Introducing Occupational Health in an Emerging Economy: A Nepal Experience

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Received 13 September 2009; in final form 11 March 2010; published online 19 April 2010

From January to July of 2009, an investigation was conducted on Occupational Health in Nepal. An evaluation of occupational health and safety in Nepal is compared to that in other South Asian countries. The analysis includes an evaluation of what is in place and a multi-tiered recommendation to define and enact a modern legal framework, implement enforcement policies, develop forums, educate professional workforce, train and thus empower workers and management, and ensure an effective workers compensation program.

Keywords: developing countries; general hygiene; generic assessment; hazard assessment; occupational groups; participatory techniques; professional issues

INTRODUCTION

South Asia’s emerging economies face significant challenges to improve workers’ health and safety (H&S) while increasing economic vitality and productivity. Nepal, a small, landlocked, politically unstable country, presents an interesting case. As South Asian economies move from predominantly agriculture and home-based work to industries employing workers in medium to large companies, workers face increased environmental, safety, and health risks. Hay (2002) conducted a comprehensive study under the auspices of the United Nations International Labour Office and the Asian Development Bank. The study reviewed the condition of occupational safety and health (OSH) in South Asian countries including Bangladesh, Thailand, Philippines, and Nepal. It described OSH policy conditions, status of OSH legislation, oversight and inspection of facilities, methods of communicating hazard information to employers and workers, and worker compensation schemes. He identified five areas for strategic action to implement a national occupational H&S strategy. These were:

1. Develop a comprehensive framework of OSH laws covering workers in all sectors of the economy.
2. Develop a comprehensive national enforcement policy employing inspectors who demonstrate core competencies and will have career development pathways.
3. Implement national forums on safety and health that include government, employer, and worker representatives to develop national safety and health policies and legislation.
4. Identify a broad range of safety and health training needs through an analysis of current OSH capacity. Recommendations include establishing autonomous public OSH institutions and encouraging OSH courses at universities, academic institutions, and industry-specific training centers.
5. Implement worker’s compensation as an integral part of a safety and health program. Conduct accident and illness statistical analyses. Establish financial incentives for employers to develop safe working conditions and provide significant penalties for employers who have higher than average claim rates.

This paper reviews the status of Occupational Health in Nepal and provides an assessment of...
current progress on the five areas for strategic action recommended by Hay. Recommendations for a multileveled approach to improve worker H&S are specific to Nepal but could successfully be implemented in similar economies.

Like many developing countries, Nepal has a growing workforce and significant underemployment. There is a large subsistence level agricultural workforce, many self-employed workers, and high rates of unemployment (Nepal Central Bureau of Statistics, 1998). While there is abundant cheap unskilled labor, the number of semiskilled and skilled workers seeking employment has increased dramatically in recent years. Furthermore, Nepal’s migrant workforce presents challenges to accurately estimate employment numbers and training opportunities with estimates varying greatly as to the size of this transient workforce. Seddon et al. (1998) stated there were 250,000 known migrant Nepalese working in India with some estimates suggesting that this figure could be as high as one million. The International Organization for Migration (2003) using unpublished and unverifiable sources reported that between 800,000 and 3.2 million workers from India are gainfully employed in Nepal with nearly an equal number of Nepalese finding work in India. Thus, associated estimates indicate a net balance of workers. Given the transparent border between India and Nepal, it is likely that net zero ratio remains relatively constant.

A World Bank Development Research Group report by Fafchamps and Shilpi (2008) indicates that population density, social proximity, and access to amenities are the primary influences on migrant destination. A World Bank report by Shishido et al. (2009) estimates that one-third of Nepal’s adult population migrates internally or externally to find work. This results in a heavy economic dependency on foreign remittance and a relatively mobile work population migrating to urban centers within Nepal such as Kathmandu and Biratnagar. These migration patterns provide opportunities for improving OSH through training programs in urban areas.

