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Animal Science teaching and research: remaining relevant in a changing environment

In this address, a brief historical overview of the development of Animal Science at the University of Pretoria will be provided, followed by the role and importance of teaching of Animal Science. I will share some thoughts on research in the three major disciplines of animal breeding and genetics, animal physiology and animal nutrition in a South African context with the focus on Animal breeding and genetics. In conclusion, the future challenges for Animal Science teaching and research, to remain relevant on a local, African and international level, will be discussed. Animal Science as a scientific field and discipline has developed over many centuries. The current understanding of Animal Science comprises the scientific study of the genetics, physiology and nutrition of farm animals, equine and companion animals. 100 years ago there was no term such as Animal Science and farming and teaching of livestock were known as "Animal Husbandry". In order to appreciate the origin and foundation of Animal Science, the domestication of farm animals that took place approximately 12000 years ago, should be acknowledged, when humans consciously started to select plants and animals to benefit humankind. Driscoll et al (2009) duly notes that all domesticated animals, except for cats, had one major aspect in common namely that they were tolerant of man and therefore provided the potential to be tamed. Most of the domestication of farm animals, used for food, hides and fibre, took place in the plains of Mesopotamia, along the Taurus Mountains and parts of the Mediterranean coast; currently including regions of Anatolia, Iraq, Syria and Central Asia. The ancestral species included the Auroch (Bos primigenius), Bezoar (Capra hircus), Mouflon (Ovis Aries) and wild boar (sus scrofa) that are today recognised as the common ancestors of the large variety of domesticated dairy and beef cattle, goat, sheep and pig breeds used for food production (Diamond, 2002). Domestication laid the foundation for farming and the development of agriculture with a life-long commitment of humans to feed and take care of their animals. A historical view of agricultural developments during early times highlights the uneven distribution of land for food production, both plant and animal, as well as access to food. During the middle ages, land was either owned by the church or royalty and agricultural 2 production was controlled through feudal systems; the small farmers or rather tenants on the land owned by the Lords cultivated the soil and cared for their stock, but were at the mercy of the natural environment in the form of drought, floods, pests and other disasters. Pretty (1990) refers to the low productivity of both crop and livestock production often not sufficient to sustain the family after payments in product or labour were provided to the Lordship. Events such as the industrial revolution had a significant impact on the development of agriculture that included rural families leaving the land to earn a living in cities. According to Allan (2010), the percentage of labour working in cropping reduced from 74% to 35% between the 1500 and 1800's. The need of urban dwellers for access to food created the opportunity for surplus food production and opened up new markets. This provided incentives for farmers to increase productivity and make a living from crop and livestock production. The

development of farming equipment and other technology, slowly but surely, established agriculture as a viable enterprise. After many centuries of development in livestock production, traditional farming has been replaced by large farming operations for beef, dairy and small stock in most parts of the world as well as in South Africa. The swine and poultry is characterised by vertical integration and privately owned companies. The increasing pressure for food production for an ever-growing world population has shaped the farming landscape and this has provided opportunities for Animal Science to develop as a scientific field of study. Despite the advancements made in Animal Science for the production of safe and high quality food as well as socio-economic development, sufficient food production and access to food to alleviate poverty and hunger remain among the top priorities on the list of Sustainable Development goals (SDG) (UN 2015). South Africa is seen as a developing country, despite first world practises applied in most industries including Animal Sciences. It is estimated that the world population will grow to reach 9 billion by 2050 and most of the growth will take place in the developing world, including Africa (Godfrey et al., 2010; Telegu et al., 2017). South Africa will have an estimated population of 72.7 million to feed by 2025 with 50 million residing in urban areas (Worldometers, World Population Prospects, 2017). Consequently there will be a need for sufficient animal protein to be provided by the livestock, pig and poultry industries. Currently the livestock and animal feeds industry contribute more than 50% of the Agricultural GDP and are perceived as one of the fastest growing sectors. There is however a need to accelerate the developing farming sector and support small holder livestock farming. A collective effort by the well-established commercial livestock sector and government will be essential to ensure 3 the sustainability thereof. Professional Animal Scientists for the South African and Southern African livestock environment need to be educated and trained by the Department of Animal & Wildlife Sciences. At the same time relevant research must be performed that will meet the demands of more efficient, environmentally friendly, high quality and safe food production for the people of Southern Africa.