

# ENHANCEMENT OF EGYPTIAN VETERINARY MEDICAL EDUCATION THROUGH COMPETITIVE PROJECTS

By

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## Abstract

This article attempts to provide an insight into the current state of veterinary education in Egypt within the context of higher education. It also describes the role played by Higher Education Enhancement Project Fund (HEEPF) to partially upgrade this vital sector and to develop strategies for changes in the future. HEEPF projects achievements were recognized in various fields of veterinary education including laboratories and learning environment development, human resource development, academic enhancement of the undergraduate and postgraduate stages, E-Learning and simulation.

**Keywords:** Veterinary medicine; higher education; competitive projects, quality, Egypt

## 1. Overview on Veterinary Education in Egypt

There is no doubt that veterinary medicine plays an important role in Egypt national security, and protection of the public health. Academic veterinary medicine and the profession have dramatically changed with the rapid change in information technology to fulfill such needs.

There are eleven established veterinary colleges in Egypt. They represent most of the universities; Cairo, Alexandria, Assiut, Kafr El-Sheikh, Menoufyia, Benha, Zagazig, Suiz Canal, Mansoura, South Valley, and Beni-Suef. In addition to a new college in Damanhour, currently a branch from Alexandria University, besides 3 research veterinary institutes. Fig. 1 depicts the hierarchy of the programs in veterinary medicine. Graduate education at the Egyptian veterinary colleges offers a variety of diplomas, master and doctorate degrees that cover almost all fields of veterinary sciences. Applicants for diplomas are required to be holders of a bachelor degree in veterinary science. Those applying for a Ph.D. degree are required to be holders of a master degree in the field they have applied to obtain the Ph.D.

Courses in veterinary education are divided into academic and clinical courses. Those are studied along five years accompanied by summer practical training courses in some colleges. There are group of departments in each college; anatomy and embryology, histology, physiology, biochemistry, pathology, pharmacology, clinical pathology, zoonosis, fish, poultry, food hygiene, parasitology, surgery, gynecology, animal behavior, forensic medicine, medicine, infectious diseases. Veterinary curriculum in the first and second years; education in the first 2 years aim at orienting freshmen by a variety of basic courses that are designed to introduce them to fundamental skills that are required for further progress in their academic life and are essential for modern veterinarians. These courses include English language and medical terminology, an introduction to computer and computer applications in the field of medical sciences, basics of biology, biophysics, chemistry, and biostatistics in addition to these general courses there are other introductory courses in the field of veterinary medicine. The latter courses include anatomy and embryology of domestic

animals, cytology and histology, biochemistry and chemistry of nutrition, physiology, ethology and management of animals and poultry, veterinary genetics and genetic engineering. Building on the basics given in the first and second years, students will be gradually introduced to the clinical veterinary sciences by a set of courses designed to ease this transition from the academic. These courses include nutrition and clinical nutrition of farm animals, parasitology, pathology, pharmacology, virology, bacteriology, immunology, and mycology, surgery, veterinary economics and farm management. By the fourth and fifth years, students start to spend more time dealing directly with animals. Most of the courses offered during these last two years of veterinary are hands-on experiences that are designed to instill the latest in veterinary science and education into students. The courses taught through these final two-years includes veterinary medicine and infectious diseases, theriogenology, poultry and rabbit disease, fish diseases and management, clinical pathology, veterinary hygiene and management, toxicology, forensic medicine, and veterinary regulations, food hygiene and control, zoonosis and surgery.

