Introduction
Occupational issues and problems receive less prominent attention in industrially developing countries (IDCs) than in industrialized countries and, within IDCs, occupational concerns in the rural sector are all but ignored. The first comparison has been widely reported and discussed by several authors, including Christiani et al. (1), El-Batawi (2) and Eijkemans (3) but fewer authors have drawn attention to the problems of the rural sector, and especially the millions of people engaged in subsistence or smallholder agriculture for their livelihoods. In the realms of smallholder agriculture, the plight of Asian farmers seems to have generated more interest than that of African farmers (see, for example, Sen (4), Manuaba (5) Mohan (6) and Kogi (7)). Rural sector problems in Africa have, however, been raised by Choudhry (8), Kaul (9) and O’Neill (10), the last two with specific reference to ergonomics.

The relative disregard of occupational health and safety in IDCs is attributed largely to the plentiful supply of cheap, unskilled labour and the absence of the economic justification, which is emerging in economically developed societies, of looking after the labour force as a valuable asset. According to Leamon (11), the incentives to care for employees are based on the costs of insurance, compensation, absenteeism, recruitment and other management overheads. In the rural sector, the whole situation is exacerbated by the lack of structured employment (often described as the “informal sector”) especially among subsistence farming families. Most agricultural workers are of self-employed status and comprise the largest occupational group in many IDCs. Furthermore, through the nature of their work environments they are confronted with different health threats and safety hazards from those occurring in offices, factories or mines, etc. which require particular remedies. This article considers how ergonomics may help provide these remedies. The threats and hazards are presented in three categories: those associated with 1) the use / misuse of tools and equipment, 2) posture and musculoskeletal disorders, and 3) the exposure to pesticides and infectious agents.

Tools and equipment
Work in the rural sector is characterized by the use of simple tools and equipment, with workers often improvising by using tools not designed for the task. The most widely used tools are hoes, machetes and sickles – simply blades on handles – which have no moving parts and rely on human effort and skill for their function. Except for operational injuries, such as cuts and bruises, the main occupational threat is related to posture, which is considered in the next section.

In a survey reported by McNeill and O’Neill (12), 79% and 57% of farmers in the Brong Ahafo region of Ghana suffered injuries from use of machetes (cutlasses) and hoes, respectively, although these injuries were less debilitating than many of the others reported.

For the less than desperately poor farmers and rural workers (i.e. those that have access to more sophisticated equipment), the use of cutting and threshing
machines, which may be engine- or human-powered, presents a major risk. A survey by Mohan and Patel (13) in Northern India found that 47% of injuries (n=576) were associated with the use of spades and sickles and 13% with cutters and threshers. However, when severity was considered and minor injuries disregarded, there were nearly four times as many injuries with cutters and threshers (some being severe or critical) than with spades and sickles (no serious, severe or critical). These problems can be addressed by better machine design, especially regarding design of handtools which may be engine- or human-powered. Particular attention should be paid to guard design, feeding mechanisms and guarding to protect hands and arms. Problems can be addressed by better design of handtools, which may be engine- or human-powered.

Posture
The adoption of poor postures, especially for prolonged periods, heavy manual loading and repetitive movements of a limb are the most likely cause of musculoskeletal problems. As noted by the ILO (14), an individual’s posture is determined by the tools used for, and the visual requirements of, the agricultural task. In various surveys, agricultural workers have complained of back ache which is attributed to the stooping posture so frequently observed, particularly whilst hoeing or transplanting. Sekimpi (15) commented that the ergonomic design of handtools could contribute to reducing musculoskeletal disease. However, in their review, Rainbird and O’Neill (16) warned that there is very little published evidence from the smallholder agricultural sector to substantiate this although it would be expected by extrapolation from other industries. Head-loading, mainly by women, provides another set of musculoskeletal risk factors which has been demonstrated largely by the fact that the symptoms of neck ache and back ache are alleviated when alternative modes of transport have been used.

Pesticides
The use of pesticides is probably the most notorious threat to smallholder farmers’ health and, according to Bull (17), can lead to fatalities. Although this was published more than 20 years ago, the use of pesticides by smallholders has escalated but there has been very little progress in educating smallholders of the dangers and in promoting safe practices. These are the responsibilities of the manufacturers and the suppliers, as well as the users themselves but in the absence of enforceable regulations, typical of the informal sector, misuse and abuse of these chemicals is rife. The use of personal protection is a key need but designing equipment and clothing which are appropriate and affordable poses a major challenge. Nevertheless, ergonomics has a significant role to play in this design process and in conducting user trials to achieve maximum acceptability. The provision of instructions on packaging for safe and proper (e.g. dilution) practices suitable for users of low literacy levels is also an area where ergonomics could contribute.

