Studying the Gap in the Processes of Converting Productive Ruminant Herds into Sustainable Ruminant Herds

25th of September 2022

Egypt's Vision for Cop27: The Role of Animal Health in Egypt's National Climate Commitments

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Dr. Taher Ahmad Baraka is a full Professor of Internal Medicine at Department of Medicine and Infectious Diseases, Faculty of Veterinary Medicine, Cairo University. He was born in Giza (Egypt) on January, 1, 1968 and received his Veterinary Medical Degree at Faculty of Veterinary Medicine, Cairo University in 1990, Master (1995) and Ph.D. under co-supervision with VFU, Czech Republic (2002) in Veterinary Sciences. During Ph. D. graduation he had a scientific mission to OARDC, Ohio State University, USA (2000). He was appointed to Assistant Professor in 2007 and Professorship in 2012 in Cairo University. He was appointed to many academic positions and units' supervision. He shared as PI of two Research Projects and Co-PI of another one, and all financially supported by Cairo University Research Sector. He created Research Laboratory of Rumenology in his department (since 2007 and current), and achieved several theses and published papers. He prepared a proposal for four teaching programs (Occupational Certificate, Diploma and Master degree of farm animals, equine, camel and pet animal Veterinary Medicine). He has authored and co-authored several peer reviewed researches in International and local journals. He is a reviewer in Scientific Committee for Graduation of Assistant Professors and full professors in Animal Medicine Specialization, Supreme Council of Universities in Egypt. He has a membership with several scientific professional organizations and associations. He has invited as a speaker for several international and local scientific conferences. He has supervised many Master and PhD Theses. He is former Head of Department of Medicine and Infectious Diseases 2018 to 2021, and now is the Head of Internal Medicine sector in the same department, and Scientific Coordinator of three under graduate and four post graduate courses. He has published books in Camel Medicine, Equine Medicine, General Medicine and Animal Medicine.

Studying the gap in processes of converting productive ruminant herds into sustainable ruminant herds

Abstract

Ruminant herds' production of meat and milk provide an important source of protein and other nutrients for human consumption. Global require is expected to increase by 73% and 58%, respectively, by 2050 compared with 2010 levels, due to continuous expansion of the world population.

Elements of sustainable animal production systems can be summarized as: 1) Resource efficiency use of nonrenewable resources and, whenever possible, substituting local renewable resources for those imported from outside the farm; 2) Profitability; 3) Productivity; 4) Environmental soundness; 5) Social viability. A sustainable ruminant production of milk and meat system is comprised of three different, but intersecting, pillars: social responsibility, economic viability and environmental stewardship. True sustainability is a balance of these three aspects.

Rumen which is main factory for utilization of feeds into milk and meat in ruminants should be kept working perfectly by keeping normal ecology and relationship between bacteria, ciliates and fungi. Bacteria have fermentative properties and producing propionic, putyric, acetic volatile fatty acids, methane, CO2 and hydrogen. While rumen ciliates: 1) constitute about 50% of rumen biological population; 2) Represent about20% of gained protein by the host with digestibility at the abomasum of 91%; 3) Detoxify the toxins of poisonous plants and eliminate some toxins out of the digestive tract; 4) Stabilize the number of Streptococci to reduce the produced harmful lactic acid; 5) Entodinium types of ciliate protozoa digest starch and protein to produce the amino acids which are essential for bacteria and protozoa.

Methane emissions in dairy cattle represent values from 26 - 497g/day; in beef cattle161 - 396 g/day; Dairy ewe 8.4 kg/head of CH4 annually, sheep 22 - 25 g/day. It is also necessary to obtain data on CH4 emissions from housing systems and manure management.

Strategies for mitigating methane emissions depend on: 1) Increasing animal productivity; 2) Animal breeding; 3) Nutrition (Lipids, Concentrates, Forages); 4) Rumen fermentation and microbiome manipulation Vaccines, 5) Early life programming; 6) Chemical inhibitors; 7) Algae; 8) Alternative [H^+] sinks (nitrate); 9) Phytocompounds.

Recently, a shift from cattle to camel and goat farming can sustain milk production with lower inputs and methane emissions. More research should be applied to sustain efficient ruminant herd's production with minimal environmental hazard.