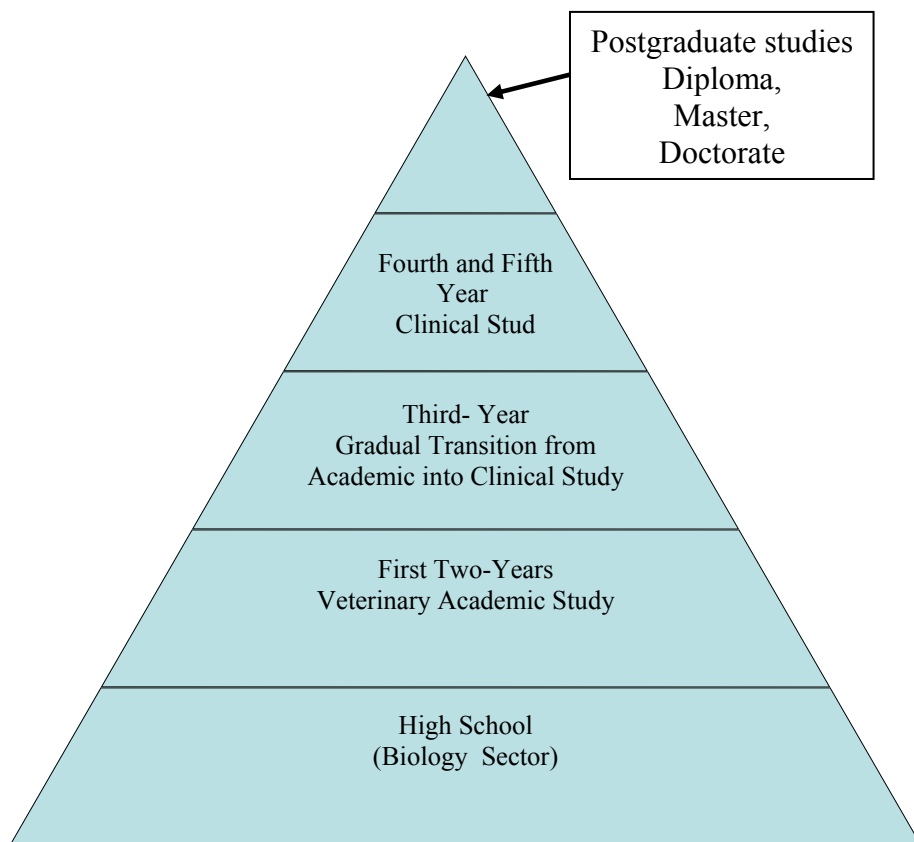


Fig. 1 The Hierarchy of programs in Veterinary Medicine

There are similar departments in all of these 11 colleges; however they vary in their facilities. Though, there are some unique departments in certain colleges for example Faculty of Veterinary Medicine, at Suez Canal University has a unique department for the wildlife, others have unique distinguished centers like the biotechnology center in faculty of veterinary medicine at Cairo University. Table 1 lists the percentage of veterinary students to total students in selective universities, staff to students' ratio, and assistant staff to students' ratio based on year 2004-2005 statistics [8]. The least among the universities for the staff to students' ratio are Benha and Cairo universities. On the other hand, the least among the universities for the assistant staff to students'

ratio are Zagazig and Beni-Suef universities. However, strategic planning should through the next five years forecast the anticipated ratios.

Table 1 Percentage of veterinary students to total students in selective universities, staff to students' ratio, and assistant staff to students' ratio.

University	% of Veterinary Students/University students	Staff to students' ratio	Assistant staff to students' ratio
Cairo	6.2	1/11	1/49
Beni-Suef	9.5	1/15	1/27
Alexandria	1.4	1/24	1/44
Assiut	2.1	1/13	1/29
Kafr El Sheikh	6.1	1/22	1/30
Mansoura	2	1/39	1/36
Zagazig	2	1/13	1/23
Benha	1.6	1/10	1/31

Regarding the gender of the veterinary students, it has been noticed in recent years that female student number has increased compared with the number of male as shown in Fig. 2 in Cairo University. A recent study [7] has indicated the average number of female students is about 54.7% in the academic year 2004-2005

