

# A catalyst for technological development



Jute production gets a boost.

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AHMED A. AZAD

THE announcement by the PM in parliament on June 16 that Bangladeshi scientists had unlocked the genetic code of the jute genome was a welcomed news as this discovery, if properly utilised, can give Bangladesh the competitive edge that can restore its position as the world's leading grower and exporter of jute. Jute and jute products could even become our main foreign exchange earner.

This is also inspirational news for the Bangladeshi scientific community as it demonstrates that given the right support and conditions our scientists are capable of carrying out internationally competitive research.

The sequencing of the jute genomic DNA is indeed a scientific achievement, which the most advanced laboratories in the world would be proud of. The concerned scientists deserve all the accolades that have come their

way. The novel genetic information can now be used to produce new jute varieties that have higher yield and better fibre quality, that are adapted to environmental challenges such as salinity, drought and water logging, and resistant to microbial infections and parasitic infestations.

However, what has been achieved till now is only the first step in a very long process of sustained research and development. How soon this is completed will depend on what scientific expertise and research infrastructure is already available in Bangladesh or can be put in place in a short time.

The current euphoria is understandable but the celebration can perhaps wait till the necessary science and technology (S&T) infrastructure and expertise needed to complete this project, and to competently tackle other national priority projects, is established.

The story of the jute genome decoding project is inspirational and

requires re-telling as a number of important observations can be made and some very useful lessons can be learnt from it. The reported success has been due to a multidisciplinary team effort that demonstrates that such positive accomplishments are possible in Bangladesh if the necessary enabling conditions are provided.

The main credit should go to the individual efforts of an exceptional group of scientists and organisations and the extraordinary faith of a courageous and resolute minister in their ability.

The principal investigator Dr. Maqsood Alam, a NRB scientist provided visionary leadership, and it was also through him that the high-end expertise and facilities required for the sequencing became available to the jute project through his affiliations at the University of Hawaii and the University of Science, Malaysia (Penang) where he and his team had previously sequenced the genomes of papaya and rubber, respectively.

The initial suggestion about jute genome sequencing was put forward by Prof. Ahmad Shamsul Islam (Moderator, Global Network of Bangladesh Biotechnologists, GNOBB) more than two years back, but Dr. Alam and some resident scientists were unable to find the required funding till a fortunate set of events unfolded in quick succession.

An article by Mr. Munir Hasan in *Prothom Alo* on how the published sequence of the rice genome was being used by researchers at Dhaka University's Department of Biochemistry and Molecular Biology to construct new rice varieties resistant to environmental stress caught the eye of Agriculture Minister Begum Motia Choudhury, and in a follow up meeting with the scientists she was informed that similar things were also possible with jute.

Begum Motia Choudhury immediately invited Dr. Maqsood Alam to fly over from Malaysia, offered Tk.10 crore for the project and had the offer immediately affirmed by the PM. The rest is history. However, Dr. Maqsood Alam would be the first to point out that the project would not have got off the ground had it not been for dedicated researchers and the biological resources available in Bangladesh.

Among the resident Bangladeshi scientists the major credit goes to DU biochemists Prof. Haseena Khan and Prof. Zeba Seraj who have worked in tandem over many years and under very difficult circumstances to establish a very productive crop biotechnology laboratory, which, unfortunately, is still not properly equipped.

Special thanks for the success of the jute genome project are also due to their young and enthusiastic research students whose intellectual capability and dedication are second to none. Imagine what would be possible if a proper research culture existed in our academic institutions!

The large and invaluable collection of jute variants at the Jute Research Institute has given the Bangladeshi research team a comfortable head start over other international competitors. Bio-informatics is a major tool for constructing genomic profiles from large arrays of random gene sequences and for analyses of these profiles. Bio-informatics support has been ably provided by a team of computer scientists from a local IT company DataSoft led by Mr. Mahub Zaman.

This collaboration of public sector researchers with a private sector IT company is a very positive development and an innovative application of Digital Bangladesh that was probably not anticipated by most of its proponents.