د.ماجد إبراهيم محمد علي مصلح

د.ماجد حاصل على درجة دكتوراة فى العلوم البيطرية تخصص الباثولوجيا الاكلينيكية عام ٢٠١٧مع خبرة مميزه ودرجات علمية فى مجال فحص الاغذية مع مرتبة الشرف من جامعات الولايات المتحدة كما انه اتم دراسة دبلوم الطب الوقائى بدرجة امتياز وكذلك درجة الزمالة فى الجراحة من مستشفيات القوات المسلحة الامريكية. اتم الحصول على العديد من الدورات الاساسية و المتقدمة فى العلوم العسكرية.

لديه خبرة مميزه فى اداره وحدات الذبح او مزارع الالبان والمجمعات المنتجة للبيض والدواجن. لدى سيادته العديد من المشاركات بتصميم وانشاء وادارة وحدات الانتاج عالية الكثافة وذلك فى اطار تنفيذ السياسة القومية فى التوسع فى انتاج البروتين الحيوانى.كما ان لدى سيادتة مشاركات مميزه فى اللجان القومية التى تنتقى السلالات من بلاد اجنبية وفق الاشتراطات العلمية الحديثة. ساهم فى رفع مستوى اللحوم و منتجاتها بوضع خطط بناء مميز للمجازر وطرق تحديثها لرفع القيمة الصحية للمنتج المصرى.

رؤية تحقيق التوسع في مشروعات الإنتاج الحيواني في ظل التحديات البيئية والمناخية والإقتصادية العالمية

المستخلص

إن للتغيرات المناخية والبيئية تأثير قوي على الإقتصاديات التي تعتمد على عناصر الثروة الحيوانية كأحد عناصر التنمية المستدامة حيث أن الإنتاج الحيواني من أكثر المجالات تأثراً بالتغيرات المناخية مثل (الإرتفاع في درجة الحرارة والأثار المترتبة عليها / تناقص الأمطار وما يتبعها من جفاف ... إلــخ).

وفي إطار تحقيق رؤية الدولة لتفعيل برامج التنمية المستدامة ومنها برامج توفير الغذاء ذو الأصل الحيواني بعناصرها المتعددة (لحوم / ألبان / منتجات ألبان / لحوم بيضاء / بيض / أسماك ... إلــخ) برزت أهمية التنوع في إقامة مشروعات الإنتاج الحيواني بأسلوب حديث يمزج بين توفير العناصر الإنتاجية وخلق الفرص والبرامج والأساليب التي تكفل التوسع في إنتاج الأغذية ذات الأصل الحيواني وتحقيق الإكتفاء الذاتي بدون الإعتماد على الإستيراد في سد الفجوة الغذائية أو إستخدام الإستيراد كوسيلة مؤقتة لحين خلق العناصر الإنتاجية التي تتيح توفير المنتجات الغذائية التي تعتمد على تنمية الثروة الحيوانية بشكل أساسي وتحقيق رؤية الدولة في إستنباط السلالات التي تتميز بمعدلات إنتاجية عالية من خلال برامج متعددة تحقق المستهدف وتهتم بوضع الحلول الضرورية لأزمة الأمن الغذائي التي تعتبر تحديا حقيقيا لكل الحكومات المصرية على مر العصور والذي تقع علي رأس أولوياته توفير الغذاء ذو الأصل الحيواني بالكم والنوع والجودة التي تتواكب مع الزيادة السكانية المطردة والتي تجعل التوسع في مشروعات الإنتاج الحيواني المتعددة أحد الحلول الرئيسية لمجابهة هذه المشكلة.

Dr. Ahmed Medhat

Dr. Ahmedis a Director of Sustainability in Mawared Industries(S.A.E.).Hehas been dollar projects fundedby development -million-involved in the execution of various multi ıgencies in Egypt (UNDP, GIZ, WB, EBRD, KFW, etc.), in which heentailed undertaking project's the design, implementation, and monitoring of the different aspectsof the :ycle.This ranged from development and integration of effectiveEnvironmental and Social PerformanceManagement systems, raising awareness, trainingand developing business ul and partnerships, market need analysis, operational plans, fundraising, successf effective implementation, to monitoring and evaluation. Over aperiod of eighteen years, Ahmed has worked with different national and internationalorganizations both in the Government, private and NGO, mostly concerned withrenewable energies, energy efficiency, climate change, water supply and sanitation,waste management, agriculture, sustainable development related issues and start updevelopment. Ahmed extensive experience includes digestionyears in biogas and anaerobic (AD)ed and his relat includes over experience1500based, commercial,industrial, municipal and -farm wastewater treatment facility AD systems utilizing biosolids,manures, food waste, and systems can handle up to agriculture waste. His AD90000ic feedstocks tons/yr. of organ with CHP’s up to3 MWe