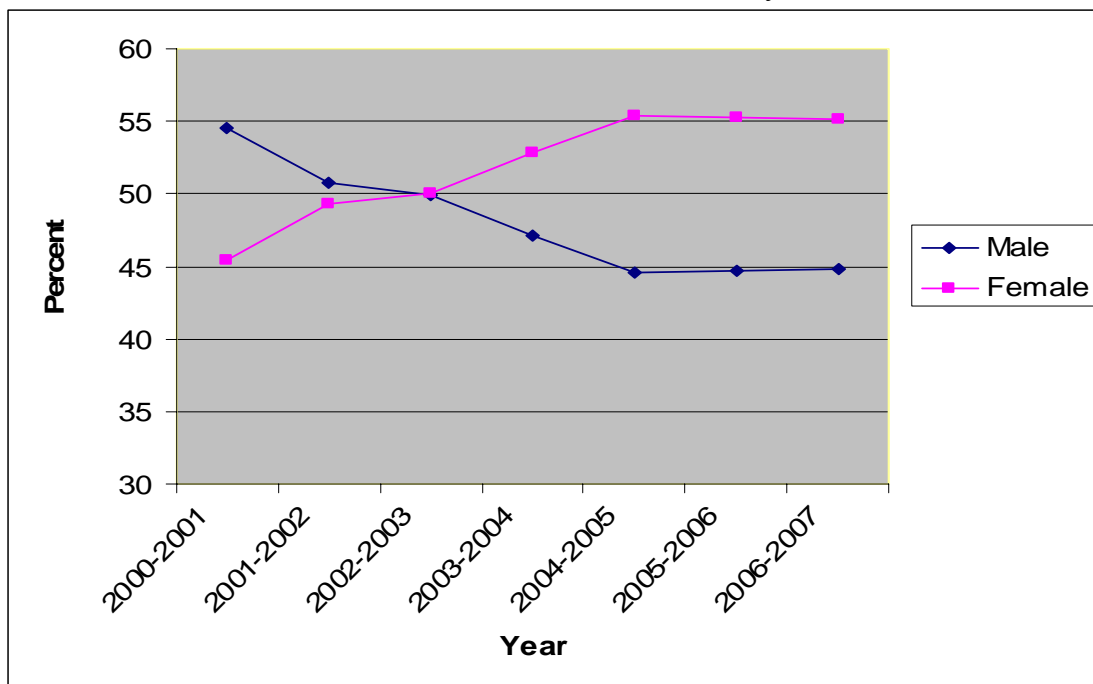


Fig. 2 Gender of veterinary students at the faculty of veterinary medicine, Cairo University (2000-2007).

The veterinary staff members demonstrate achievements in three areas; effective teaching, scientific research and community services. Productivity in such fields is changeable due to the rapid proliferation of information, techniques, and strategies. Careers of the graduated veterinarians are varied according to the global market opportunities. The fields of work include small animal practice, large animal practice, fish and poultry farms, research in veterinary scientific institutes, and sales representatives for human and veterinary medical pharmaceutical companies. Moreover, some of the graduated veterinarians may apply at police or military academies. Though there some vets who choose to work outside the profession.

## 2. HEEPF projects in the field of veterinary medicine

During HEEPF's first phase, March 2003 – March 2007, 158 projects were accepted with total financial support of 13 Million USD on competitive basis. Twelve of these projects were in the field of veterinary medicine with total financial support of 21.143 USD, which represents about 11.7 % of the total allocated budget. The projects' fields and themes are given in Table 2.

Table 2 Competitive projects with their themes in veterinary medicine

Project Field	Theme
Application of Digital and Networking Technologies in the Establishment of Veterinary Education Center (AVEC)	<ul style="list-style-type: none"> <li>• Curricula Development and E-Learning</li> <li>• Establishment of Specialized and Interdisciplinary Centers</li> </ul>
Upgrading and Development of Meat Hygiene and Technology Education in Egypt (UP-DMHTE)	
Enhancement of Veterinary Education in the field of Theriogenology (EVET)	<ul style="list-style-type: none"> <li>• Curricula Development and E-Learning</li> <li>• E-learning and simulation</li> </ul>
Developing Of Veterinary Education in the Faculty of Veterinary Medicine to Prepare Veterinarians for the Labor Market. D V E F V M P V L M	<ul style="list-style-type: none"> <li>• Human Resource Development and Capacity building</li> </ul>
Developing Knowledge and Improving Skills in Molecular Biology for Medical Science (DKISMS)	<ul style="list-style-type: none"> <li>• Research and Development of Laboratories and learning environment</li> <li>• Human Resource Development and Capacity building</li> </ul>
Establishment of Tissue bank and collection of biological materials of animal origin (ETBCBMAO)	
Development of Clinical Pharmacology Course (DOPC)	<ul style="list-style-type: none"> <li>• Curricula Development and E-Learning</li> </ul>
Enhancement of Diagnostic Imaging Program in Veterinary Medical Education (EDIPVME)	<ul style="list-style-type: none"> <li>• Human Resource Development and Capacity building</li> </ul>
Enhancing Veterinary Infectious Diseases Education and Training in Egypt: Internet Based, CD-ROM Course Resources	
Enhancement of Education and Development of Distance Learning Resources for Veterinary Image-Based Courses	
Development of Veterinary Medicine Education Through Field Clinical Train	
Enhancement of Teaching Anatomy by Plastination (ETAP)	<ul style="list-style-type: none"> <li>• Establishment of Specialized and Interdisciplinary Centers</li> <li>• Human Resource Development and Capacity building</li> </ul>