Now that the jute genome project has the full attention of the government and policy makers, it is opportune time to highlight some important take home messages and what can be learnt from these to build a robust and enduring

science and technology platform, enforced by home grown intellectual capital, that will enable Bangladesh to meet all current and future challenges and fulfil the expectations of Vision 2021.

Bangladesh has a reservoir of scientific talent, biological resources and even some expensive equipment, but these are most often widely dispersed and under-utilised due to a lack of critical mass of researchers. Bringing these together to form multidisciplinary research teams can pay high dividends, as can be seen in the case of the jute genome sequencing project. This process should be replicated to successfully tackle all national research priorities.

The capability and dedication of research students involved in this project have been amply demonstrated. The full potential of postgraduate research and its benefit to the country could be realised through the provision of well paying scholarships to the brightest students involved in research in areas of highest national priority.

The pivotal leadership of Dr. Maqsood Alam in the success of the jute project should be a strong incentive to invite the participation of other NRB scientists, in whatever capacity or duration, in all areas of national priority. Most NRB scientists willing to help their country of origin would be happy to provide their time and advice for free if invited.

Much of the high-end technologies and equipment needed for this project became available through Dr. Alam's laboratories in Penang and Hawaii. However, if Bangladesh wishes to become internationally competitive and have unencumbered ownership of intellectual property in future, the required expertise and contemporary technologies need to be established here.

The jute genome project has led to the establishment of a dynamic bio-informatics technology group which could become the nucleus of a bio-informatics network in Bangladesh. Other advanced technologies needed to complete the jute genome project, such as functional genomics, proteomics and metabolomics, will be equally useful for other major biotechnology projects and need to be established without delay as national core facilities at selected centres of excellence.

The initial grant of Tk.10 crore from the agriculture minister got the jute genome project up and running. Her subsequent offers of higher salaries and better working conditions for the

researchers were reiterated by the PM during her reception to the research team. The Parliamentary Standing Committee for Jute has recommended a further allocation of Tk.100 crore to jute research. However, other priority areas of research also need to be adequately supported through a comprehensive government policy for the funding and support of scientific research.

As the collaborating universities and various research institutions and funding sources fall under the jurisdiction of different ministries and the UGC, the government should seriously consider the formation of a national research council for proper coordination and peer-reviewed funding of major collaborative research programs in areas of highest national priority.

The procedural success of the jute genome project vindicates what has been widely advocated by the biotechnology community in Bangladesh over the years. In support of the biotechnology community efforts, I had discussed at length all the above issues of research management and research capacity development, including intellectual property development and commercialisation of research, in numerous op-ed pieces in this newspaper and articles in its monthly magazine (Forum). For review readers may wish to refer to: A. Azad, "A case for biotechnology," Forum June 2007; A. Azad, "You are what you study," Forum September 2009; A. Azad, "Moving on up," Forum May 2010.

In response to the government's National Biotechnology Policy, resident and NRB biotechnologists attending an international biotechnology conference in Dhaka in 2007 prepared a position paper and a set of recommendations to help in the implementation of the government's biotechnology policy. These were formally submitted to the government in April 2007 but to date are gathering dust in the archives of relevant ministries.

Hopefully, because of the positive publicity generated by the jute genome saga, the government may wish to reconsider the collective suggestions from the biotechnology community and engage with them in preparing a roadmap for biotechnology research.

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# Why is everyone leaving?

Education is no longer a tool to apply to gain that worth, it is worth in itself. An end in itself. We need to stop seeing education as a means to add letters before or after our names. We also need to stop judging people blindly on these credentials.

ABHISHEK R. PARAJULI

RECENTLY, there appeared an article on reversing brain drain in the point counter-point section of The Daily Star. Writing from Nepal, I want to expand the scope to the South Asian region, as it is a common problem we share, and suggest some solutions.

