



Historical Evolution and Future Direction of Dr. John Garang Memorial University of Science and Technology in South Sudan

M.D. ABRAHAM

Dr John Garang Memorial University of Science and Technology, P.O. Box 436, Juba, South Sudan

Corresponding author: abraham.matoc@gmail.com

ABSTRACT

Historically, Dr. John Garang Memorial University of Science and Technology was first established as an institute and was upgraded to the university status after the war mainly in 2010. The university is named as Dr. John Garang Memorial University of Science and Technology in memory of Dr John Garang's contribution to bringing independence of South Sudan to a reality. The University has expanded from four colleges initially to ten colleges of: Agriculture, Education, Environmental Sciences, Management Sciences, Sciences and Technology, Veterinary Medicine, Medicine and Health Sciences, Law, School of Mathematics and Computer Science, Economics and Social Sciences. The purpose of the university is to accomplish scientific development in the contemporary technology age and to propagate science and technology, and scientific information necessary to ensure development of agriculture sector as engine of growth. The objectives include disseminating science and technology through teaching and training, promotion of knowledge in a variety of scientific specialities including economics and social sciences. This paper provides a historical descriptive of the genesis and progress made in setting up and operationalizing the University. It is based on review of relevant secondary material. The findings are many but most important ones include creation of jobs both at State and national levels. Importantly, the University has graduated a good number of professionals and most of them are employed in public, private and NGOs sectors. The future direction of the University remains the provision of science and technology quality university education to ensure growth with development in South Sudan.

Keywords: Dr John Garang, Higher Education, Science and Technology, South Sudan

RÉSUMÉ

Historiquement, l'Université commémorative Dr. John Garang des sciences et de la technologie a d'abord été créée en tant qu'institut, puis a été élevée au statut d'université après la guerre, principalement en 2010. L'université porte le nom de Dr. John Garang Memorial University of Science and Technology en mémoire de la contribution du Dr John Garang à l'indépendance du Soudan du Sud. L'université s'est développée à partir de quatre collèges initiaux pour en compter dix : Agriculture, Éducation, Sciences de l'environnement, Sciences de gestion, Sciences et technologie, Médecine vétérinaire, Médecine et sciences de la santé, Droit, École de mathématiques et d'informatique, Économie et sciences sociales. Le but de l'université est d'accomplir un

développement scientifique à l'ère de la technologie contemporaine et de propager la science et la technologie, ainsi que les informations scientifiques nécessaires pour assurer le développement du secteur agricole en tant que moteur de croissance. Les objectifs incluent la diffusion de la science et de la technologie par l'enseignement et la formation, la promotion des connaissances dans diverses spécialités scientifiques, y compris l'économie et les sciences sociales. Cet article fournit une description historique de la genèse et des progrès réalisés dans la mise en place et l'opérationnalisation de l'université. Il est basé sur l'examen de documents secondaires pertinents. Les conclusions sont nombreuses, mais les plus importantes incluent la création d'emplois tant au niveau de l'État que national. De manière significative, l'université a diplômé un grand nombre de professionnels, dont la plupart sont employés dans les secteurs public, privé et des ONG. L'orientation future de l'université reste la fourniture d'une éducation universitaire de qualité en sciences et technologie pour assurer la croissance et le développement au Soudan du Sud.

Mots-clés: Dr John Garang, Enseignement supérieur, Science et technologie, Soudan du Sud

Introduction

South Sudan became an independent country from Sudan on 9th July 2011, after decades of Liberation war against problems of underdevelopment, political exploitation, marginalization and deprivation in education services by Sudan/ Khartoum government. The last war that broke out in 1983 ended with the Comprehensive Peace Agreement (CPA, 2005) that gave birth to Dr. John Garang Memorial University of Science and Technology (JGMUST). Indeed, the significance of the CPA was that a referendum article was enshrined, and with the referendum vote, South Sudanese voted for the independence on 9th July 2011.

During the Interim period, on 27 February 2007, the Government of South Sudan laid the foundation stone for the establishment of the University as an institute of Science and Technology. On 22 January 2008, the Governor of Jonglei State signed collaboration agreement with the Rector of Free International University of Moldova (ULIM). This collaboration agreement led to the opening of the Institute on 1st February 2008. The Institute was to award degrees with accreditation from ULIM, based on European Union Standards. In March 2010, the Institute was nationalized and upgraded to

to a university status. Historically the university bears the name of late the Dr. John Garang de Mabior, the founder and leader of Sudan People's Liberation Movement/Army (SPLM/A). Late Dr. John Garang pioneered the Comprehensive Peace Agreement (CPA, 2005), which embedded referendum article and with the referendum popular vote culminated into the independence of the Republic of South Sudan on 9th July 2011.

