from existing distribution network in the project area was carried out. The results show that more than 50% of the tested tube wells and distribution network, and all samples taken from the catchment of the surface water supply at Rawal Lake are highly contaminated with E-Coli, Faecal Coliforms and other bacteriological contamination.

**Land use**

The land of proposed Site is flat, and is mostly not barren area. The proposed site is far away from cultivated land. The proposed Site for QIA Hospital is located away from the industrial area. The proposed Site has a lot of open land in its surroundings. No agricultural activities or beneficial use of the existing open land is there. Hence, no negative impacts due to change of land use are envisaged for the project. Previously, most of the area was open land owned by a number of owners. A house on the land which was also purchased by the QIH which is now being used as site office.

**Noise Environment**

The hospital site is near the main road carrying heavy traffic all the day. The hospital is a sensitive installation which needs a peaceful environment. Therefore, noise level tests are considered necessary. These were carried out at two main locations: the main entrance and the center of the hospital site. The average noise level at main entrance was 60.9 dBA and 50.7 dBA at the center of hospital site. The noise levels are quite acceptable and further reduction would be observed once construction is completed due to existence of walls around the hospital facility and walls for the main building blocks, which serve as noise barriers. The noise level would fall below 35 dBA inside the hospital building.

**Traffic Scenario and Parking Facilities**

The site is located along the Grand Trunk road connecting Rawalpindi with western cities like Peshawar, Nowshera, Attock and Hassanabdal. Being a main road, the traffic load is considerable. All types of traffic can be seen on the road. The road is wide enough to allow a smooth flow of traffic on both sides. Traffic jams are possible only if an accident happens but that too for only a few minutes.

A service road is available along the northern side of the G.T. road which would be used by vehicles visiting the hospital. Enough space is available along both sides of this service road for any parking by private ambulances, taxi cars and others. A spacious parking place is planned and under construction inside the hospital premises. Controlling traffic would not be a problem for the hospital or district traffic administration.

The hospital premises are planned 100 meters away from main road. There is service road zone and an open area between the service road and the hospital boundary wall. That space can be used by vehicles for parking. This will not affect the flow of traffic as it is away from both the main road and the service road.

The parking space to be provided inside the QIH would be sufficient as only 25% of the area would occupied by buildings. A total of 359 vehicles will have parking facilities inside the premises. Separate spaces will be provided within the parking areas for accommodating double the number of motorcycles. Parking spaces for ambulances belonging to the hospital will be separately provided on eastern side of Block A.
POTENTIAL IMPACTS

All the potentially significant environmental impacts from the project are grouped below:

**Air Environment**
- Impact on ambient air quality
- Impact on ambient noise

**Water Environment**
- Impacts on surface water quality and ground water

**Land Environment**
- Impacts on land use
- Impacts on soil fertility

**Ecological Impacts**
- Impact of tree / vegetation
- Impacts on forests and wildlife

**Socio-Economic Impacts**
- Impacts on other infrastructure
- Impacts on employment
- Impacts on public health and safety
- Impacts on cultural resources
- Impacts on aesthetics

The following table gives an overview of the potential impacts due to project location, construction and operation of the proposed project.
Table 8: Overview of Potential Impacts due to the Proposed Project

<table>
<thead>
<tr>
<th>No.</th>
<th>Impacts</th>
<th>Negative Impacts</th>
<th>Positive Impacts</th>
<th>No Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Short Term</td>
<td>Long Term</td>
<td>Short Term</td>
</tr>
<tr>
<td>A.</td>
<td>Project Siting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>Displacement of people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>Change of land use</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>iii.</td>
<td>Loss of trees/vegetation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td>Shifting of utilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v.</td>
<td>Impact on archaeological property</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td>Construction phase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>Pressure on local infrastructure</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>Impact on water quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>Impact on air quality including dust generation</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>iv.</td>
<td>Noise pollution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v.</td>
<td>Traffic congestion and loss of access</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vi.</td>
<td>Staking and disposal of construction material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vii.</td>
<td>Public health and safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>viii.</td>
<td>Social impact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.</td>
<td>Operational phase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>Increase in air pollution and noise levels</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>Water harvesting and recharge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>Increased water use efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td>Disposal of solid and biomedical waste</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v.</td>
<td>Induced infrastructure development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vi.</td>
<td>Quality of life/human use value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vii.</td>
<td>Increment in green cover</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IMPACTS DUE TO PROJECT OPERATION