Public education through grade 10 has been available for >20 years resulting in a significant increase in the rate of literacy, notably in urban areas. The Nepal government and private institutions have established technical institutions and college-level programs providing training in electrical wiring, electronics, air conditioning and refrigeration, mechanical, and other semiskilled trades. The supply of young people capable of adding capacity to the industrial sector is growing. According to Federation of Nepalese Chamber of Commerce and Industry (2009) workers in the traditional trades such as woodworking, metal working, tailoring, and leather working have benefited from vocational training programs.

Employment surveys in 1998 and 2007 provide the most current data concerning employment distribution and suggest the education and training tasks that Nepal should undertake. In 1998–1999, labor force statistics were compiled in collaboration with United National–International Labour Organization (UN–ILO), providing the latest industry-specific employment data [Nepal Central Bureau of Statistics (NCBS)]. Jobs were classified using the standardized two-digit International Standard Industrial Classification; third Revision, 1990. The study reported 9.5 million persons >15 years of age were employed in Nepal. Approximately 75% of these were employed in subsistence agriculture or agricultural labor activities. In 1998, the estimated population of employable adults age 15–64 was 13 million with a total population of 23.7 million. In July 2009, the estimated population of employable adults age 15–64 was 16.9 million with a total population of 28.5 million (Worldfact Book, 2009).

The 1998 employee numbers in the dominant industries are shown in Table 1 (NCBS). Manufacturing has the greatest number of employees at 224,000 in the formal sectors of the economy. This is followed by construction at 207,000 and education at 157,000. Other significant formal sectors are transportation, public administration, and health and social workers. The informal or self-employed sector is dominated by agriculture, farming, and forestry at 546,000 workers.

While there are 310,000 listed as private household employees, the majority of these are ‘employed’ to collect water and firewood for domestic use (NCBS, Table E6.6). Data collected in 2006–2007 lists 3446 registered manufacturing establishments employing 177,550 workers (NCBS). This decrease of ~29% between 1998 and 2007 may reflect a continued instability in the government and its inability to stimulate the economy.

Currently, Nepal’s important export industries are the carpet, pashmina, and garment manufacturing industries. Internally, consumption involves brick manufacturing, jute, sugar cane, hydroelectric generation, agriculture, and construction industries. Public sector workers include traffic police, Nepal Army, and ministry workers. All these sectors should become better educated about H&S issues and proactive in seeking remedies.
METHODS

From January 2009 to July 2009, I was a Fulbright Senior Scholar in Nepal teaching a course in Occupational Health in the Department of Environmental Science and Engineering at Kathmandu University. As part of this role, I developed and taught an Occupational Health course—the first offered at the university level in Nepal. During that time, I evaluated the status of Occupational Health in Nepal by consulting medical professionals, graduate students, and faculty. I conducted interviews with representatives of the UN–ILO-Kathmandu and Rugmark, a manufacturing and marketing organization representing the hand woven carpet industry. Visits were performed to a variety of manufacturing facilities to evaluate the implementation and status of H&S procedures. Due to the general political disruption and limited access to labor and manufacturing personnel, it was not feasible to conduct a statistical survey of the industrial sector as part of this study; however, a review of employment and financial data from the most recent Economic Survey for fiscal year 2007–2008 as prepared by the Ministry of Finance, Government of Nepal, was carried out.

RESULTS—A MULTI-TIERED IMPLEMENTATION STRATEGY

Effective worker H&S programs in Nepal, and other South Asian countries, require a multi-tiered implementation strategy. Building on the Hay report, a review of the current status and recommendations for implementing such a strategy follow:

1. Establish a legal framework.
2. Implement national enforcement policies.
3. Develop national H&S forums.
4. Educate a professional workforce.
5. Empower workers and employers.
6. Implement effective worker compensation.
A vital component, missing in the Hay report, is a recommendation for educating a professional workforce. As described by Lacey (2010), occupational H&S engineers and scientists can be instrumental in implementing an overall strategy. Just as medical professionals have been important in introducing public health in emerging economies, a professional Occupational Health workforce can serve as the catalyst to bring government, manufacturers, unions, Nongovernmental Organizations (NGO), and workers together. These professionals will provide the information and leadership to implement a successful comprehensive strategy. Internationally recognized professional organizations can provide the ethical framework to limit corruption, expertise and technical guidance to assure sound scientific decision making, and support to help grow the profession. State of the art research institutions educate professionals to promote occupational health in the public and private sectors. Ultimately these professionals will empower workers to advocate for, and implement their own, occupational H&S behaviors.

**Establish a legal framework**

As a result of rapid growth and change in South Asian economies, governments have begun to develop H&S policy and introduce legislation to address issues for formal as well as self-employment (informal) work sites. Countries in the region have responded at different rates and in different manners to meet their respective local needs. For instance, Paik (2008) described the steps that he and others took to implement industrial health in South Korea. In Korea, industrial hygiene activity has increased steadily with implementation of the Occupational Health and Safety Act in 1980, development of the Korean Industrial Hygiene Association that now has >150 members, and a laboratory accreditation program. Similarly, Thailand has instituted a four-level administrative approach to H&S protection as described by Hay. Governments usually consolidate H&S responsibilities under the Ministry of Labor. Some economic sectors, such as transportation and agriculture, fall under different ministries. Depending upon the economic sector, H&S issues vary and different legislation is necessary. As far as possible, the policies and regulations should be consistent from one sector to another.

H&S regulations should address issues in the formal sector dominated by small- and medium-sized business, as well as the informal sectors that include individual entrepreneurs and subsistence farmers.

**Nepal**. Nepal Occupational H&S law began in 1992 and addressed in Chapter 5 of the Labor Law. The H&S standards are presented in just 10 paragraphs that identify several of the common hazards, but do not specify how to evaluate or enforce provisions of the law. The framework of the law charges the ‘general manager of each establishment’ to arrange for H&S provisions (Nepal Recorder, 1992; Vol. 16, No. 19, pp. 220–253). For instance, the law states manufacturers must ensure that workers avoid lifting or carrying ‘any load so heavy that it is likely to cause him injury or harm’ and says maximum loads for women and men should be prescribed. However, there are no criteria for evaluating maximum loads and it is evident this provision is not enforced.

**Bangladesh**. In contrast, Bangladesh updated its health, safety, and welfare laws in 2006. The 2006 Labor Code defines the health, safety, and welfare obligations that employers have for workers in most industrial and commercial premises. A separate law, the 2006 National Building Code, addresses the safety of construction workers. These regulations provide a more detailed description of occupational hazards than the Nepal Labor Law. However, like Nepal, there are still several instances where definitions are vague and numeric values are not specified. For example ‘excessive weight’ is not clearly defined. There are no H&S laws for agricultural workers [Center for Corporate Accountability (2008)].

**Implement national enforcement policy**

In Nepal, as in many South Asian countries, adequate inspection and oversight of facilities to enforce compliance is a significant challenge. Resources are limited and there are few inspectors. To be successful, a national enforcement program requires a clear and accepted mandate, consensus among employers, workers, and worker unions concerning inspection, an oversight process, and enforcement. Under present circumstances, inspection by low paid and poorly trained government employees is likely to result in corruption and little or no enforcement. Observations during my visits to facilities revealed little enforcement and less incentive to comply with existing H&S standards. For example there were no provisions for bonding and grounding during transfer of flammable materials from drums to smaller containers. There was no evidence that a pressure vessel had been tested and certified. The owners acknowledged they often neglect to follow procedures to report on the job injuries.