Utilization of Livestock for Climate Change Mitigation: Manure Based Biogas

Abstract

The urge to use renewable energy sources has grown as a result of the continued rise in global energy demand, the depletion of fossil fuel supplies, and worries about climate change brought on by the burning of fossil fuels. A sustainable energy source called biogas is created when organic waste decomposes anaerobically. The creation of biogas from organic wastes like animal manure benefits the generation of renewable energy and waste management techniques for environmental and public health protection. The pinnacle of a sustainable bioenergy system is the farm-level production of biogas from manure. While simultaneously reducing fugitive methane emissions from open slurry holding tanks, reducing smells, and minimizing pollution effects on rivers and wells, the system incorporates a circular economy decentralized production of organic biofertilizer and biogas for use in heat, power, or transport fuel. The properties of manure vary depending on the type of farm animal used and the style of animal husbandry, which in turn affects the cost of producing biogas from manure as well as the technical level of manure resource. The main factors that determine whether or not manure is suitable for an economical anaerobic digestion process are its biogas potential, its water content, the presence of unwanted and inhibitory materials in the manure, the size of the herd where the processing takes place, and the amount of manure that is made available to the biogas facility. Incentives are necessary for the anaerobic digestion of manure to be profitable. To have a major influence effectively, every measure or plan for encouraging manure digestion must take into account the setup of current farms and the properties of the generated manures. Facilities for anaerobic digestion that use manure as their primary substrate frequently have modest capacities and high specific costs. The cost of digestion and the production of biogas are significantly influenced by the kind of animal husbandry and species. To be effective, support programs must take these variables into consideration. Finally, the use of biogas in organic farming is another issue that is becoming more important. Organic fertilizers are needed in greater numbers due to the growing proportion of organic farming. Future policy and support improvements should take into consideration the ability to include the biogas facility into the organic farm model to supply organic fertilizer. An integral part of the agricultural system for the circular economy should be the biogas plant. Its output must include useful biofertilizer that can be recycled back onto agricultural land, which is the source of the feed for the animals that create the manure, in addition to energy yield.

Prof. Khaled Nasr El-Din Fahmy

Dr. Khaled is a professor and Headof Nutrition & Clinical Nutrition department, Faculty of Veterinary Medicine, Cairo University and manager of Animal and Poultry research center, Faculty of Veterinary Medicine, Cairo University. He is a member of Egyptian Veterinary Nutrition Association, Egyptian Society of Animal Management, Egyptian Society of Animal Reproduction and Fertility, Egyptian Veterinary Syndicate, Egyptian Veterinary Medical Association, Egyptian Society of Environment and Aquatic Animal Health (ESEAAH), Veterinary Social Association, International Goat Association, Physiological Sciences and their applications. He is an expert at Basic Animal Nutrition, clinical nutrition, quality control of feed, feed additives, feeding and nutrition of dairy, beef and small ruminants.

Advances in nutritional management in Ruminants to alleviate Climate change

Abstract

Climate play an important role in animal husbandry and livestock productionWhile**,** climate determines the adaptability of a particular animal in a given region, weather determines animal health and performance**.** In recent years, there has been an increase in public concern over environmental damage originating from animal feeding operations. The increased concentration of greenhouse gases (CO_2, CH_4, and N_2O) in the troposphere has been implicated in the consistent increase in atmospheric temperature and global warming over the last few decades. Domesticated ruminants are estimated to produce about 80 million metric tons of CH_4 annually, accounting for about 22% of CH_4 emissions from human-related activities (NRC, 2002). Methane is potential greenhouse gas produced in ruminants as a by-product of OM fermentation in the rumen, and it represents a significant energy loss to the host animal. The energy loss as CH_4 in ruminants can range from 2 to 12% of the gross energy intake. Methane (CH_4) has 21 times more global warming potential (GWP) than carbon dioxide (CO_2). Ruminant animals are unique due to ability to digest, highly fibrous feedstuffs, making cattle and other ruminants contributing factors in global warming .The contribution of other livestock such as horses, rabbits, or poultry is much less significant.Changing the level of feed intake, the dietary characteristics or the fermentation conditions in the rumen affect the microbial digestion of feed and the efficiency of microbial synthesis. As a consequence, amounts of microbial matter as well as undegraded feed substrate flowing out of the rumen to the small intestine change, because of the multiple factors that may have changed simultaneously and have affected rumen fermentation and hence methane yield. ***By Dietary Manipulation Through*** increasing proportion of concentrate rich in starch, high quality leguminous forage, grinding and pelleting of forages, inclusion fats and oils, total mixed ration (TMR) and Urea Molasses Mineral Block, organic acids (fumarate, malate), tannin, saponin rich plants and ionophores, like monensin has a very positive effect on the reduction of greenhouse gases and resulted in energy balance and less negative conditions and improved fertility and production.