Veterinary education in Egypt suffers from a lot of constrains including lack of facilities in classrooms, lecture halls, laboratories, human resources....etc. HEEPF has started competitive projects in the field of veterinary medicine in an exploration trial to overcome such constrains and the results were quite satisfactory based on results of evaluation data of some projects. The outcomes of these projects varied to cover a lot of highly important innovative aspects and fill a real gap between the supply and demand in that field.

### 3. Development of Laboratories and learning environment

Updated equipped laboratories are one of the major needs in veterinary education. Including plastination laboratories needed for preparing anatomical, histological and pathological specimens. Besides, biotechnology laboratories which are necessary for molecular biology and computer labs have been adopted for use of educational technology in teaching. In the field of new specialized labs in the faculty of veterinary medicine, Menoufyia University, a project has established veterinary labs that include the latest medical equipment in addition to mobile labs for the treatment of sick cases in their different locations. In the field of adding advanced laboratory equipment to existing specialized labs, a distinguished project in Beni-Suef University has added advanced laboratory equipment which allows the establishment of a bank of referential sections for the sick tissues in the Pathology section to facilitate the teaching of animal diseases and to use them in the fast diagnosis of different diseases. This project is considered an excellent example of the effective contribution of the University in laboratory equipment for Beni-Suef University contributed with more than L.E. 175000 to provide the project with a microtome set that costs L.E. 47600, a Cairo stat set for the preparation of samples out of cooled fresh tissues that costs L.E. 81531, and a research microscope with a camera that costs L.E. 47600.



Fig. 3 A snapshot of the veterinary pathology tissue bank  
<http://www.veterinary-tissue-bank-egypt.com>

### 4. Establishment of Specialized and Interdisciplinary Centers

A large number of specialized centers have been established through HEEPF projects, in the faculty of veterinary medicine, Alex. University, a teaching center for

veterinary medicine was established using digital techniques and information exchange and communication network technology. One of the criteria for the success of this center was annexing the faculty of veterinary medicine to CLIVE institution for veterinary medicine. In the faculty of veterinary medicine, Zagazig University, a center for the production of plastination preserved specimens was established to prepare anatomical samples of various animal organs. The developed specimens are used in teaching because they are easy to handle, are not damaged as a result of overuse, and safer as they do not emanate foul odors or fumes as is the case when using traditional samples of formalized organs. Numerous studies have proved the benefits of plastination in research and teaching anatomy. Such plastinated specimens can be used in faculties of medicine, veterinary medicine, science, agriculture, and science departments in the faculty of education. A team of faculty members in Cairo, Assiut, Alexandria and Zagazig Universities participated together with their counterparts in Vienna Univ. Austria and Munich Univ. in Germany in this field. The outcomes of the project were declared in the International Conference for the international society of plastination in Vienna 2006.

In the field of modern laboratories, Menoufyia University established movable veterinary laboratories. The laboratories included the latest medical equipment necessary for curing sick cases in different places. It aims at; providing students with field training, connecting to the fields of scientific research, training veterinarians in veterinary units on the latest technology in the field of veterinary practice.

In the field of developing postgraduate studies, the Faculty of Veterinary Medicine, Beni-Suef University, established a Pathology Center where a bank in the pathology department was established including referential sections, pathological tissues, and two digital courses: (human organs pathology and animal pathology). A bank of questions in the field pathology using specialized software was developed. Setting a database for pathological photos of stock, goats, and camels to be used in the quick diagnosis of different diseases, as well as printing CDs include advanced images and information in the fields related to pathology. Setting a database for contagious diseases that infect farm animals in Egypt and are recorded in published research to be used in preparing master's degree and doctorate theses, as well as establishing a digital library that includes various important theoretical and applied topics accompanied with digital images.