Stakeholders should regularly conduct a gap analysis of the country’s labor laws and standards. The national legislative body should enact legislation
Medical and scientific studies of occupational diseases. Dixit (2005) discusses in ‘Nepal’s Quest for Health’, the establishment and priorities of a health program for Nepal. Infectious diseases have received the most attention. In 1991, the Nepal Health Research Council (NHRC) was formed to encourage, help organize, and conduct medical research in Nepal. In 1995, the NHRC included the objective of improving occupational health for the first time under its Health Policy and Implementing Strategies Development Research report. To date, there have been limited investigations of occupational health issues in Nepal. Where the medical community has paid attention to occupational diseases, these studies have focused on workers in the Kathmandu Valley, Nepal’s primary industrialized region. For example Joshi et al. (2003) of the Bhaktapur Cancer Hospital, Nepal conducted lung cancer studies. Colon cancer was used for reference study, as very few occupational carcinogens are known to cause colon cancer. The study revealed that 72.95% of lung cancer patients were involved in exposed occupations while only 32.5% of colon cancer patients were in such occupations. The study demonstrates a statistically significant higher prevalence of lung cancer among occupationally exposed workers.

A 2007 study by Murthy et al. (2007) on ‘Occupational Health and Safety Study of the Brick Industry in the Kathmandu Valley’ demonstrated significant health risks in the brick manufacturing industry. Respirable particulate pollution, sulfur dioxide (SO2), and thermal stress (radiant heat) were evaluated. The Fixed Chimney Bull Trench Kiln (FCBTK) brick technology was compared to Vertical Stack Brick Kiln (VSBK) brick making technology. The results indicate there are lower dust levels in the work environment at VSBK factories compared to FCBTK corresponding work areas. Kurmi et al. (2008) conducted a study of particulate matter exposure of people performing domestic work in Nepal. The difference in the fuel type employed was the strongest contributing factor to the variation in the particulate measured. Studies of the noise and dust exposure levels of traffic police in the Kathmandu Valley are currently ongoing.

Most of these studies seek to find sources of illnesses and injuries but have not proposed proactive programs to prevent the causes. Moreover, efforts to inform both company managers and workers about the implications of this research are limited. Industrial hygienists and engineers trained in occupational health methods of anticipating, recognizing, evaluating, and control will implement workplace

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improvements while introducing efficiencies in productivity.

**Occupational H&S education at Kathmandu University.** India and China have instituted university programs in Occupational Health. With increasing frequency, short courses in Occupational Health are offered throughout South Asia. Some universities include courses or comprehensive programs online. These programs, designed for company health professionals, are open to medical and other professionals.

My recent experience in Nepal is illustrative. Kathmandu University, the only privately operated university in Nepal, has several highly respected schools including a School of Science. An important School of Science objective is to help develop Nepal’s economy and prepare students to live and work in Nepal in technical professions. Faculty of the Department of Environmental Science and Engineering, with international reputations in various fields associated with the discipline, have well-established research projects.

In 2009, Kathmandu University, in cooperation with the United States Fulbright Educational Foundation, arranged to have me develop and teach a course in Occupational Health in the Environmental Science and Engineering Department. Thirty-three engineering students completing their fourth (senior) year at the university took the course which follows a curriculum that is part of an American Board of Engineering Technology (ABET)-approved program in Environmental Safety and Health employed in the US. The university has incorporated this class as a standard part of the Environmental Engineering curriculum.

The class visited three different facilities—a sawmill, a furniture manufacturing facility, and a poultry operation. Using a standardized checklist, the students evaluated the facilities for compliance with the H&S provisions of the labor law. Additionally, each student conducted a Job Hazard Analysis (JHA) at a facility of her or his choosing; many students demonstrated a thorough comprehension of JHA.

As the occupational H&S field advances these newly educated practitioners are likely to take on diverse roles. They have the skills to assess risks associated with traditional industries, such as farming, food processing, brick, carpet and fabric manufacturing, wood products, and construction. As the occupational H&S field grows and diversifies, they will apply their knowledge and skills in the pharmaceutical and herbal medicine industry, electronic related activities, as well as hydroelectric power generation. Some have entered governmental careers or begun working for NGOs. With appropriate experience, these students may become certified Occupational Health professionals.

