AFRICA NAZARENE UNIVERSITY

PROPOSED BACHELOR OF SCIENCE

DRYLAND NATURAL RESOURCE MANAGEMENT

Presented to
The Commission for Higher Education

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AUTHORISED SIGNATURE

The integration of faith and learning nurtures students toward intellectual maturity and moral integrity while at the same time instilling the desire to become a life• long learner.
The objectives of the University are:

- Develop students for effective Christian living.
- Develop a community of scholars.
- Develop students for leadership services by promoting students participation in leadership roles in various clubs and societies in the University and student associations.
- Develop in student, an appreciation of African culture and heritage so as to assist them.
- Equip students with the necessary knowledge and skills required in addressing the contemporary issues of both the Christian faith and sound Government.
- Instill in the student values that will help them stand up against discrimination of the basis of race, denomination, gender or irrelevant handicaps.

RATIONALE

It is estimated that the population of Sub-Saharan Africa, which constitutes over 80% of the continent, has increased from 210 million in 1960 to almost 700 million in 2003. The increase in population has a significant impact on our natural resources and currently the Sub-Saharan Africa has a massive problem in food security, mediated by unsustainable land uses, unpredictable extreme weather conditions and strict market and trade conditions. Africa remains basically a rural-society largely dependent on agriculture, pastoralism and is endowed with abundant biophysical diversity. Dryland Natural Resource Management has the potential to moderate the constraints relating to unsustainability of land use. Although irrigation has made some deserts bloom, it is an expensive undertaking which also ruins the land by concentrating the salts through evaporation. Rather than try to alter dryland to suit water - loving crops and animals, the selection of plants and animals, which are adapted to dryland, is preferable.
The University's mission in introducing this programme into its curriculum is to generate capable and creative graduates desiring to achieve a better quality of life, develop themselves and their societies through management of the available vast dryland natural resources.

THE DRYLANDS

The -drylands occupy about one-seventh of the land surface of the earth and are largely confined to a worldwide belt between the Tropic of Cancer and Tropic of Capricorn. All the drylands have low rainfall, high evaporation and wide daily range of temperature, hot days and cool nights.
Drylands are defined in terms of absolute amount of rainfall, length of the wet season, the temperature and the amount of potential evapotranspiration, vegetation type and land use. The aridity is caused by location of mountain ranges, the low frequency of occurrence of an adiabatic rise of large bodies of air and the remoteness from an oceanic moisture source in the prevailing wind direction. The principal drylands of the world occur where one or both of these factors operate. Only 40% of the earth's total land area is capable of productive use. The other 60% is tied up in ice and snow, mountains and deserts. Of the potential cultivable land, only 25% could reasonably be brought under cultivation.
In the flat deserts of Africa, Arabia and Australia the primary reason for aridity is the chronic lack of aerographic lifting. Sahara is the largest desert in the world and extends across the whole continent of Africa between 15° - 33° N covering 9 million square kilometers. These drylands extend across Arabia, western Asia to northwest India and Pakistan. Drylands between latitude 20° and 25° in both hemispheres are located on the western leeward sides of the continents. Dryland conditions prevail along the coast of southwest Africa from Angola to Cape Province comprising Namib, Namaland, Kalahari and Karoo deserts covering some half a million square kilometers. Mediterranean climates on the western side of the continents i.e. 30° - 40° lies between those of arid and humid climates. Cold deserts of Alaska, Siberia and the Western part of Tibetan Plateau have a mean temperature in the warmest months that do not exceed I0°C and where even irrigation cannot ensure a reasonable level of crop productivity. Plants and animals have evolved ways to circumvent aridity and high temperature by becoming either drought resisters or evaders. The economic and material needs of the people will continue to demand the development of dryland without ignoring plants, animals and soils of the world. Our continued existence depends on the continued management and well-being of all plant and animal resources.

IMPORTANCE OF THEDRYLANDS

The increased population pressure on natural resources has led to forest recession, soil erosion, desertification, water catchments degradation, poverty, and food insecurity and malnutrition. There is no greater long-term need in our continent today than the conservation, restoration, management and utilization of the vast drylands that cover more

than 80% of Africa's land mass. Agriculture is a key-contributing factor to Africa's economy. The East Africa Governments consider agriculture to be the key to social and economic prosperity.

Its potential is underlined by its immense contribution to food security, foreign exchange earnings, gross domestic product and employment in both formal and informal sectors and also to the production of raw materials for agribusiness and agri-industry.

With one half hectare of fertile land per capita, a nation will be self-sufficient in food production. France, Sweden and Denmark have this amount of land per capita, England and China have 0.25 ha, India and Pakistan have 0.8 ha, USA and Australia have I ha, and Canada has 2.5 ha, per capita. In most of the countries in Africa, the land per capita falls below 0.1 ha. In Kenya dry conditions take the better part of the land where 80% of the 58 million hectares can be classified as drylands. This leaves less than 15% for rain fed agriculture, considering gazetted forests, mountains and other portions that are not arable. The population of Kenya has increased from 6 million in 1963 to almost 35 million in 2004. The fertile land per capita in Kenya is estimated at 0.24 ha.