In 2006, an agreement was reached by the Government of South Sudan (GoSS), through the Jonglei State Government, to send 40 students every year to Universities Liberă Internațională din Moldova (Free International University of Moldova), or ULIM. This idea was later changed by the then Governor of Jonglei State, who requested the establishment of an institute affiliated with ULIM where the students would be trained in the country.

In February 2007, Dr. John Garang Institute of Science and Technology was established in Bor as a branch of the Free International University of Moldova to award Degrees in four colleges, namely, Humanities; Ecological Security; Pharmaceutical Technology; and Public Gardening. However, with the upgrading of the institute to a university status, some colleges

were dropped and some changed names and new colleges were created. Instead of Humanities the University has colleges of: College of Science and Technology, College of Agriculture, College of Education, College of Management Sciences, College of Environmental Sciences, and College of Law. Through the expansion program planned by the university's administration, the university added new academic programs to meet the labour market demand for qualified and technical experts in various fields. The following academic programs were added: College of Veterinary Medicine, College of Medical Sciences, School of Mathematics and Computer Sciences, College of Economics and Social Sciences, and College of Post Graduate Programs.

Purpose of Dr JGMUST

The university's ultimate purpose is to accomplish scientific development in the contemporary technology age; so, the suffix "Science and Technology" symbolizes that. The University's mission is to provide for the creation of higher educational institutions of learning in order to propagate science, technology, and information while also involving the local populace in various economic and social sciences. In terms of Objectives, as provided for in Chapter 2 of the University Act 2013, the objectives of the university include disseminating science and technology through teaching, promotion of knowledge, and enhancing participation in different aspect of economics, social and cultural development in the country, prepare students in different programmes of diploma, bachelor, and post-graduate studies in the scientific and applied specializations and programmes for awards of academic degrees, conduct scientific and applied research connected with the needs of the society for the purpose of making the required transformation in the country. These thrusts are similar to those outlined by Bok (1982) of roles for a University.

Furthermore, the university is to implement joint programmes with State and National Government and public corporations, to train technicians in different fields needed by the

country. The University aims at inventing appropriate technologies connected with development and to support national projects in the field of scientific and technical consultancy as well as to implement required programmes to train and rehabilitate students, and promote social values and capabilities of students to prepare them for public life.

To achieve the goals for which Dr. JG MUST was established, a strong and competent administration is required to develop internal rules and regulations that guide, manage, and control the academic and support staff, both classified and unclassified, as well as the students' behaviours, actions, activities, and performances.

The University logo bears the words "Knowledge is strength," which symbolises the effectiveness of Science and Technological advancement to improve modern world communication, and application of technology to stimulate raising of living standards of people in South Sudan. The Logo reflects the need for a leading institution of higher learning with professional thinking-core values and a cultural promotor of the nation.

Methodology

The sources used to write this paper are mainly from secondary data. Most of the information is derived from reviewed documents such as Higher Education Act 2012, Dr. John Garang Memorial University Act 2013, Dr. John Garang Memorial University Calendar 2021-2025 and from annual reports. Some information was obtained through internet sources such as number of schools and so on. Through assessment the data from these sources were examined. The approach is thus descriptive historical explanation with some analytical approaches within the context of the evolution of the university.

Geographical Location, Land Area and Population

The University is located in Pakuau quarter in Bor, the capital of Jonglei State. The University occupies an area of 5,261,127 km², allotted by the State Ministry of Housing and Land and

Public Utilities in 2007. With total land mass of 122,587 square kilometers, about 47,329 square miles, Jonglei State is the largest State in the country, and the most populated State, with 1, 358,602 people, according to census results of 2008. In broader context, Jonglei State is among the 10 States (Upper Nile, Malakal, Northern Bahr El Ghazal, Aweil, Western Bahr El Ghazal, Wau, Western Equatoria, Yambio, Central Equatoria, Juba, Eastern Equatoria, Torit, and three Administrative Areas, Ruweng, Pibor and Abyei) of the Republic of South Sudan. The country has about 79 counties and a number of Payams and Bomas at the lower local government level.