Prediction of Pollution Load from DG Set

For emergency purposes 1 DG set of 750 KVA capacity is proposed for 100% backup in case of power break down. The pollution load has been calculated assuming that DG set will be operated for 8 hours per day and assuming the use of low sulphur content diesel (presently 0.25% sulphur diesel is available in the market). Table 9 shows the pollution load due to the DG Set:

Table 9: Pollution load due to the DG Set

<table>
<thead>
<tr>
<th>Capacity of DG Set in KVA</th>
<th>Emission of SPM in g/sec</th>
<th>Emission of SO2 in g/sec</th>
<th>Emission of CO in g/sec</th>
<th>Emission of NOx in g/sec</th>
<th>Stack dia. in m.</th>
<th>Flue Gas Temp in O K</th>
<th>Stack Height in (m)</th>
<th>Flue gas Velocity in m/sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>750</td>
<td>0.0625</td>
<td>0.0016</td>
<td>0.729</td>
<td>1.916</td>
<td>0.3</td>
<td>773</td>
<td>45.3</td>
<td>37.84</td>
</tr>
</tbody>
</table>

In order to minimize the emission load, an effective height of the stack for the DG Set will be provided. For the proper dispersion of pollutants, a stack of 3.5 m height above the roof has been proposed for the DG Set.

The vehicles would be allowed to enter inside up to a certain very limited area. Hence only minor increments in the baseline condition would be observed, and more importantly, the resultant concentrations of the criteria pollutants would be within the limits of the National Ambient Air Quality Standards.

Noise Environment

The sound pressure level generated decreases with increase in distance from the source due to wave divergence. An additional decrease in sound pressure level with distance from the source is expected, due to atmospheric effect or its interaction with objects in the transmission path. During the operational stage, DG set, cooling towers, pumps and vehicles are the major source of noise pollution. The table below highlights the noise levels emanating from various equipments during the operation stage:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of Equipment</th>
<th>Noise level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D.G Set</td>
<td>80 – 85</td>
</tr>
<tr>
<td>2</td>
<td>Pumps</td>
<td>70 – 75</td>
</tr>
<tr>
<td>3</td>
<td>Cooling Towers</td>
<td>65 – 70</td>
</tr>
</tbody>
</table>

Traffic Environment

The total vehicle load from the proposed project is estimated to be around 600 PCUs / day. This load is assumed to be distributed over a period of 24 hours, which is presumably the duration of activity for any hospital project and distributed as per the hourly traffic distribution. The carrying capacity of the main G.T. Road is more than 5,000 PCUs/hour, hence, under no circumstances will the G.T. Road's carrying capacity be exceeded.

Buffer Zone for pollution free environment to patients

The front of the hospital, which faces south, has road at a distance of 100 meters. Therefore, enough space is available to assimilate the traffic noise and disperse the traffic pollution. On the northern side is the residential area at a considerable distance from the main buildings. To the east is a private school and some houses and other settlements are on the western side. Therefore, the overall location itself is environmentally friendly for patients.
**POSITIVE IMPACTS**

**Health Infrastructure**

This Hospital cum Research Institute is going to cater to a large mass of people from the entire cities of Rawalpindi and Islamabad, and will provide them an excellent opportunity for a healthy life at a reasonable cost.

**Physical Infrastructure**

The operation of the project will provide value addition to the existing infrastructure facilities such as public transport, water supply and telecommunications.

**Employment**

The operation of the project and other allied facilities, will improve employment opportunities. On an average about 50 - 100 persons per acre will be getting direct or indirect employment due to the proposed project. The employment will have positive impact on the local economy thereby increasing the quality of life.

**Enhancement of Public Health and Safety**

Public health and safety will be enhanced. All fire and safety measures suggested by Government Authorities will be taken and regular mock drills will be conducted at the project site. Regular health check up will be carried for those persons working near DG sets and the security guards.