Concluding remarks
Three major areas of occupational health and safety concern in the rural sector, with the emphasis on agriculture because of the large numbers of people involved, have been considered. Other areas of concern, such as disease due to infective or parasitic agents, have been excluded as being beyond the scope of this short article.

All three areas considered are amenable to ergonomics interventions to reduce the health threats and safety hazards identified although the author feels that the success of any intervention would depend on team work with other professionals plus, undoubtedly, participation by the target populations. In industrialized countries and, to a lesser extent, in formal workplaces in IDCs ergonomics interventions can be justified on economic or even ethical grounds or may be demanded by legislation (e.g. see Mbakaya et al. (18)), but in the rural sector these options hardly exist. It is a challenge to health and safety professionals and ergonomists alike to penetrate this sector but the author believes that significant inroads could be made by developing and promoting ergonomic designs and work practices so that the most serious threats and hazards would be moderated if not eliminated. The probability of workers falling victim to disease or injury would be proportionately reduced.

The final question, then, is how to bring ergonomics and occupational medicine together in an arena where neither “multi-discipline” has established a flattering reputation. Both Stubbs (19) and Roetting and Luczak (20) have alluded to this, albeit in a different context, but, with some imagination and inspiration, a combined effort should be feasible and should deliver substantial benefits to the most disadvantaged people in Africa and elsewhere in IDCs.

References
5. Manuaba A. Application of ergonomics to cope with strenuous and hazardous work in agriculture, forestry, plantation and cottage industries. In: Proceedings of the International Symposium on ergonomics in devel-

Smallholder farmers are exposed to pesticides.
During its presidency of the Council of the European Union, the Grand Duchy of Luxembourg, together with the ILO, provided a platform for the exchange of experiences among representatives of governments and social partners with regard to the role of the inspection services. An EU-ILO Conference: Unity beyond Differences: The need for an Integrated Labour Inspection System, was organized on 9–11 March 2005 in Luxembourg—Mondorf-les-Bains. The Mondorf-les-Bains Conference aimed at analysing the changes brought about by globalization, new opportunities for partnerships and the need for reshaping the roles and activities of various actors in work life, including the labour inspectors. It also strove to build effective, relevant and enlightened policies to drive forward an action plan towards the implementation of an Integrated Labour Inspection System.

The Conference gathered together a total of 180 participants. The number of countries represented totalled 70. During the two-day Conference, examples of good practices with regard to the development of an integrated labour inspection system at the national and company levels were presented. The objective was to raise the European and world-wide level of consciousness of the social dimension, to be equally footed with economy, finance and environmental protection in a holistic approach.

Dr. Sammy Thumbi Nyambari, Executive Director, African Regional Labour Administration Centre ARLAC), Zimbabwe, said in his presentation that labour inspectorates today face many challenges. Globalization and structural transformation even worsen their situation. He was convinced that it is cost-effective to invest in integrated services. The major challenges are managerial, he said. One of the major problems is that the coverage of inspection is less than 10%. There are less and less budget resources but the work load of the inspectors is increasing. Another problem is that 70–80% of the labour force work in the informal economy.

The small and medium-sized enterprises present a similar issue. Here the key question is how to deliver to them occupational safety and health information and various preventive measures. New hazards and risks caused by dangerous chemicals, HIV/AIDS in the work environment, and child labour, especially its worst forms, are among the big problems that need to be tackled. A special challenge in occupational safety and health inspection in most developing countries is the Export Processing Zones. All these issues call for better organization and management of services. In many countries in Africa, positive development can already be seen. For instance, a continuous change management toolkit that advocates the preventive culture has been constructed. Dr. Thumbi Nyambari also reported on two good practice cases, one from South Africa and the other from Kenya. The computerization of inspections in Kenya has greatly facilitated the communication of information among the inspectors, he said.

Mr. Franklin Muchiri, Senior Specialist in Occupational Safety and Health, ILO, Addis-Ababa, Ethiopia, described the trends in labour inspection in Africa. The countries in Africa face many challenges related to health, nutrition and food security, infrastructure, illiteracy, armed conflicts, weak economies, and labour inspection. It is important to understand that labour inspection can, on its part, help improve the quality of life and alleviate poverty, but also improve the economy of the companies, as safety pays, he said.

The structure of the economies is based on agriculture, thus bringing the occupational safety and health of especially women and migrant workers to the forefront. Also the question of child labour needs to be tackled. In the vast ma-