In the Faculty of Veterinary Medicine, Assiut University, the Egyptian center for food safety and man's health was established. The center aims at ensuring food safety and protection from microbes and informing specialists in the fields of food and public health.



Fig. 4 Section of a donkey foot preserved by technique of plastination

## **5. Human Resource Development and Capacity building**

Training is one of the main pillars for the development of capabilities, skills, and competencies in all social sectors. The advanced countries support long life learning and offer training programs for different sections of leadership and executive jobs to update knowledge and improve performance in all fields. Investment in human resource development is considered the most important locomotive for progress. Most of HEEPF projects offered training programs for example, Benha Univ., implemented a number of training programs for faculty members in the Faculties of Veterinary Medicine in Alex, Suez Canal, and Benha Universities through the establishment of a modern ultrasonic unit and the invitation of a foreign professor in this specialization to design a training program for 200 faculty members. The program included theoretical lectures and practical applications. This project was carried out in the framework of scientific experience exchange and keeping up to date with the latest developments in this field which will upgrade performance in University hospitals. Project no. Zagazig univ., participated in training on using plastination in the preparation of anatomical samples through an elite of faculty members in Cairo, Assiut, Alex., and Zagazig universities together with professors from Vienna and Munich Universities. 71 faculty members and 125 students participated in the training programs and 6 workshops were held. Plastic samples can be used in the Faculties of Veterinary Medicine, Medicine, Science, Agriculture, and scientific departments in the Faculty of Education. Training programs reflected directly on performance in the scientific faculties in the universities mentioned above. In addition, the experience of trained faculty members was used in training their colleagues in other universities to maximize the benefit of these programs. Assiut University, Faculty of Veterinary Medicine, organized training programs for veterinarians, faculty members, and students on the latest technology of healthy slaughter and meat industry. It is worth mentioning that the faculties that participated in the training activities included Zagazig, Suez Canal, Mansoura, and Alexandria Universities. In addition, members of the Faculty of Veterinary Medicine, Edfina, and Alexandria Universities were trained on producing electronic modules to be used in the development of different skills and established a special unit for that purpose in the Faculty. Another project in Assiut University, another project offered students and veterinarians training programs according to the requirements of the labor market. Veterinary medical caravans were sent to the neighboring villages. The Particle Biology Center in the university also organized training courses in collaboration with Austrian experts.



Fig. 5 A snapshot of the diagnostic imaging program in veterinary medical education, showing a training workshop

## 6. Academic Enhancement of the Undergraduate and Postgraduate Levels

In the specialization of veterinary medicine, 10 projects led to the development of around 30 curricula. These projects developed curricula in an electronic or e-learning version. However, the development of some curricula was not only restricted to creating an electronic version, but also improving the scientific content and skills. One of the fundamentals of higher education enhancement process is the upgrading of post-graduate curricula taught at Egyptian universities so that they include skills and behavioral sides in addition to Instructional knowledge to keep pace with international standards. In the sector of agriculture and veterinary medicine, one project has developed nine curricula.

## 7. E-learning and simulation

By the end of the four cycles of the HEEPF first phase, many projects have developed electronic courses using power point and other computer programs. Some of the developed courses were enhanced to fit the SCORM standards of e-learning. Most of the developed courses were up-loaded onto one of the available learning content management systems (LCMS) like moodle or A-tutor. Twenty three courses covering several topics in veterinary medicine have been produced through 7 HEEPF projects, appendix B. In addition to some meta courses produced by other projects at the faculty of science. Some projects developed new pedagogical techniques for teaching their curricula, as in the plastination project where plastinated specimens were used to simulate and replace animal dissected organs. Another example was innovated where manually developed training manikins for teaching veterinary obstetrics were developed. The developed models are accepted as a humane source for teaching instead of using animals. A lot of students preferred use of models rather than harmful use of animals.

