

## The Scientific Research in Libya: The Role of the New Generation of Researchers

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There is a potential for improving the scientific research environment in Libya. One reason to be optimistic about the prospects of the future of science in Libya is the number of postgraduate students in all disciplines who are training in European and North American Universities. According to statistics of the Higher Education Authorities in Libya, there are approximately 3000 Libyan students enrolled in postgraduate studies in British universities alone and almost half of this number in North America [1]. However, research output of Libyan universities' academic staff members is still very low. For example, a recent survey of published medical literature revealed that the average annual production rate at the Al-Fateh Medical University is 1.4 article/100 academic staff [2]. In my opinion, four major reasons may explain the problems facing scientific research in Arab countries in general and in Libya in particular: 1) Brain Drain 2) Lack of funding 3) Lack of scientific infrastructure and incompetent supportive staff, and 4) Teaching overload. I will discuss the role that the new generation of Libyan researchers\* could play to advance the scientific research output in Libya.

### Networking to tackle Brain Drain

The Arab countries' research output, judged by the number of publications, registered patents, trademarks and high-technology exports is among the lowest in the world [3]. Reports from Arab League and International Organizations suggest that among the main reasons that hinder scientific research is the immigration of doctors, engineers and scientists [4]. It has been estimated that "54% of doctors, 26% of engineers and 17% of scientists graduating from Arab and African universities migrate to Europe, the United States of America (USA) and Canada, and half of African and Arab students studying abroad never return" [3]. The negative impact of this massive brain drain on scientific research output of the Arab world resulted in many initiatives to attract the migrated scientists to contribute to research and development plans in their home countries. Algeria, recently, in an attempt to stop the brain drain of its brightest talents decided to stop sending them to study abroad. This counterproductive measure illustrates the desperation of policy makers in Arab countries to tackle the migration of their scientists to the developed world. In contrast, Libya pursued an ambitious plan to invest in teaching and training of postgraduates in Europe, Canada and recently in USA [1]. While risking losing scientists, the Libyan plan has taken into account that developing the local scientific research capacity is dependant on providing the best training and education for future scientists. However, more innovative solutions have to be implemented to get the most of the migrated Libyan scientists. Efficient networking between the Libyan scientists abroad and the Libyan scientific

institutions could benefit the research community in Libya and in the long run attract the migrated scientists to the potential scientific research opportunities that exist in the country. The new generation of Libyan researchers has a great role to play in keeping the link with the institutions they have trained in and developing an extensive network with other Libyan scientists. A bidirectional relationship between Libyan researchers working in Libya and those working elsewhere is beneficial to both parties.

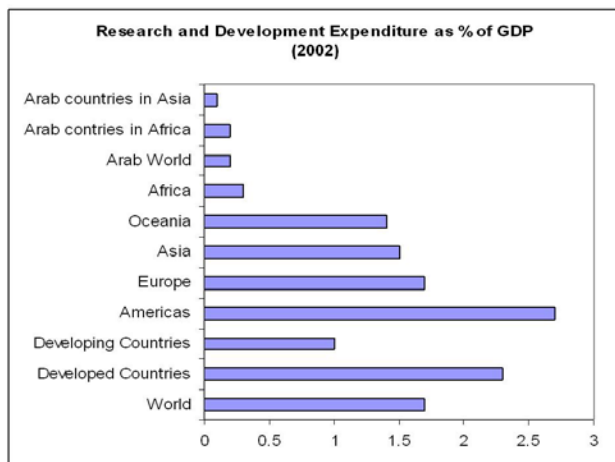
### Asking for more funds whilst getting the most out of the available resources

At the same time as the research community presses for more funding, researchers and scientists have to make the most of the available resources. Spending on research and development in Libya and other Arab and African countries are currently lower than other regions in the world (Fig.1). Researchers have to promote the need for research and have to justify expenditure on research projects. This is not an easy task for most of the new scientists who are ambitious to do research but lack public relations skills and political abilities to engage in securing more funding for their research institutions and projects. Increasing young and new researchers' visibility within the scientific and educational community in Libya would undoubtedly increase their chance of engaging in debates and discussions about present and future research plans. Participating in conferences and scientific meetings, engaging in small budget research projects and disseminating own research could lead to great opportunities to do more advanced research projects. There are many International, Regional and National funding opportunities that Libyan scientists are not aware of. Recently, the director of The Libyan National Council for Scientific Research declared at an academic conference to the Libyan postgraduate students in Bradford University that funding for scientific projects is available for bidding but few actually bid for realistic projects. It would be useful if the young scientists invested time and effort in searching for sources of funding and acquired the skills necessary to bid for grants.

### Building a competent research community

Spending on infrastructures of higher education in Libya has increased in the last decade. Some state-of-the-art laboratories exist in Libyan universities, research centers and hospitals. However, there are shortcomings in training staff, maintaining equipment and providing a continuous supply of consumables. For example, when a fully equipped veterinary diagnostic and research laboratory was established in Benghazi area few years ago, both the local university and the veterinary authority discovered that no one is trained to operate the newly installed electron microscope. The young scientists have to

approach these problems positively. Most of the aforementioned shortcomings are due to: 1) lack of momentum at the managerial level of universities to make scientific research a priority and 2) lack of reasonable development plans for the technical supportive staff. Training and encouraging technical staff to run research laboratories would solve many logistical and technical problems. Improving communication between managerial and technical staff can also bring success. Universities have to revisit their strategic priorities and create a community in which research can be enriched. Libraries and information technology systems have to support both the teacher/researcher and the student/researcher at the same time.



**Figure 1** A graph based on the statistics of UNESCO on Research and Development expenditures as percentage of Gross Domestic Product.

### Linking research with teaching

Teaching duties of all academics in Libyan universities are linked with salary, the more you teach the more income you earn. The new academics usually get the worst part of the deal. A young researcher's academic life is occupied with all sorts of teaching activities: lecturing, assessing and invigilating but none of these activities contribute to his/her development. When the new academics return to Libya after obtaining their degrees and having participated in the active research environment in Europe and America, they are usually full of research ideas. A possible scheme to salvage their research potential is to link teaching with research. Combining research and teaching has been recognized to offer rich possibilities to produce competent teachers and research oriented students [5]. This link has to be integrated into the curricula, and should be done at an institutional level to be successful [6].

### Conclusions

The new Libyan researchers have a great role to play to overcome the challenges that face the process of scientific research in Libya. Only a positive attitude and optimistic approach would yield fruitful rewards. Networking with colleagues inside and outside Libya is the key to sharing ideas and debating issues related to science and pragmatically resolving problems.

### Endnotes and Further Readings

- \* I used the words "researcher", "scientist" and "academic" almost interchangeably to denote a Libyan postgraduate who has recently returned or will return to work in a Libyan University after obtaining a PhD or a similar degree. There are, however, subtle differences between the three words.
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