**Empower workers and employers**

Given the generally lax enforcement in emerging economies, empowering workers and employers to be proactive for their own safety is a most important step for implementing occupational H&S. To become proactive, individual workers must appreciate the need to implement safer work practices. This presents significant challenges.

Most Nepalese work in agriculture or subsistence occupations and learn their work skills almost entirely from other workers on the job. To reach these, workers require a multi-faceted approach. Presently, advocacy groups strive to increase awareness with publicity campaigns, posters, and general announcements on public health. Examples include campaigns regarding tobacco use, increase in tuberculosis screening and prevention, and publicity and awareness of global warming. NGOs play important roles in building awareness and reaching rural and other formal and informal work groups. Private and government training programs enjoy limited success in providing safety information to electricians and other electrical workers. These efforts need to be expanded.

As attempts to implement democracy began in 1990, trade unions also emerged as an important force. The 1992 Trade Union Act requires unions to register with the government every 2 years. The influence of the trade unions has varied depending on the government. Presently, at least three trade federations should be involved in H&S training: General Federation of Nepalese Trade Unions, Nepal Trade Union Congress Independent, and Maoists Trade Union (ANFTU, 2009). At this time, the ANFTU has significant influence in the chemical, iron and allied industries, textile manufacturing, transportation, hospitality and recreation, tea plantation, auto-mechanics, as well as private and boarding schools. Intimidation is common practice affecting productivity in these industries.

Communication among and between the regulators and regulated community is critical for effective training. Today, communication and management skills are as important as technical skills to properly convey the message to management and workers. Training needs of the agricultural, construction, and manufacturing sectors differ and programs should be directed to the specific needs of these audiences. Knowledge for knowledge’s sake does not attract much attention in the adult learner or the
business world, when these stakeholders are asking the question ‘How does this apply to me?’ Effective training programs should incorporate necessary elements as outlined by the National Environmental Safety and Health Training Association (McMaster and Bowles, 2007):

- Audience analysis.
- Training needs analysis.
- Clearly stated learning objectives.
- Appropriate learning strategies.
- Effective evaluation tools.
- Methods for follow up.

In South Asia, there are many challenges associated with communicating biological, physical, chemical, and cumulative trauma hazards. Cultural differences and language barriers are significant. Multiple languages and dialects may be spoken throughout a country. In Nepal, there are at least 23 different spoken languages. English and Nepali, the national language, are taught in school, yet many workers cannot read or write in Nepali, let alone English. Written Nepali uses the phonetic Devanagari alphabet. Conversion of the sounds to a Romanized alphabet results in several spelling versions, further complicating written communication. For effective community training, it is essential that teaching professionals comprehend language and cultural differences.

The paper ‘Discussion Paper on Industry Needs for Occupational Hygiene’ (Alesbury, 2006) recommends many specific training needs for various target audiences. Training activities should focus primarily on the practical needs emphasizing effective observation, qualitative data collection, proper calibration of monitoring equipment, and appropriate comparison to accepted international standards.

Implementing effective worker compensation schemes

In Nepal under the current labor law, it is ‘lawful to terminate any worker or employee who has not recovered from an occupational accident within a year or who has been found to be permanently disabled by a certified physician’ (Nepal Recorder, 1992). The law requires a maximum payment equivalent to 5 years wages in the case of physical disability and 3 years wages in case of death. Under the Public Works Directive, contractors must provide insurance to cover personal injury or death related to public contracts (Tajgman, 2005). This limited legal protection for workers in Nepal provides little incentive for employers to provide a safe work place. Likewise there is no mechanism to avoid underreporting or mismanagement of the system.