Prof. Diea Abo El-Hassan

Dr. Diea Abo El-Hassan has been a professor of infectious diseases in, Faculty of Veterinary Medicine, Cairo University since 1987. He received his PhD in Animal infectious diseases at Cairo University, Texas A & M University and Plum Island Institute, USA in 1986, and obtained both his B.V.Sc. and M.V.Sc. degrees at Faculty of Veterinary Medicine, Cairo University in 1979 and 1983 respectively. Professor of Animal Infectious diseases and Clinical laboratory diagnosis in Qassim University Saudi Arabia since 2006 - 2010, Director of Publications and Publishing Center College of Veterinary Medicine, Cairo University, since 2010; head of Animal Internal Medicine & Infectious Diseases in Cairo University, since 2015. Currently, he is a consultant for many dairy & beef farms. He worked in many international projects in cooperation with Germany, USA and Saudi Arabia as well as other national projects.

Misuse of antibiotics in farms and the environmental pollution with resistant microbes

Abstract

Antibiotics are valuable therapeutics have been widely used in animal production for decades worldwide. They are delivered to animals for a variety of reasons, including disease treatment, prevention, control, and growth promotion; added in low doses to the feed of farm animals to improve their growth performance. For both humans and animals; the misuse of antibiotics for nonbacterial infections such viral infections, overuse of the antibiotics and inadequate antibiotic stewardship in the animal and poultry farms can lead to the development and spread of antibiotic-resistant bacteria that may cause untreatable infections. Antibiotic resistance has been recognized as a global health problem. It has now been escalated by WHO, OIE and FAO to one of the top health and environmental challenges facing the 21st century.

Substantial data show elevated antibiotic resistance in bacteria associated with animals specially that fed nontherapeutic antibiotics (NTAs) and their food products. Infectious disease experts facing antibiotic resistance questioned the possible harm from this use. The studies found that farms using antimicrobial growth promotants (AGPs) or exposed to misuse of antibiotics, had more resistant bacteria in the intestinal floras of the farm workers and farm animals. This resistance spreads to other animals and humans directly by contact and indirectly via variety of food chain, water, air, and soils fertilized with manure.

Due to the emergence of microbes resistant to antibiotics which are used to treat human and animal infections, the European Union has banned the marketing and use of antibiotics as growth promoters in animal feed since January, 2006. While it was hoped by many that the years of experience following the bans on nontherapeutic use of antimicrobials in Europe would end this practice, arguments continued, largely along the lines of a cost/benefit ratio.

Action in developing countries, including Egypt, continues to lag far behind that of the European Union, which has chosen the preventive measures a guiding tenet of solving this health problem. The substantial and expanding volume of evidence reporting animal-to-human spread of resistant bacteria, arising from the misuse of antibiotics in animal and poultry farms, supports the wise use of it in order to reduce the growing environmental load of resistance genes.

Prof. Mohamed Khaled ElsayedElmossalami

Dr. Mohamed is a professor, Meat Hygiene Department, Faculty of Veterinary Medicine, Cairo University. He was the director of Conference and Social center, Cairo University from 2006 till 2010, Vice Dean for Student Affairs from 01.08.2010 – 10.10.2011, Vice Dean for Community Service and environment Development from 11.10.2011 – 10.10.2014, and now he is the director of Cairo University Guest House.