Most of us are now familiar with the image of oil gushing out of the Deepwater Horizon oil leak off the US coast. The environmental impacts are clear to see, with images of oil soaked birds and threatened coasts filling our screens.

South Asia has a leak of its own. And the impacts of this leak are arguably worse than that of the oil, only not as gut wrenchingly immediate. As human capital gushes out of our region its time we recognised the true nature of this silent emergency.

To write another op-ed blaming political instability, however, would be clichéd and leave us no closer to a solution. Yes, our region is fraught with political instability, but while we move towards stability we need to re-frame the problem.

I contend that risk aversion brought on by the structure of the educational system, and societal pressure to conform to rigid academic tracks, has

allowed developed nations to harvest South Asian talent for everything from diners to hospitals. The solution requires recognising, first, that we have only ourselves to rely on, and then changing our perception of business and education.

"Harvest" is an apt term. The end-product of billions spent by developing countries like Bangladesh, Sri Lanka, Nepal, Pakistan and India on education (often with "development aid") is reaped by the West, creating a situation of reverse aid. Human capital is flowing to developed nations. The hypocrisy is striking. What this means is that the West is using the low cost of living in developing nations to lower costs of labour and get cheaper doctors (1 in 4 in the US is trained abroad), engineers and bell boys.

Many have been pushing for an international agreement to help curb brain drain. They should ask themselves why these countries will hurt their own self-interest by doing so. Everyone works for his own benefit, and nation states, answerable to domestic tax payers, are no different. Regardless of the rhetoric we, as a region, are left alone to deal with the question: How do we stop this leak?

A University of Ireland study on "The Relationship between Unemployment and Risk-Aversion" found that risk aversion increased

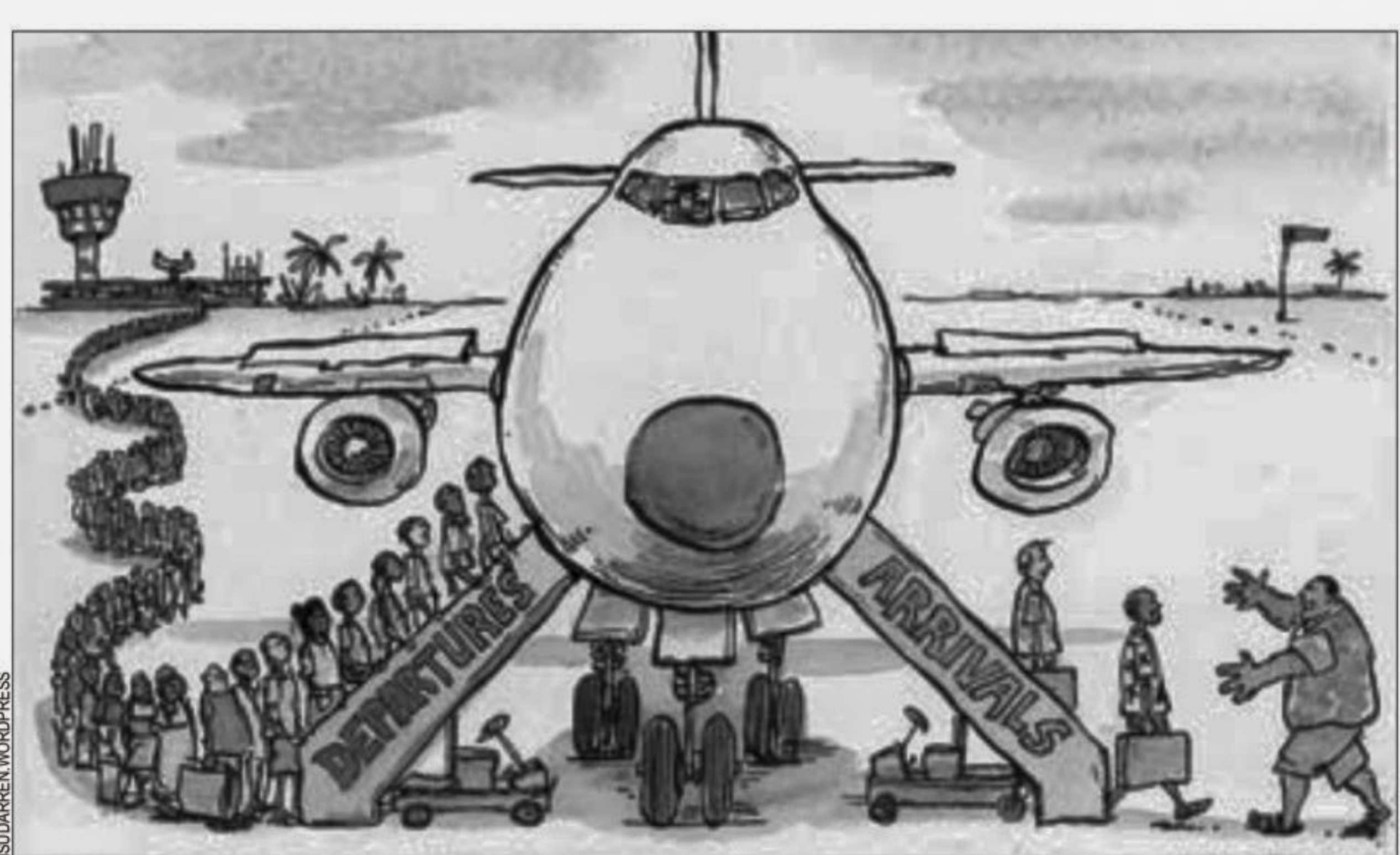
chances of unemployment. This makes sense at the micro level as risk averse individuals are less likely to switch sectors, even if theirs is a sunset industry, or switch to self-employment. At a macro level too this propensity to be employees leads to fewer small and medium size enterprises which create employment.