THE FUTURE: IMPLEMENTATION STRATEGIES

The overriding challenges for implementing occupational H&S in emerging economies continue to be enforcement, compliance, education, and training as most South Asian countries already have some occupational H&S laws and regulations. Given the relative poverty, underfunded government structures, and the existing political situation in South Asian countries, where cultures lack motivation to comply with laws, strict compliance is unlikely for the foreseeable future.

Ultimately, educated H&S professionals are the key to bringing worker H&S to Nepal. Public and private universities should offer Occupational and Public Health studies as a regular part of the curriculum. Fellowship and student work experiences through government, industrial organizations, NGOs, and companies could provide employment opportunities for graduates. Universities will benefit by developing relationships with other South Asian academic institutions where Occupational Health has a presence. Transparent communication among universities and government so as to eliminate the tariffs and restrictions on cross-border transport of scientific equipment will enable students and faculty to make decisions based on sound scientific measurements.

Trained professionals will assure adequate and appropriate oversight and inspection of the formal business sectors. Programs to stimulate voluntary conformance are critical to implementing effective H&S programs. Strategies emphasizing consensus among involved stakeholders and work appropriate conformance standards coupled with effective implementation and training programs can be effectively developed. These stakeholders will share the goals of improved productivity and profitability aligned with internationally accepted standards.

The greatest challenge for governments is providing adequate resources to implement the initiatives described above. The ministry responsible for H&S must allocate appropriate funding, offer training for worker groups specific to the hazards they encounter, and awareness training for the broader public.

Nepal has attempted to increase trade capacity and launch public awareness programs (Mahat, 2008). While much remains to be done, Nepal is committed to effectively engage in international trade. A
recently enacted law requires workers be retained except under extreme conditions. In 2009, three companies facing financial setbacks were expected to submit requests to the Department of Labor seeking permission to ‘pay off’ workers (provide severance packages) (Prabhakar, 2009). Such restrictions will hopefully encourage companies to retain and retrain workers and provide a healthier safer workplace.

Advocacy groups can be powerful allies to encourage conformance by raising issues about child labor, environmental sustainability, and worker H&S protection. Consumers increasingly expect to buy products produced in an environmentally sustainable manner and in workplaces where worker H&S is not jeopardized. International companies increasingly recognize the liability and require effective H&S oversight in all their plants regardless of the location. International business standards such as the International Standards Organization certification can increase worldwide business opportunities.

Progress in building occupational H&S awareness is evident throughout South Asia. The Occupational Health and Safety Council of Hong Kong (2009) publishes brochures, posters, and information in several languages, including Nepali. As Chinese companies participate in projects throughout South Asia, they develop training materials. The materials have been used, particularly by the construction industry in Nepal. The Asia-Pacific Occupational Safety and Health Organization, an international non-profit professional organizations from the Asia-Pacific region devoted to preventing occupational accidents and diseases, provides H&S services to governments, International Nongovernmental Organization (INGO), NGOs, and other organizations.

Ultimately, all stakeholders, the government, universities, INGOs, trade organizations, labor unions, and companies should coordinate their efforts to address the H&S needs of workers. As Yunus (2007) states in his book ‘Banker to the Poor’, ‘With each passing year the borrowers assume more responsibilities for the management of their own affairs. They come up with more innovative approaches to prevention and solving problems and find new ways to ensure that each member rises above the poverty line as quickly as possible’. The world of occupational health can take a lesson from Grameen Bank’s approach as started by Yunus by empowering workers to assume responsibility for their own welfare.

As workers and managers see increased productivity and profits resulting from a safer and healthier workplace, they will assume ever-increasing responsibility for workplace safety and health. Individually and collectively they will develop innovative approaches to prevent and solve their unique workplace problems. Through cooperative efforts to improve worker H&S, Nepal and other less well-developed countries can become more efficient and effective players in the global economy.

**FUNDING**

Fulbright United States Scholar program Award#8507.

**Acknowledgements**—Without the support of Dr Sanjay Nath Khanal and Kathmandu University this project would not have been successful.

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