These important facts suggest that unless technology is found to harness, conserve and manage the resources of the drylands, it will be impossible to feed the nation using the available fertile land. Emphasis on proper management and increasing dryland production and concurrently reducing degradation, brought about by overgrazing and erosion, has become evident recently in many developing regions. A few examples of successful major yield increase of food crops and management of dryland natural resources are available. Turkey and Israel have been pursuing dryland improvement programmes for over decades and today the bulk of their cereal and other crop production occur under dryland conditions.

CURRENT TRAINING STATUS

Kenya, being a small niche on the global environment complex system, needs to produce competent natural resource conservationists who will make deliberate effort to facilitate the utilization and conservation of her natural resources without upsetting the environmental equilibrium of the ecosystem. Most of the teaching in tertiary institutions in the developing countries is done without equipping the student with entrepreneurial knowledge and skills that target-producing graduates capable of generating employment both for themselves and the community. They are blamed for producing job seekers mostly in public service and unable to adapt innovative solutions to compete effectively in a globalized economy.

The reduction in resources for education and the reduced recruitment of graduates into civil service has highlighted the need to emphasize entrepreneurial skills as a teaching tool and as a means to foster idealism. It will also make the learner aware of the nature of opportunities in; and the dangers of interfering with environment and how to safe guard it for a better future by using skills which are particularly relevant to the student needs in the contemporary academic situations. The approach to education must be goal-oriented. The emphasis needs to shift from a narrow base to a broad base so as to effect integration. The main objective is to produce dryland resource managers who are environmental and multidisciplinary in their approach. One of the greatest needs of the dryland is the introduction of fast growing drought tolerant animals and plants, which would have multipurpose uses, coupled with additional nitrogen fixing and salt tolerance properties.

Nowhere in Kenya is there a first degree designed to produce graduates with a holistic view of how to conserve the country's vast assets - the dryland natural resources. In coping with the insufficiency of qualified human resources to respond effectively to human priorities of sustainable natural resource management, food insecurity, poverty reduction, conflict resolution and sustainable economic growth, Africa Nazarene University is making deliberate efforts to produce graduates with a holistic view of how to conserve the greatest asset of the Continent's Biodiversity. The purpose of this degree programme is therefore to offer educational opportunities to students who desire a broad knowledge in the management of drylands. Emphasis is placed on the ecological approach relative to conservation and management. This will increase opportunities for the employment of graduates in areas such as range management, wildlife, apiculture, aquaculture, forest management, soil conservation, resource use planning, wetland management, environmental monitoring, impact studies, natural resource development, conservation information, regulatory activities and· education are available in public and private sectors.

DRYLANDS RESOURCE MANAGEMEENT AND THE ANU VISION AND MISSION

The Dryland Natural Resource Management (DRM) curriculum is expected to instill a
spirit of entrepreneurship and innovations in future DRM managers, favor the creation of knowledge that is pertinent to local realities and place more emphasis on practical skills by shifting the burden of learning towards the student. Class interaction and usage of information and communication technology will encourage more time for research and interactive activities. The programme will introduce various entrepreneurial and income generating units and will include knowledge of fodder production, medicinal plants, fruit trees, apiculture, aquaculture, crop

husbandry, livestock and agro forestry. It is believed this will call for student-centered learning systems, which emphasize life-long learning processes, which is an asset par excellence.

As an essential preliminary, students will be introduced to the general understanding of sociology that serves to understand social organizations, families, culture and behaviour of the communities involved in the social change and development and those aspects of communication skills particularly relevant to the student needs and subsequent careers. The program, therefore, prepares students for farm management, entrepreneurship in agriculture, and further graduate work. In line with the vision and mission of this University, the training offered under DRM will provide the service and leadership, which will make a difference in Africa and the world. The training will allow the graduates to go out into the world prepared to face the challenges of drylands in today's world.

PROGRAMME OBJECTIVES

The basic objective of the Bachelor of Science in Dryland Natural Resources Management is to equip the trainees with relevant technical and professional knowledge that will enable them to effectively manage, conserve and utilize dryland resources wherever they are employed. The specific objectives at the end of the program are that the graduates will be able to:

1. Apply the acquired knowledge in ecological, sociological and economic concepts to the theory and practice of dryland natural resources management, utilization and conservation.
2. Communicate this knowledge to the stakeholders.

ADMISSION TO THE UNIVERSITY

Applicants for the Bachelor of Science in Dryland Natural Resource Management degree program must meet all of Africa Nazarene University entrance requirements as specified in the University's academic regulations. In addition, they should have a pass grade of C+ in Biology or Biological Sciences and Physical Sciences, and C in Chemistry and Mathematics for Kenya Certificate of Secondary Education (K.C.S.E) or its equivalent. Preference will be given to students with a C+ pass in Agriculture or Economics at K.C.S.E. Level. Admission may be granted to a student with a Diploma in Agriculture, Range Management, Animal Husbandry, Wildlife Management, Natural Resource Management, Forestry and other related fields from recognized institutions, who have passed with minimum Credit or their equivalent.

Applicants outside Kenya who have not taken the above examinations must produce to the admissions committee an acceptable documentary evidence of having passed an examination of equivalent standard Education. The evidence must bear the signature of the Authority in the country of origin.

COURSE DURATION

The duration of the programme shall extend over ten trimesters leading to the award of Bachelor of Science in Dryland Natural Resource Management. Each academic year consists of three Trimesters; students may enroll in two or three trimesters per academic year.