Table 3 Electronic courses and e-learning developed by HEEPF projects in the field of veterinary medicine

Specialty	Course Title	Location
Academic courses	Application of Animal Nutrition	Second year, Veterinary Medicine, Tanta Univ.
	Animal, Poultry, & Fish Nutrition & Malnutrition	
	Veterinary Histology	First year, Histology, Faculty of Veterinary Medicine, Mansoura Univ.
	Veterinary Pathology	Second & Fourth year, Pathology, Faculty of Veterinary Medicine, Mansoura Univ.
Clinical courses	Animal Pathology (Internal & Contagious)	First term, Animal Pathology, Faculty of Veterinary Medicine, Assiut Univ.
	Veterinary Radiology	Fifth year, Radiology, Faculty of Veterinary Medicine, Mansoura Univ.
	Poultry Pathology	First term, Poultry Pathology, Faculty of Veterinary Medicine, Assiut Univ.
	Fish Pathology	First term, Fish Pathology, Faculty of Veterinary Medicine, Assiut Univ.
	Animal Surgery	First term, Surgery, Faculty of Veterinary Medicine, Assiut Univ.
	Clinical Laboratory Diagnosis	First term, Clinical Diagnosis, Faculty of Veterinary Medicine, Assiut Univ.
	Meat Hygiene theoretical	Fourth year, Food Health, Faculty of Veterinary Medicine, Assiut Univ.
	Meat Hygiene practical	
	1. Delivery 2. Anatomy 3. Surgery 4. Contagious Diseases 5. Fish 6. Internal Diseases 7. Microbiology	B.A. Current Departments of the Faculty of Veterinary Medicine, Menoufyia Univ.
	Veterinary contagious Diseases	Fifth year, Internal & Contagious Diseases, Faculty of Veterinary Medicine, Mansoura Univ.
	1. Surgery 2. Parasites 3. Anatomy	B.A. Surgery, Parasites, Anatomy, Faculty of Veterinary Medicine, Alex. Univ.

### 8. HEEPF projects Evaluation and Effectiveness

Most of HEEPF projects were subjected to internal evaluation by students, staff members and were under focus of the monitoring team of HEEPF. In addition to mutual and external evaluation by other faculty members in Egypt, experts from other countries were consulted as peer reviewers. The analysis of the evaluation sheets was positive and encouraging to proceed in such competitive projects. Universities worldwide are facing numerous challenges, and will be unable, in the future, to function effectively in isolation. The current cooperation between schools engaged in

veterinary education has become a network, in comparison to the “patchwork” of many other professions (Jische et al., 1999). So the 12 veterinary HEEPF projects have not only been integrated together among themselves but also with other 17 agricultural ones. Integration has been established in various aspects as in biotechnology, anatomy, pathology, meat and animal production. It included exchange of experience, scientific information, developed common electronic courses, training programs.

A lot of faithful efforts were exerted by the project managers to get new finance resources necessary to maintain the sustainability of the projects after their contracting period. One of such efforts was represented in establishing special units that aim to extend the activities of the projects in each University after their delivery and maintain the entity of the projects after the end of the HEEPF financing. It is worth mentioning that these special units are considered a real source of income and financial profit for the faculties and universities to which they are affiliated. Other project managers applied in other projects. One of the projects has already applied for a new project to the European Union for Mediterranean Sea Countries in collaboration with two Faculties in France and England in the field of Clinical Veterinary Medicine. One of the new project basic axes is developing means of diagnosis using ultrasonic radiation in the field of Veterinary Medicine, which is the chief goal of the HEEPF financed project. Another model is a project whose project manager succeeded in getting finance for a new project from the EU to continue the DNA labs in the field of veterinary medicine as a continuation of the HEEPF financed project activities after delivery.