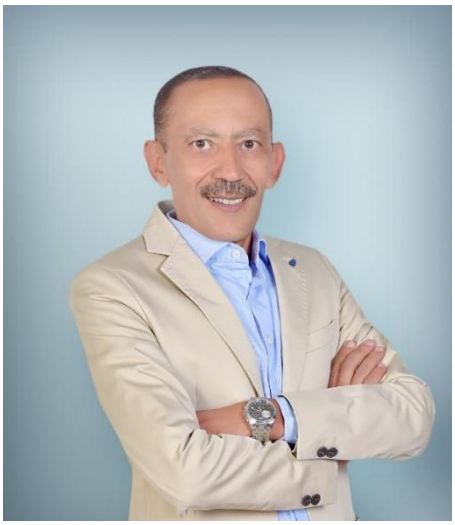
Impact of climate changes on food safety and quality

Abstract

Climate change is impacting our global food system in a variety of direct and indirect ways and presenting new challenges to food safety and human health. Food safety refers to the conditions and processes throughout the food system that ensure food is safe for human consumption. The impact of climate on food safety occurs through multiple pathways. Changes in air and water temperatures, weather-related changes, and extreme events such as severe droughts or flooding which can in turn affect pathogens and introduce toxins to crops. Ingestion of food contaminated with pathogens can result in foodborne illnesses, such as norovirus infection or salmonellosis. Globally, about one in 10 people become ill with a foodborne illness, and over 420,000 deaths occur every year. therefore, changes in temperature and precipitation can affect the distribution and survivability of pathogens that cause foodborne illnesses. Furthermore, changes in air and water temperatures can modify the seasonal and geographic occurrence of bacteria, viruses, parasites, fungi, and pests as well as chemical contaminants. Higher temperatures can increase the number of pathogens already present on produce and seafood, while bacterial populations can increase during food storage which depending on time and temperature, can also raise food spoilage rates. But these changes will not affect all foodborne pathogens equally as the occurrence of some pathogens, such as *Salmonella*, *Escherichia coli* (*E. coli*), and *Campylobacter*, could increase with climate change because these pathogens flourish in warm, humid conditions. For example, *Salmonella* on raw chicken will double in number approximately every hour at 70°F, every 30 minutes at 80°F, and every 22 minutes at 90°F.Moreover, increasing in atmospheric carbon dioxide associated with climate change affect the quality of food by disturbing the nutritional value of main crops resulting in malnutrition by reducing protein content and essential minerals.

In conclusion, Climate already impacts food safety within an agricultural system—prior to, during, and after the harvest, and during transport, storage, preparation, and consumption. Changes in climate factors, such as temperature, precipitation, and extreme weather are key factors of pathogen introduction, food contamination, and foodborne disease, as well as changes in the level of exposure to specific contaminants and chemical residues for crops and livestock.

Dr. Mohamed Osthman



Dr. Mohamed born in Cairo 1968, graduated from Cairo university in the faculty of Veterinary Medicine 1990. 2010, He got master's degree in surgery, anesthesia and radiology entitled "Mandatory surgical interferences associated with feeding disorders in dairy cattle" 2019, got a PhD with the same major entitled "Studies on claw disorders in dairy cattle herds with special emphasis on the feeding regime "Published 2019. Also, he published articles: Claw disorders in dairy herds: Nutritional prospective Effect of days in milk on incidence of lameness in Holstein dairy cow. As for the scope of work, He Joined Dina farms in 1991, which is the largest farm in Egypt & Africa until I became the Livestock director and then CEO consultant. During this time, he participated in many international and regional conferences as Speaker on International summer school on imported and neglected infectious diseases, University of Göttingen 2018, on Livestock seminar, Uldag Univ. Bursa, Turkey, and Cairo Climatic talks sponsored by the German embassy in Egypt. He participates World Buiatrics Congress Nice 2006, Budapest 2008, Lisbon 2012, SPACE Renne – France 1999, ISPAH Middle east symposium-Mastitis control and milk quality", Cyprus 2011, Ruminantpartnershipdays, Greece 2010, European Buiatrics Congress, Marseille, France, 2009, Rome 2015, National Mastitis Council, Ghent, Belgium 2014, Blanca – Wisconsin Madison Dairy professional workshop, Barcelona, Spain 2015. Added to that now he is a Member & Dairy farms representative in Board of Directors, Faculty of Veterinary medicine, SADAT University, 2015 – 2022. Also, was certified as Principal Lecturer at Yotta Medical Transformation from a veterinarian to an entrepreneur was an incredible journey inspired by the cow's nature and guided by dairy sciences over 30 years, in 2020 he found that it's the time to share that knowledge with people who share my passion for agribusiness and livestock production, assisting them to establish, grow, manage, and develop profitable innovative sustainable dairy farm with available resources through founding his own company La Vache Consultancy group.