South Sudan is bordered by Sudan in the north, Ethiopia in north east, Kenya and Uganda in the east and Democratic Republic of Congo in the South and Central African Republic at the west. South Sudan is a vast country covering land area of 644,330 km² (248,777mi²) (Wikipedia, 2022). Recent population estimate is approximately 11,544,905 of which about 80% of the population resides in rural areas. According to the World Fact Book (2018), the country possesses enormous natural resources consisting of hydropower, fertile agricultural land, gold, diamonds, petroleum, hardwoods, limestones, iron ore, copper, chromium ore, zinc, tungsten, mica, silver etc. However, the land use has been insignificant ranging from agricultural land which constitute 45%, arable land 4.4%, permanent pasture 40.7%, forest 11.3% and others 43.5%. In spite of the immense availability of these resources, Food and Agriculture Organization (2019) estimated that up to 95% of South Sudanese rely on farming, herding or fishing. The FAO (2019) put estimates of livestock as 12 million cattle, 12.1 million sheep and 12.4 million goats. In addition, some of the societies earn their living by relying on forestry products such as fruits, honey, hunting and others. World Bank (2022) estimated that about 82% of South Sudanese endure poverty, surviving on less than \$1.90 per day. In addition, other sources claimed that 85% of the population works in non-wage pastoral jobs and does not benefit from abundance of natural resources.

Therefore, existence of such economic problems including high rates of youth unemployment,

increasing inequality in the society, high rates of poverty and low growth of the economy, and low productivity are linked to technological backwardness. These weaknesses need to be addressed through provision of quality education focusing on science and technology to ensure development of the agriculture sector as well as other productive economic sectors in the country to ensure development (Akec, 2021). However, reducing such persistent economic ills will depend on sound higher education policies and system.

Structure of Higher Education in South Sudan

In South Sudan, the National Council of Higher Education, Science and Technology (NCHES&T) is the policy making body with the Minister as the Chairperson and the President of the country as the patron (NCHES&T, 2011; Akec, 2021). It has Undersecretary who also double as the Undersecretary of the Ministry of Higher Education, Science and Technology. The Ministry is composed of six directorates: Director General of Admission, Evaluation and Accreditation, Director General of Training and External Relations, Director General for Private and Foreign Higher Education, Director General of Higher Education for Budgeting and Planning, Director General for Technical/ Technological Higher Education, and Director General of Administration and Finance. All the directorates have specific functions (NCHES&T, 2011).

Distribution of universities in South Sudan. Although the universities are semi-autonomous, the universities and higher institutions of learning are placed under the Ministry of Higher Education, Science and Technology. Vice Chancellors and Academic Registrars are members of the National Council of Higher Education, Science and Technology. The universities and polytechnics are fairly distributed all over the 10 States. This was to ensure implementation of the policy of taking services to the people in all parts of the country. Though they are State based, the Universities are national institutions in character. In terms of students' admission and staff recruitment this is done nationally. Only local unclassified staff such as cleaners, watchmen and casual labour

are recruited from the States where the universities are located.

There are five (5) public universities, namely, University of Juba, Upper Nile University in Malakal, Bahr El Ghazal University in Wau, Rumbek University in Rumbek and Dr. John Garang Memorial University of Science and Technology in Bor. It is worth noting that, in the recent ranking of public universities, Dr. John Garang Memorial University of Science and Technology ranked the second and University of Juba the first in the country. This comes as a result of academic performances, quality of teaching staff recruited, improvement in learning facilities, etc. In addition, there are 12 private universities or more depending on the accreditation by the Ministry of Higher Education, Science and Technology. However, the private universities are mostly concentrated in Juba town. In addition, there are four polytechnics, including Northern Bahr El Ghazal University for Health Sciences and Nursing in Aweil, Torit University for Engineering, Western Equatoria University for Agriculture in Yambio and Bentiu University for Petroleum Engineering.

Governance of Dr. JGMUST

The University Administration is headed by a Vice Chancellor, and two deputies, for Academic Affairs, and Administration and Finance. The supreme body overseeing the university is the University Council, supported by the Senate, and Deans Board. According to the university calendar 2021-2025 the administration of the university includes teaching staff and support staff both classified and unclassified. Among the teaching staff some serve as Deans, Directors and Heads of Departments in the Colleges. Most of senior staff among the support staff are assigned as Directors and Heads of unclassified support staff. The administrative work in the academic programme is entirely done by Deans including: Academic Registrar, Dean of Students' Affairs, Dean of Libraries, Dean of Graduate College, Dean of the College of Management Sciences, Dean of College of Science and Technology, Agriculture, Environmental Studies, and Education. The academic registrar is in charge of the academic programs and heads the academic

administration, which is below the VC and Deputy VC for Academic Affairs. Deans are in charge of the Colleges and are deputized by their Deputy Deans. The Vice Chancellor appoints the holders of these posts, as for all other positions at the institution. The university has adopted a semester system. The students who fail some subjects must pass their supplementary to be eligible to go to the next class.