**FIRE FIGHTING SYSTEM**

i. Water storage for firefighting shall be provided in the water reservoir.

ii. Pumps will maintain constant pressure in the system.

iii. Two stand pipes, connected with fire pumps, will be provided in the building with fire hose cabinets on each floor.

iv. Each cabinet shall house one 1.5” diameter hose of 100 ft length and attached to a gate valve of same diameter.

v. Orifice plates will be provided at the hose cabinets to control pressure at required level as per manufacturer’s requirements.

vi. Both the standpipes shall also have connection from overhead water tank to feed the system in case of a rare emergency (i.e. when pumps do not start). Fire reserves in the overhead water tank shall be a minimum of 5,000 gallons (as per provisions of “Design of plumbing and drainage systems” by Louis Blendermann).

vii. Roof manifold provides a point to check functioning of the system at periodic intervals, in order to ensure its effective functioning at the time of actual use.

viii. One Siamese connection outside the building shall facilitate the fire tenders to connect the system to fight a fire.
MITIGATION MEASURES

Besides other mitigation measures for air, water and soil pollution control, the following important measures have also been taken care of in the EIA:

GREENBELT DEVELOPMENT

The landscape for the proposed project has been planned to provide a clean, healthy and beautiful green environment for the people to live in and work in. Green belts will be created at different locations within the hospital premises. The main green belt area would be near the entrance of the hospital which is designed for about 7,840 Sq. Ft. Smaller green belts will also be created near the buildings of the main hospital blocks. A number of flower pots of varying sizes will be provided at all the possible locations within the hospital premises.

MEASURES FOR GREENING THE STRUCTURE AND ENERGY CONSERVATION

The following measures have been taken into account to make the hospital a green building and facility:

- Double glazed tempered glass is being used. This will absorb heat and decrease the use of fuel (electricity, gas and diesel) to heat the inside of the building. Therefore, this type of glass is by nature an 'energy saver'.
- A Central Air Conditioning System would be imported from MIA Company, Malaysia which is energy efficient and very effective in providing fresh air and ventilation for all areas including wards, labs, corridors and offices.
- 80 percent of lighting in the hospital would be based on energy saving bulbs
- Wastewater treatment plant and sewerage treatment facilities are provided in the plan.

The above measures have contributed to the establishment of businesses and employment which promote green jobs indirectly. The construction firm has trained its workers whose market value is now more than that of traditional workers. They now have various options from many construction firms for jobs at higher salaries and wages.

The engineers, workers and supervisors of the firm are now being hired by other firms on a consultancy basis to train their workers and to complete assignments. More and more workers are now being introduced by this construction firm in the field and the number of jobs is on the rise in various construction firms. The firms are also sending their engineers and supervisors for advanced education and training to foreign countries. This will ensure the updating of skills needed in this sector.

Shadow and Reflection from the Building

The building blocks are being constructed away from local residential properties and have limited heights so as to avoid casting shadows on the homes and properties of local residents. The buildings are on the southern side of the residential area near the hospital so the position and movement of the sun would not affect the residential area.
Choice of Construction Material

The authorities have decided to use modern construction techniques including the use of the following materials:

- Cellular Lightweight Concrete Blocks
- High Performance Glass
- Low VOC paints

The size of the CLC blocks for the external walls will be 500x200x200mm and the internal partition blocks will be 500x200x100mm nominal size. Any desired size as per the requirement would also be used.

Double glazed tempered high performance glass is being used in the building which is suitable for tapping solar energy and reducing the use of utilities for heating or cooling. The low Volatile Organic Compounds paints are being used to minimize health hazards. The paints are more efficient in reducing the transmission of heat from inside the building to the construction materials inside the walls. This will further reduce the use of energy for heating the building.

Construction Work Force Situation

The contractor has employed workers from the local area and trained them in the proper use of materials and machinery to avoid loss of materials, reduce wastes, ensure the workers' health and safety and keep the environment clean.

Workers employed on the site were not previously trained to meet the requirement of the contractor but have become 'environmentally friendly' workers. They needed awareness and training which was arranged on the spot by the contractor. The contractor indicated that trained workers are not available even in other parts of the country.