Dairy management, a key for sustaining livable planet

Abstract

As we cannot remember the future, we must imagine it instead. things might happen, but they might not.

The world population is expected to grow to about 10 billion in 2050, and to supply the future human population with food while sustaining a livable planet, food should be produced sustainably.

Dairy cattle provide a major benefit to the world through upcycling human inedible feedstuffs into milk and associated dairy products. However, as beneficial as this process has become, it is not without potential negatives.

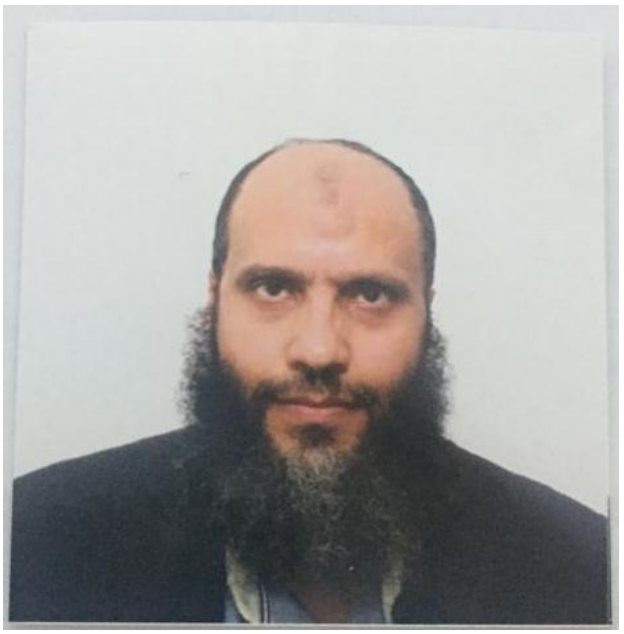
Dairy cattle are a source of greenhouse gases through enteric and waste fermentation as well as excreting nitrogen emissions through their feces and urine.

Important GHGs related to milk production are carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O), mainly emitted during feed production, enteric fermentation, and manure management. Methane, which has 25 times greater global warming potential than carbon dioxide. Enteric methane not only contributes to greenhouse gas emissions, but also represents a substantial waste of feed energy for ruminant animals

However, these negative impacts vary widely due to how and what these animals are fed. In addition, there are many promising opportunities for further reducing emissions through feed and waste additives.

The present discussion aims to further expand on where the industry is today and the potential avenues for improvement in the dairy business as it made up of a mix of people, livestock, natural resources, technology, economics, and finance.

Prof.Mohammed A. AboElkhair



Dr. Mohamed is a professor of Virology, Faculty of Veterinary Medicine, University of Sadat City. His research interests are Diagnosis of viral diseases, Host immune response developed against viral infection, Study pathogenesis of viral infection, and Development of effective viral vaccine.

The most prevalent viruses affecting ruminants in Egypt

Abstract

Infectious diseases represent more than one-fifth of the overall losses in livestock production worldwide, with important consequences for food security and health of both animals and humans. Ruminant livestock are considered as an essential source of meat and milk for Egyptians. Particularly, infectious viral diseases hamper the expected benefits from these animals. A number of important viral infection that affect ruminant populations in Egypt have been reported since long time. Currently, most of these viral infections are endemic and cause overwhelming diseases such as Foot and Mouth disease (FMD), Lumpy skin disease (LSD), Bovine viral diarrhea (BVD), Bovine ephemeral fever (BEF), and others. Recently, the epidemiology, pathogenesis, and clinical picture of most of these viral diseases have changed dramatically due to introduction of new strains of the causative viruses combined with other factors. Transboundary transmission of the newly introduced viral strains to Egypt occurred via different routes, mainly importation of apparently healthy animals. In additions, environmental and socioeconomic changes, such as global warming, changes in land use, host migration and globalization, have influenced the distribution of those infectious diseases especially those that are transmitted by vectors. Therefore, the current situation of viral infection in ruminants in Egypt requires an urgent need for collaborative surveillance and intervention plans for the control. This presentation highlights different aspects of some of the most important infectious viral diseases that affect ruminants in Egypt.