On the other hand, the support staff both classified and unclassified staff are under direct supervision of the Personnel Secretary/ Human Resource unit. The unit is under the responsibility of the Deputy Vice Chancellor for Administration and Finance.

There are 19 Professors, 48 Associate Professors, and 89 Assistant Professors who are holders of PhDs. currently but some are masters holders. Currently there are also 129 lecturers, and 106 teaching assistants making a total of 391 academic staff plus 50 technicians. The number of administrative staff stand at 175 classified. In addition, unclassified staff are 431 and overall total is 1,045. Table 1 shows number of academic and support staff

From Table 1, it can be noted that the creation of the University in the State has not provided training only but it has created jobs for both youth and women in the State and the country at large. Hence, the University has contributed to unemployment reduction. The university has graduated over 1300 students in 14 batches since 2019 to 2021/2022.

Academic Programs. Dr. John Garang Memorial University of Science and Technology (Dr. JGMUST) has six operational colleges namely: College of Science and Technology, College of Agriculture, College of Education, College of Management Sciences, College of Environmental Sciences, and College of Law. Through the expansion program planned by the university's administration, the University added new academic programs to meet the labour market demand for qualified and technical experts in various fields. The following academic programs as passed by the Senate and within the context of the Higher Education Act 2012 were added: College of

Table 1. Number of Academic and support staff, 2022

College	Professor	Associate Professor	Assistant Professor	Lecturer	Teaching Assistants	Total	Technician	Administration	Unclassified Staff	Total Man Power
Science & Technology	4	6	13	19	13	55	15	175	431	
Agriculture	5	9	14	17	14	59	13			
Environmental Studies	2	5	11	15	11	44	9			
Management Sciences	4	8	15	20	19	66				
Education	3	7	12	18	13	53				
Law		4	9	15	7	35				
Economics	1	6	12	16	13	47				
Medicine		3	3	9	7	22	7			
Padak Institute					3	3	6			
Awerail Agricultural Training Center					6	6				
Total	19	48	89	129	106	390	50	175	431	1045

of Veterinary Medicine, College of Medical Sciences, School of Mathematics and Computer Sciences, College of Economics and Social Sciences, and College of Post Graduate Programs. Notably, the university has 10 operational or running faculties at the moment. Soon, colleges of Pharmacy, Petroleum Engineering are to be established.

Academic Degrees and Students' Population.

The university has registered 1, 268 (362 females) students this academic year in the current active Colleges (Table 2). Out of this total number of students, 366 have been accommodated in the hostels built at the university while the rest come as day scholars. The total number of students registered per college in each of the five active colleges, and the degrees to be awarded are as follows:

College of Agriculture: There are 201 (19 females) students registered for 2023/2024 academic year. At the end of fourth year, the College awards degrees in Agronomy, Animal Production, Agricultural Extension and Agricultural mechanization.

College of Education: The College of Education enrollment for academic year 2023/2024 is 51 students, with only four female students. The current enrollment represents 4% increase over the previous academic year

enrollment in this College. The College awards degrees in Mathematics and Physics, Biology and Chemistry, English and Literature, English, History and Geography.

College of Environmental Sciences: This College registered 52 students from first to fourth year, compared to 37 students registered in the last academic year. This indicates that the students' enrollment has increased by 41% from the previous enrollment. The College awards degrees in Environmental Science and Fisheries at the end of the fourth year.

College of Management Sciences: This is the largest College in the University in terms of students who register each year. This academic year, the College registered 927 students, compared to previous academic year in which the enrollment stood at 916. The College awards Diplomas and Degrees to students in third and fourth year respectively depending on which program a student had registered for. The awards can be in Banking and Finance, Logistic and Procurement, Human Resource, Public Administration, Hotel Management and Tourism, Accounting and Business Administration.