The workers trained by the contractor now have the ability to work in bigger construction firms with confidence that they would be valuable to the firm. They are able to get higher salaries. The contractor is using these workers in other construction projects because he has invested time and money on them. Training of each worker does not cost more than one day's wage of a worker, which is not a large sum but could provide profit many times over.
RECOMMENDATIONS

Addressing changes in human behavior is not only or mainly a philosophical exercise but requires engagement. Furthermore the construction sector is a great place to engage, as it is involved in a basic and necessary activity, and has great potential to assist change.

STRATEGY FOR PROMOTION OF GREEN JOBS

The proposed strategy is structured on the following pillars:

1. ILO to take the lead in helping raise awareness.
2. Promotion of green jobs at the public sector level through policies and coordination among Line Ministries and stakeholders.
3. Training needs and training programs for skills enhancement.
4. Skill enhancement in green jobs sector.
5. Model projects in each province.

Promotion of green jobs by the Government

One of the respondent's recommendations was to advocate within the Line Ministries to take action for promoting green jobs in the construction sector. This can be done through a letter written by the Ministry of Labor and Manpower to the Ministry of Environment which, in turn, may include the promotion of green jobs in its policies and communicate with stakeholders to invest in the green jobs sector. The joint efforts of the Ministry of Labor and Manpower and the Ministry of Environment are required as both of these stakeholder ministries are involved in jobs and environmental protection respectively.

The Line Ministries are required to include the concept of green jobs and decent jobs in their policies. This can be done through holding consultative meetings with stakeholders and developing recommendations for inclusion in policies. The ILO may take the lead to initiate the dialogue through holding consultative workshops at the District level, then the Provincial and Federal levels. 02 Districts in each Province can be targeted for consultative workshops. In this way about 20 workshops can be held, thereby ensuring that each stakeholder has received due consideration in policy formulation.

Skills Enhancement in Green Jobs

The survey respondents have recommended the following three organizations to be assigned the responsibilities of improving workers' skills through training in making jobs green:

2. Small & Medium Enterprise Development Authority (SMEDA).
3. Technology Upgrading and Skills Development Council (TUSDEC).

In addition, the following NGOs have offered their technical assistance for awareness creation and even skills enhancement through training:

1. Peace and Development Foundation, Islamabad.
3. STEPS Society, Punjab.

**Training Needs**

During the survey and discussions with the stakeholders a number of training topics were identified. Table 11 presents the training needs assessment for promoting green jobs in Pakistan.

**Table 11: Training Program**

<table>
<thead>
<tr>
<th>Training Topic</th>
<th>Duration</th>
<th>Venue</th>
<th>No. of participants</th>
<th>Frequency</th>
<th>Level of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Green Jobs – Prospects for the future Construction Industry in Pakistan</td>
<td>02 days</td>
<td>Islamabad, Peshawar, Lahore, Karachi, Quetta, Gilgit and Muzaffarabad</td>
<td>20 at each venue</td>
<td>Every 6 months for 18 months</td>
<td>Construction firm owners and managers of sections</td>
</tr>
<tr>
<td>Environmental Impacts and Mitigation Measures for Construction Occupations</td>
<td>03 days</td>
<td>Islamabad, Peshawar, Lahore, Karachi, Quetta, Gilgit and Muzaffarabad</td>
<td>15 at each venue</td>
<td>Once per year for two years</td>
<td>Engineers, Architects, Supervisors, mid level managers</td>
</tr>
<tr>
<td>Converting conventional jobs into green jobs</td>
<td>05 days</td>
<td>Islamabad, Peshawar, Lahore, Karachi, Quetta, Gilgit and Muzaffarabad</td>
<td>15 at each venue</td>
<td>Every 6 months for 18 months</td>
<td>Construction firm owners, Representatives of stakeholders</td>
</tr>
<tr>
<td>Economic aspects and benefits of Green Jobs in the construction industry</td>
<td>02 days</td>
<td>Islamabad, Peshawar, Lahore, Karachi, Quetta, Gilgit and Muzaffarabad</td>
<td>25 at each venue</td>
<td>Every 6 months for 02 years</td>
<td>Construction firm owners, Representatives of stakeholders</td>
</tr>
<tr>
<td>Capacity building of Stakeholders in policy making for promotion of green jobs</td>
<td>03 days</td>
<td>Islamabad</td>
<td>20</td>
<td>Every 6 months for 02 years</td>
<td>Construction firm owners, Representatives of stakeholders</td>
</tr>
<tr>
<td>Environment Friendly Construction materials and alternatives</td>
<td>05 days</td>
<td>Islamabad, Peshawar, Lahore, Karachi, Quetta, Gilgit and Muzaffarabad</td>
<td>25 at each venue</td>
<td>Every 6 months for 02 years</td>
<td>Engineers, Architects, Supervisors, mid level managers</td>
</tr>
<tr>
<td>Environmental Impacts Assessment for construction projects</td>
<td>05 days</td>
<td>Islamabad, Peshawar, Lahore, Karachi, Quetta, Gilgit and Muzaffarabad</td>
<td>25 at each venue</td>
<td>Every 6 months for 02 years</td>
<td>Environmentalists, Engineers, Supervisors, mid level managers</td>
</tr>
<tr>
<td>Specialized training/advocacy workshops for Architects and Engineers</td>
<td>02 days</td>
<td>Islamabad, Peshawar, Lahore, Karachi, Quetta, Gilgit and Muzaffarabad</td>
<td>25 at each venue</td>
<td>Every 6 months for 02 years</td>
<td>Architects and Engineers</td>
</tr>
</tbody>
</table>
In addition the following training topics can be considered:

Leadership in Energy and Environmental Design: State and local governments have been updating building rules, with some mandating more efficient designs. More and more homeowners and businesses are opting to follow the stringent standards.

Energy Auditors: As people become more energy conscious they may start to realize that they are spending money unnecessarily. An energy auditor can go into any business, large or small, and help the owners save on energy costs. A background in engineering is not required to start in this field.

Training unemployed or underemployed workers with previous construction experience in these green building areas: Green Building Professional, Building Analyst Professional, Home Energy Rater, Water Auditor, Solar Photovoltaic Cell Installer and Solar Thermal Installer.

Training in the Building and Systems Construction and Maintenance industry and the Management and Innovation Services industry. Graduating students can be prepared for entry-level work as wastewater technicians, energy efficiency building technicians, rough carpentry workers, HVAC installer assistants, green plumbing assistants, solar installation assistants, and general maintenance and repair workers. Training can be offered in a series of classes:

- Environmental Training, Introduction to Green Building;
- Energy Fundamentals;
- Retrofits and Energy Efficiency;
- Water Efficiency;
- Building And Retrofits;
- Solar Hot Water Installation and Design Principles;
- Solar Electricity Installation and Design Principles;
- OSHA safety.

Additional training for basic and soft skills can prepare new entrants for the workforce. Participants enter and complete training in cohorts of their peers to encourage teamwork and networking. All cohorts may include union orientation to understand the opportunities, benefits and operations of union apprenticeship programs.

Pre-apprenticeship training for unemployed or underemployed workers with a focus on those with construction experience. Participants will develop new skills needed in the green building and water and energy efficiency industries. Technical training modules may contain:

- Green Building Overview;
- Certified Green Building Professional;
- Green Associate;
- Home Energy Rating System;
- Home and Building Performance Analysis;
- Certified Hot Water Installer;
- Building Information Modeling
Model Projects in each province

It is proposed that model projects may be implemented in two selected Districts in each Province with the aim of developing some selected public and private sector stakeholders with regard to green jobs. Two stakeholder organizations in each selected District can be approached and green jobs can be promoted in them as model projects. For this purpose the following methodology can be adopted:

a. Selection of district in consultation with Public Sector.
b. Selection of two stakeholders in each district (01 public sector and 01 private sector).
c. Conducting a detailed study of selected organization for situation analyses.
d. Recommending improvements.
e. Developing interventions to implement through the project budget. This may include, as a test case, introducing new jobs in the organization, eliminating some jobs (for the short term to test the results), enhance some jobs, etc. with reference to Table 3 in the survey findings.
f. Holding training sessions in selected organizations for the promotion of green jobs.
g. Evaluation of results and presentation of summary findings to the management and public sector.