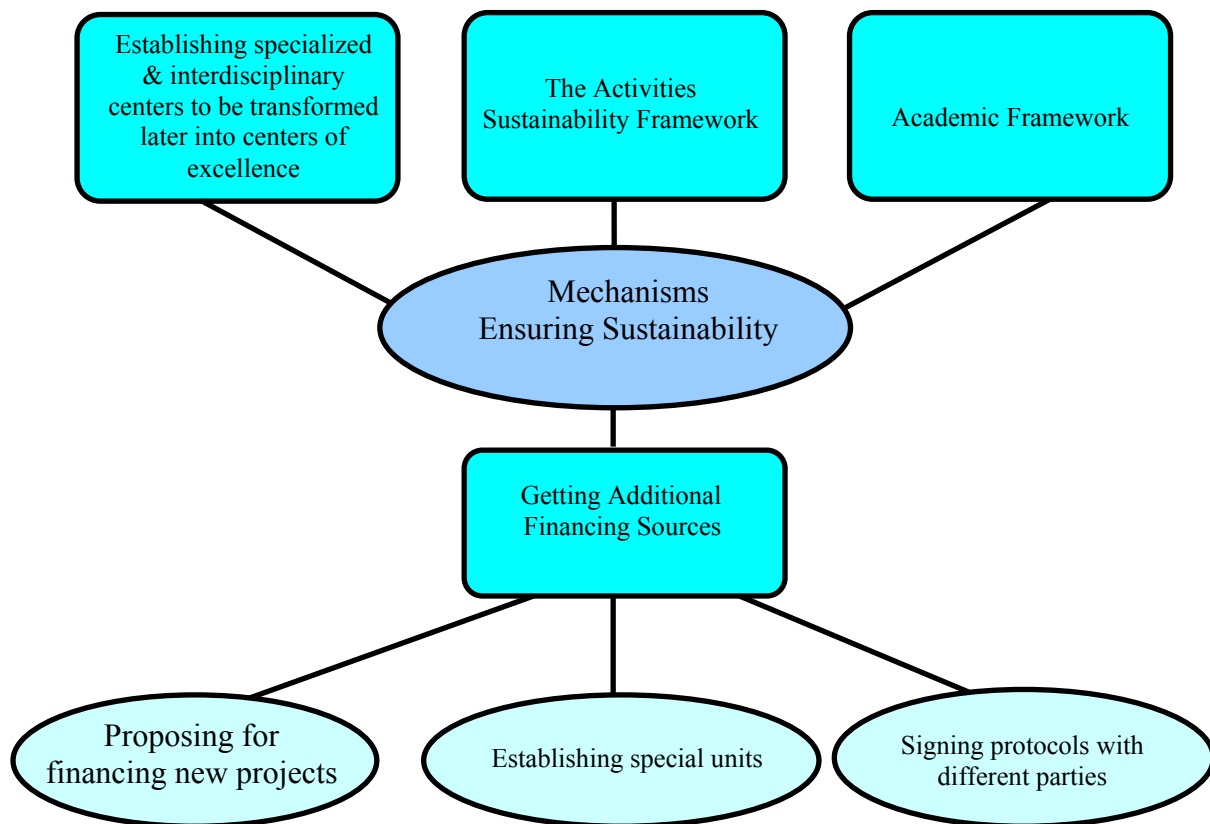


Fig. 6 Mechanisms that Guarantee HEEPF Projects Sustainability

The culture of educational projects has been established concerning writing proposals, competitive procedures, judgment and management until final delivery. Veterinary leaders in academia have indicated largely positive reactions toward HEEPF outcomes. In departments which have HEEPF projects use of educational technology has been adopted as a basic effective way for teaching. Direction toward electronic learning has been accepted and employed in many veterinary courses. A lot of laboratories have been constructed or reconstructed, including computer and biotechnology labs. Some unique labs were constructed as in Zagazig where plastinaton laboratory was innovated. Gain of experience was one of the common outcomes among HEEPF projects.

## **9. Scope for Future Developments**

### **9.1 Cooperation to reply society needs**

Changes are often determined by local needs, so the future profile of veterinarians and the profession should be based on the requirements of society. Hence we are in need for an Up-to date survey to be conducted to provide factual guidance on the society needs, employment status and type of work carried out by registered veterinarians.

One of the most important comments made in the Pew Report (Pritchard, 1989), was: “There is no way that a single veterinary college can adequately cover all of veterinary medicine or even a large part of it”. It is now accepted by most educationalists that on day one after graduation, the new veterinarian cannot have all the competences and skills in all the areas in which the veterinary profession is involved. Though we have twelve veterinary colleges geographically distribution in Egypt there are some areas that need to have veterinary institutes. In Helwan, the south of Cairo, where Helwan University is located there is a lack of veterinary college, which is needed to serve the large community. Either Ain Shams or Al-Azhar Universities don't have veterinary colleges. Building a new one will serve the community of north of Cairo. Recently, a Faculty of Veterinary Medicine, Sohag University has already got approval for establishment, while another one in Aswan, South Valley University is still waiting for approval. We should think of new specialized veterinary colleges and centers for example, college for veterinary surgeons or for wildlife...etc. Up to date slaughterhouses must be built all over Egypt, in addition to presence of well trained butchers. This can be accomplished through a short study course for technical high school graduates. Currently, Faculty of Veterinary Medicine at Zagazig University suggested a program for constructing veterinary technical institute to graduate veterinary technicians.