College of Science and Technology: The College has registered 37 students in the current 2023/2024 academic year. The College has four

Table 2. Summary of registered students, 2023-2024 academic year

S/N	College	1 st year	2 nd year	3 rd year	4 th year	Male	Female	Total
1	Agriculture	83	68	25	25	182	19	201
2	Education	20	16	10	11	47	04	51
3	Environment	20	14	06	12	47	05	52
4	Management Sciences	263	351	134	179	906	21	927
5	Science and Technology	10	20	00	07	37	00	37
	Total	396	469	169	234	1219	49	1268

departments that include Departments of Chemistry, Biology, Biotechnology, Physics, Mathematics and Statistics. The College awards degrees to students who are registered under these departments at the end of the fourth year.

The University hopes to receive many students in the next academic year, given the fact that more academic programmes have been established and more students have applied during the regular and private/mature intake.

Staff Development

For academic programs to succeed, qualified teaching staff is basic. Accordingly the University has staff trained staff in all specialities as well as in laboratories techniques and continues to train more staff. Some Teaching Assistants and lecturers are doing their Master degrees and Ph.Ds. in Juba University, and in universities in Egypt, Cameron, Botswana and other Universities in Africa. The University has signed up to RUFORUM (www.ruforum.org) as a member where some staff are also being trained in Partner Universities at Masters and Ph.D. levels as part of the co-funding agreement amongst Universities that are members of this body in Africa (Adidja, 2022).

Research and Development

As a University of Science and Technology, Dr. JGMUST has invested in research programs that will positively impact the lives and livelihoods of the people in South Sudan as well as in the region. One such research program is in the field of agriculture, where two varieties of high-yielding rice have been developed and are being tested for release. The rice testing site, led by the College of Agriculture in collaboration with the Korean Rural Development Agency, has

been launched on the main campus in Bor. It is hoped that, if this program is successful, highly performing varieties will be rolled out at an industrial scale in areas such as Jale Low Land, with mixed soil that will be a potential growing site for large production of rice. Through this project, Dr. JGMUST hopes to make South Sudan self-sufficient in rice production.

In addition, at the Students experimental farm on campus, the university has introduced machinery farming in its agricultural training Centre at Awecrial county in Yirol. A variety of cash crops have been introduced including Solanum potato, onions, maize and various vegetables at relatively large scale. The land area for farming is estimated as 2,500 feddans (ha) but only a portion of it is cultivated this year. The farm is both for training and production. As part of training, students are required to write graduation dissertations supervised by teaching staffs.

Infrastructural Development

Since its inception, the institution has been housed in a three-block container facility constructed by ASCOM, a corporation hired by the Moldovan Government to develop the University. Students were mostly housed in tents that were built to house the first group of 104 students. For years now the container buildings are worn-out and needs a lot of repair which is costly. In response, the university administration launched a program with the goal of changing the face of the institution by creating a conducive atmosphere for higher learning for both students and lecturers. The administration has constructed a triple complex facility with 10 lecture halls, 23 offices, a conference hall, and a University Council Hall

under this scheme. The lecture halls have the capacity to accommodate 4,000 students at ago. After its inauguration late last year, the problem of lack of lecture halls and offices for professors and other teaching staff was significantly reduced.

In terms of Scientific Laboratories, there are some laboratories for Chemistry, Biology, and Physics in the old container block that have been equipped with Science and Technology, Engineering, and Mathematics (STEM) equipment. Additionally the computer lab has been equipped with 30 brand new computers with 54 solar panels and 34 solar batteries to offer continual power for the laboratories' operation. Further, the University plans to build Laboratories for Chemistry, Biology, Physics, and Computer Science under the expansion programs and equip them with scientific equipment for advanced research. The University also intends to build an agricultural lab for soil analysis and the manufacturing of dairy products such as yogurt, cheese, fresh milk, and others, as well as the production of bottle water.

Concurrent with the building of the laboratories, the institution main gate will be built to facilitate the passage of cars and people in and out of the institution. The gate will serve as a symbol of this institution of higher learning to the outside world.

Conclusion

Historically, Dr. JGMUST is a pride of the Republic of South Sudan. Among the five public universities it ranks number two next to University of Juba which is the oldest institution of higher learning in the country. As a University of Science and Technology, for the last 14 years the University has educated a good number of youth and women and many of them got employment in public and private sectors and NGOs. The creation and expansion of new colleges plus agricultural training centres implies provision of more technical education and skills needed to enhance reduction of unemployment in the country and to ensure development of the agricultural sector as the engine of growth in South Sudan. The future

direction of Dr. JGMUST is spelt out in the University objectives. The university is to increase provision of technical and science education so that the University contribution towards agriculture and other sectors impact on the economy positively to increase economic growth and broad development of South Sudan and the other region.

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The author declare that there is no conflict of interest in this paper.

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