If this were implemented 14 model projects could be implemented in Pakistan by the ILO at a cost of US$ 1.4 million in two years' time. The evaluation reports of these projects could help others to implement similar interventions, thereby promoting the expansion of green jobs in Pakistan.

Information database

One of the recommendations is to create a database on green jobs and decent jobs in Pakistan, with information from around the world on green jobs; the structures of profitable organizations; strategies being followed in the renowned organizations; resources from which to obtain information; scientific knowledge on green jobs and environmental conservation and energy related data and reports.

Table 12: Time frame and budgetary requirements for implementation of strategy

<table>
<thead>
<tr>
<th>Activity</th>
<th>No. of events/activities</th>
<th>Timeframe</th>
<th>Unit Cost in US$</th>
<th>Total Cost in US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultative meetings/workshops for policy development</td>
<td>20</td>
<td>July 2011 to June 2012</td>
<td>20,000</td>
<td>400,000</td>
</tr>
<tr>
<td>Training needs assessment</td>
<td>1</td>
<td>Jan. to June 2011</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Trainings for skills enhancement</td>
<td>172</td>
<td>July 2011 to June 2013</td>
<td>15,000</td>
<td>2,580,000</td>
</tr>
<tr>
<td>Model projects in each province</td>
<td>14 projects</td>
<td>July 2011 to June 2013</td>
<td>100,000</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Database</td>
<td>1</td>
<td>July 2011 to June 2013</td>
<td>250,000</td>
<td>250,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>4,680,000</strong></td>
</tr>
</tbody>
</table>
Important word of advice

If the premise of this study is recognized, then the aim of a “low carbon building” programme might look and be quite different. It would start with people and learning and later with technologies or targets. It would also consider such things as:

1. Education of all parts of the construction industry in terms of not only how we build, but how we live in and use buildings and how buildings impact upon our environment in its widest sense. This needs to start in school with the establishment of building as a desirable high status occupation with real opportunity and interest. It needs to continue through proper training and skills programmes.
2. Introduce green jobs and decent work in the construction sector through awareness campaigns, dialogues and research.
3. Monitoring and assessment of building performance by contractors and designers should be a regulatory requirement as an essential part of continuous learning in the industry, and smart metering of buildings should be introduced to enable occupants to learn how their buildings work and the effect of human behavior on building performance and energy use.
4. A broader view of value in development and planning terms should be explored, emphasizing social and physical well being and other “soft” values.
5. More co-operative long term working and learning partnerships must be established at all levels in the construction sector so that we move from an adversarial liability driven culture to one of responsibility, trust and mutual benefit. Trust is a key element missing in this sector and needs to be restored urgently.
6. Much better sites set up with decent facilities, assistance with transport, good food, education rooms and other support mechanisms to enable self respect and high quality work amongst the workforce at all levels.
7. A stable legislative framework in terms of regulation, which gives the construction sector the ability to learn and plan for the next 10 years at least.
8. An independent and fully funded building research agency and training body to assist in all the above.

Of course many of the things which will enable the construction industry to really change its behavior lie outside the scope of building programmes. However the effect of putting learning and well being at the centre of our building programme would be immense. The construction sector in Pakistan makes up 8-10% of our total workforce. If even part of this sector was to be lifted up in knowledge and well being, not only would this hugely improve the quality of building, and reduce environmental impact, but the ‘knock on’ effects in terms of understanding of buildings and the environment would be considerable, in addition to employment creation to promote green jobs and decent work.

This would affect not only the way that construction workers understand and use their own homes, but would undoubtedly help to affect the seemingly intractable problems of human behavior right across society in relation to buildings. These things could be done as well as introducing new legislation and technologies, but very often these are in conflict, because not everything can be done at once, and priorities need to be established. More importantly, we need to ensure that new laws and mechanisms do not actually prevent people from learning and changing, because if we are going to ask the construction sector to transform the buildings of this country and the way we use them, the space and the will to learn and change is where it all starts.
This calls for a new approach to construction based on:

- The integration of 'building biology' with building physics
- Emphasis on green jobs and decent work promotion
- Designs for robust and self regulating buildings
- Simplified systems which require less labor and fewer skills, and are easy to build correctly
- Function based, not product based, trades — particularly there should be shell builders and full service providers
- A new understanding of the impact of materials use, particularly of the need to prioritize the use of sustainable and non-polluting resources, and to reduce waste.

