DESIGN AND MANUFACTURING OF LIVING POULTRY HARVESTER

By

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DEDICATION

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INTRODUCTION

Egypt’s population fast growth rate is one of the main constraints hindering its development. Egypt is not a self-sustained country in food production and remains one of the world’s largest food importers. Egypt continues to make strides towards achieving self sufficiency by using new agricultural technologies and reclaiming new lands. Food security will remain at the top of Egypt’s priority list of which securing sufficient animal protein is the most challenging task compared to all the other nutritional requirements. Poultry production can provide quick and a most cost effective solutions for this nutritional problem, more over it will help in reducing poverty by creating opportunities for employment which are badly needed within the agricultural sector (UNDP, 2004; CAPMAS, 2005).

The poultry production sector in Egypt has witnessed dramatic development as a result of new economic trends and policy shifts during the last decade (Abdelbary, 2003). The structure of the poultry sector in Egypt consists of two main divisions: poultry enterprises and the household poultry sector (Croppenstedt, 2006).

During the 1990’s the poultry industries grew at around 8.7 percent. With over 17 billion L.E. investments and 5 billion L.E. (1$ = approximately 5.75 L.E.) working capital in 2004. The poultry sector provides job opportunities for approximately 1.4 million employees when it is operational at its full potential (Maged
and Hamdey, 2006). In addition, IDSC (2008) declared that the Egyptian bird’s production reaches 800 million birds annually.

The harvesting stage is one of the important and emergency stages. For poultry, the harvesting stage is very important and critical stage done manually or mechanically and so that it must be done in a suitable method to avoid the huge losses that would be occur in two major passes, firstly the losses in the product and the second is the losses related to the human resources, economics and management.

The commercial catching of broiler chickens and other birds that are headed for the slaughterhouse is often a violent process in which birds are manually caught by workers who carry them upside down by one leg, four or six to a hand, before throwing them forcefully into crates on transport vehicles. During the process, or as a result of it, birds suffer through great stress, broken bones, bruising and even death (Cem, 2004). To reduce injury losses and to decrease labor costs, mechanical harvesters have been introduced as alternatives to conventional manual catching of poultry which catch birds and conveyed it with belt to transport crates. It is also important to note that machines can catch at approximately the same rate as manual catching crews (Associated Press, 2003) but do not fatigue or slow down at the end of the shift like their human counterparts. Also, improvements in birds welfare can only be achieved if the utmost care is taken to find a well designed mechanized system that handles birds gently. Human handling must be made a foremost priority in order to avoid the same problems
that are associated with manual methods (Cem, 2004). Moreover, not only does the use of machines improve welfare for birds during the catching process, it also results in financial savings for the producer (Cem, 2004). Finally, the most recent of these systems are less damaging to birds than conventional manual catching (HSUS, 2006).

In Egypt, manual harvesting without any mechanical implementation, compared with the international development, reveals a huge gap and leads to the human resources problems which influence the product and finally the main result is the huge economic losses.

The main aim of recent study is to investigate the poultry harvesting period with engineering approach in an attempt to provide a mechanical prototype for moving poultry from the surface and convey it with belts device to collecting drawer without any danger or injuries.

Consequently, to achieve most of its objectives the present study was carried out in three separate but interrelated stages as follows:

**First stage:** present an investigation for the important data related to the harvesting period and make a case study under local conditions to achieve the important parameters values and finally evaluate the situation.
**Second stage:** Study and determine some important dimensional, dynamical and physiological properties and measures for birds to be as helpful and supported data-bases in design and other treatments.

**Third stage:** Design, manufacture and test the mechanical proposed prototype for moving and packing birds without any danger or injuries.
REVIEW OF LITERATURE

Egypt’s population fast growth rate is one of the main constraints hindering its development. The others are high illiteracy rates, limitation of arable land and scarce water resources. In addition, Egypt is not a self-sustained country in food production and remains one of the world’s largest food importers (AAFC, 2004). Although Egypt’s Government makes great efforts to increase its food production and reducing the food gap, high population growth rate paired with slow growth in agricultural yields makes Egypt depending on food importation to fulfill its growing domestic demands. Egypt continues to make strides towards achieving self sufficiency by using new agricultural technologies and reclaiming new lands (CAPMAS, 2005).

Poultry industry is relatively more efficient than the red meat industry in providing a cheap protein source to fulfill Egyptian population requirements (Abdelbary, 2003). Poultry meat is popular among Egyptian consumers across all income categories, because of its low cost compared to red meat and fish. Poultry also represents an income source for many poor families who practice traditional aviculture. About 90 percent of rural households and a great number of urban households rely on aviculture as a clean and cheap source for animal protein and as a contributor to income, especially given the rising price of red meat during the period after 2004/2005. Also, poultry production differs from other animal production activities in several ways. The most important is the rate of capital circulation while