So why are some people more risk averse than others? Inter alia, their social standing and educational background determines affinity to risk. Most first generation entrepreneurs who have made it big come from low income and social levels, where they really had nothing to lose and everything to gain. In the lower class the opportunity costs of risking your fortunes in business are higher, but so are social pressures to conform and receive a professional degree.

The problem with professional degrees like medicine and law is that they presume a stable working environment (lawyers need court decisions honoured, MRI machines need power). When graduates from these fields fail to find the required stability in the region their degrees become redundant. Hence, the flight abroad.

Another problem with the middle class is the perception of business as a lowly activity that is the reserve of certain families. Parallels to this can be found in Chinese and Japanese history. The Meiji restoration in Japan, which led to it becoming the economic powerhouse it is today, saw a radical shift in perception of entrepreneurship, and a similar transformation occurred in Qing China before economic progress was made.

Respect for business will come from a recognition that it demands fine mental acumen and has immense



Taking off for a better life.

potential for personal and social gratification. Its risky and fraught with problems, but with creativity problems become opportunities. So the question becomes: How do you foster creativity?

Our education systems are a great example of how not to do it. Most curricula here are geared to create academia with critical thinking, knowledge application and cross curricular links ignored. The end result is that most people want to get a degree to gain a sense of worth. Education is no longer a tool to apply to gain that worth, it is worth in itself. An end in itself. We need

to stop seeing education as a means to add letters before or after our names. We also need to stop judging people blindly on these credentials.

In my limited knowledge of educational systems, one that I see does this well is the liberal arts system. It focuses on teaching basic reading, writing and numeracy skills, leaving the rest of the curriculum to develop something much more important -- thinking skills. Even some South Asian nations have woken up to this reality, with Indian law schools adding a Liberal Arts BA component to their LLBs. The rest of the region needs to play catch up.

We need to gear our social and educational frameworks to the risk around us. The situation in South Asia is bad, but it will not get better with time alone. We have seen above that developed nations will not help us plug this leak because it is beneficial to them. Self interest is very hard to argue with. Only a creative capacity to harness risks within individual professions can make the mess that is our region today a place where talent can survive.

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