In particular this means:

- Simple and easy to build, fool proof shell systems i.e. homogenous/compatible wall roof and floor build ups
- More green jobs to be created, current jobs to be transformed into green jobs or banned altogether. Consideration for decent work facilities.
- Breathable constructions (vapour open constructions with plenty of hygroscopic buffering and correct capillarity)
- Passive structures: thermally and as regards moisture control (ventilation and 'breathability')
- Non toxic materials to be used
- Sustainable resources used wherever possible and certainly for bulk materials.

This may seem like a radical change of direction but in reality it is not so difficult, nor so new. It is common elsewhere in Europe and is tried and tested. Building in a better way with skilled workers in green jobs continues to get progressively easier because of the underlying logic of the situation, which is driving all factors in one direction. But it is not only getting easier, it is becoming financially more beneficial, and moreover it is certainly more enjoyable and less stressful.

Policy Development and improvement:

Policy and legislation drawn up for traditional systems may present barriers for the introduction of new products and may therefore need to be reviewed and modified. Also new policy and legislative frameworks may be required to encourage the uptake of new lower carbon products and thereby improve the green jobs and decent work. The ILO should assist the Government of Pakistan and relevant stakeholders through its key capabilities to support the construction sector for development of buildings with low carbon alternatives and expanding green jobs and decent employment through:

- policy guidance and assessment of the likely impact of construction strategies on carbon emissions and introducing green jobs and decent work opportunities,
- supporting the development of sustainable construction policies and strategies including building the evidence and data to support policy development,
- policy assessment at the national, regional and local level,
- assessing the barriers to implementing policies within the construction sector and identifying the options for overcoming these,
• assistance for development of low carbon building standards,
• examining the current and future role of financing to enable the required paradigm shift towards the development of sustainable, low-carbon buildings in developing countries and promoting green jobs and decent work,
• the development of route maps and action plans for the country,
• guidance on funding mechanisms that can be used to support the reduction of carbon emissions from buildings and promoting green jobs and decent work,
• promotional and educational campaigns on lower carbon alternatives to support knowledge transfer and implementation,
• assessment of the safety and environmental implications of low carbon buildings,
• research into the infrastructure requirements for energy efficient buildings and promoting green jobs and decent work,
• training in HR management and site management plans to support more sustainable construction,
• development of Material Resource Strategies for construction projects,
• cost benefit studies evaluating the economics involved in using low carbon alternatives and green jobs/decent work,
• development of performance indicators and performance management methodologies for green jobs and decent work.

Policy interventions can be summarized as follows:

1. There is a strong need to improve labor productivity, green jobs and decent jobs through education and training policies, both for new entrants to the labor market and the current labor force (46 per cent of the labor force has one year education or less).
2. Development of policies and implementation of policies at the Federal and Provincial levels is necessary for promotion of green jobs and decent work.
3. To overcome the underutilization of the labor force more women need to be educated and trained, especially on the concepts of green and decent jobs.
4. In order to capitalize on the demographic dividend, policies are needed to specifically address the educational needs of new workers. This must ensure that the concepts of green jobs and decent employment opportunities are introduced properly.

Addressing new requirements in construction and renewable energy

Companies and workers must prepare themselves for future trends in the construction industry and must address new requirements as they arise. The world is fast moving in energy efficiency and decent employment. Steps must be taken now to avoid the collapse of firms if such requirements are made essential by law in Pakistan. In such a situation there would be no other option other than to spend many times more within a limited time whereas at the moment this can be done gradually with low cost. The following steps can be considered in this regard by construction firms and related companies in order to move ahead:

1. Initiate awareness and training programme for higher management.
2. Take statutory steps in respective firms and a provide base for the expansion of green jobs and decent employment opportunities within the firms.
3. Initiate awareness and training programmes for mid-level management. This may have opportunities for study tours within or outside the country for better understanding.
4. Implement workers' awareness and training programmes in stepwise and sequence ensuring the transformation of current jobs into green jobs.