### **9.2 Curricula electronic development**

As a step required for accreditation newly developed courses that have been transformed from classical format to the electronic format, revealed that many courses remained for long times without any real updates. Such electronic courses are available online and serve not only the students but also for Continuing Professional Development (CPD). Experts who are involved in the evaluation and development of such new course should link the content to outcome graduated student, i.e., firstly, we need to agree on the type of graduate we are aiming at producing, a clinician, a scientist, a food hygienist, a combination of all three, or something else completely (Tito H. F., 2005). Society in general, and in particular the gender profile of the profession, is changing and there is an important role for the veterinarian in relation to the new emerging diseases of animal origin with human implications, as well as all aspects of the safety of food of animal origin (VET2020). We have to enable students

to become specialized for the sake of their future careers. This could be done after the third year, where student can select a specialty track or a six year could be added after finishing the five years, where the student is trained in a special program because there is too much material to be covered satisfactorily in a realistic veterinary curriculum.

Improving management and teaching skills is a must. This could be achieved through training programs like those developed within HEEPF projects as well as the aid of the Faculty and Leadership Project Fund project (FLDP) which is carried out in all Egyptian universities.

### **9.3 Accreditation**

Accreditation is the first step to ensure that our colleges and graduates are recognized, compete worldwide and to meet society's demand for veterinary services. Recognizing that we have to get ready and in harmony with different evaluation system for accreditation, HEEPF projects were pioneer to achieve this goal through their realistic tangibility of its achievements. There are several committees for accrediting veterinary colleges; the American Veterinary Medical Association (AVMA), or European systems; the Royal College of Veterinary Surgeons (RCVS) in the United Kingdom, Veterinary Schools Accreditation Advisory Committee (VSAAC) in Australia and New Zealand. There are several issues to be considered for accreditation including labs, equipment, buildings and some courses to meet the international standards. The sector committee of veterinary higher education in Egypt has developing National Academic Reference Standards NARS for veterinary higher education in Egypt. NARS include Attributes of the typical graduate which are:

- 1- The graduate has a profound knowledge and understanding of normal animal, poultry and fish structure and function, as well as abnormalities that occur in common diseases.
- 2- The graduate has the skills of animal management and behavior within a safe environment.
- 3- The graduate can diagnose, assess, prevent and treat common and important animal diseases in a variety of settings.
- 4- The graduate contributes in solving complex animal diseases, welfare and environmental problems in the surrounding society.
- 5- The graduate contributes in increasing understanding in the society by application of scientific methods in research and analysis working collaborative with other professionals.
- 6- The graduate operates with respect for the legal and other regulations and applies the Veterinary code of practice including ethics.
- 7- The graduates have a profound knowledge and understanding on the economic impact and factors on delivery of animal health care, as well as nutrition and nutritional standards.
- 8- The graduate has the appropriate professional and personal attitudes and behavior, including critical evaluation, curiosity and life long learning skills as well as ethical and legal frame of medical practice.
- 9- The graduate is proficient in basic veterinary clinical skills and interprets the findings to demonstrate competence in the performance of basic technical procedures. Professional skills for the graduate were also settled including the ability to handle the animal, identify the etiological agents, use laboratory tests, clinical examination and software to find out information relevant to the clinical problem, Read and interpretation of diagnostic tests, prescribe the remedy.

## **Acknowledgements**

The authors are indebted to the support of the Ministry of Higher Education to conduct this research. Thanks are due to the entire HEEPF team and sub-projects managers who contributed to adopting such a dynamic management system. The contribution of Dr. M. E. Said, Director of the Project Management Unit (PMU) through the implementation process is highly appreciated. The contribution through the revision phase of Prof. Dr. Hany Gohar, Dean, Faculty of Veterinary Medicine, Cairo University and Prof. Dr. Samy Abd El Kareem, member of the Egyptian veterinary medicine sector committee is highly appreciated.

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