5. Develop a plan of action on how to implement a green jobs and decent jobs initiative in any organization.

6. Introduce new green jobs and decent employment.

7. Reduce the current jobs that are inefficient and unable to cope with the development needs.

8. Introduce the new engineering design features encompassing the advanced needs of energy conservation, reducing carbon emissions, use of renewable energy, incorporating legal requirements like building codes and earthquake resistance.

9. Introduce energy efficient and environment-friendly construction materials and make sure of their use in future construction activities.

10. Whenever required, employ trained green workers. If this not applicable, the company must have a training programme and setup for regular training of workers.

11. Seek assistance from international organizations including the ILO for technical assistance.

**Win-win Situation**

The construction firms are now moving in the direction of developing their human resources to cope with the future requirements of the construction industry. Some level of awareness exists in the construction firms to introduce green jobs, but the concept has yet to be well introduced to higher management ensuring their commitment for implementation.

Introducing green jobs and decent employment in construction firms would be create a win-win situation for respective firms. The concept of green jobs and decent employment does not only mean to introduce more jobs and put a financial burden on the firms. The idea is based on the principle of making firms more efficient and the execution of services more profitable, as well as increasing opportunities for employment and reducing environmental damage. Introducing more jobs in a firm, improving the efficiency of service delivery, reducing the time of work execution, constructing advanced buildings, reducing the losses of clients, reducing the waste of materials, using fewer materials, reducing the use of utilities and creating models for others to follow - are all the indicators of a win-win situation.

**The following must be considered to ensure the success of construction firm in this process of modernization:**

1. Willingness of higher management to introduce green jobs and decent employment.

2. Programme for introduction of green jobs and decent employment to be made integral part of the bylaws of the firms.

3. A built-in training programme as a SOP of the firm.

4. Collaboration with other stakeholders and academia.

**Workers' rights and social issues**

Overall, knowledge and skills are drivers of economic growth and social development since higher levels of educational attainment propel innovation and productivity and increase levels of entrepreneurship, therefore improving the economic context of decent work. Furthermore, education and training are increasingly important components of competitiveness, providing access to new knowledge and imparting training in new work processes and technologies.

For an individual, skills and competencies help identify capacities to make use of income generating
opportunities and to adjust to changes in the labour market. A key to employability is being adaptable and possessing the skills and knowledge for improved performance in changing labour markets. Furthermore, training in citizenship skills, including workers' rights, empowers the disadvantaged to access education, training, decent jobs, and to seek prospects for entrepreneurship.

Regarding organizations, the entrepreneurial and managerial skills of workers help determine the ability to generate and exploit opportunities and to invest in the skills of their workforce. The capacity to promote a culture of workplace learning and to facilitate knowledge-sharing between workers, helps determine the continuous employability of workers within an organization. Skills particular to an enterprise, combined with organizational knowledge, are essential for an organizations' ability to innovate and prosper (Foss, 2003).

Overall training encompasses the “full continuum of education, skills formation processes and training activities” (ILO, 1998). These address social rights and are the foundation of a productive labour force, as they concern primary and secondary education. The more specific skills address training to meet occupational standards and are met through vocational and technical schools as well as Training Institutes and apprenticeships. The advanced technical and professional skills involve substantial investment and are often specific to occupations, but can be transferable to a range of jobs.

The prosperity of an organization depends upon the work force which means the social needs of workers must be addressed in a proper way to allow them to lead a normal life. Social development thus forms an integral part of human resource improvement and development in any organization. Workers' rights must be protected because mental satisfaction is important to employees.

Another important aspect of workforce development is building the capacity of it workers as responsible citizens, by ensuring decreases in energy consumption and minimizing waste. A practical demonstration by higher management in this regard would be positive and effective. Implementing standards such as SA 8000 would also be helpful.

Once aware, well informed and trained, the workforce becomes an asset for the organization and act as the brand ambassadors for that organization. Their working behavior and pattern illustrates the level and competence of the organization. Thus business and profitability are directly linked to having a skilled and socially satisfied work force.
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