

Knowledge drain versus brain drain

Brain drain has been discussed at various platforms particularly in reference to its intellectual and financial impact on society. Trained manpower migrating from one country to another for short-term assignments or forever is considered a loss to the sending country whose resources are utilized by the trainees, while the receiving country benefits as services obtained from them are much greater compared to monetary remuneration offered to them. However, the migration of manpower, i.e. 'brain drain' is supported with contest of 'brain in drain'. The 'brain in drain' ensue due to many factors such as improper or inefficient work environment, malfunctioning administrative set up, unavailability of facilities, lack of job opportunities, lack of conducive work environment, red tapeism or any and all other factors.

Developing countries like India are facing a new form of 'drain', that can aptly be referred as 'knowledge drain'. The knowledge drain has a more severe impact on sending country, particularly with respect to science and technology research. This 'drain' has been hideously silent with high impact on originating countries. The academia involved in the administrative structure of research institutions and universities might have experienced its financial impact, however, ironically, it is promoted as well as facilitated by academicians and scientists (encouraged by seniors more significantly). Though it may appear inclined nationalistic view, the phenomenon which impacts the citizens should be understood concisely.

The publication of research output is an essential activity for dissemination of new knowledge. Researchers should be

aware that any small finding (research output) is achieved by investment of public money in the form of grants from central funding agencies, instruments used, consumables (chemicals, stationary, glassware, even electricity) as well as manpower; and when the results are published in a journal (particularly owned by companies and corporate societies), the published articles are sold via subscription on hefty prices. This currently prevalent model is putting a two-way burden, and has more impact on the developing countries. Moreover, the authors, their institutions and funding agencies of the investing country have no control on the once published contents. The publishing author(s) does not gain any monetary benefits too. One has to pay to access the contents published in high impact journals. Also, the parts of contents such as figures, tables, etc. are sold to researchers willing to reproduce (for review etc.) for publication in non-associated journals. When any researcher from developing countries tries to obtain reproduction permission from the publisher, he has to pay for the purchase of parts of articles as well.

From an economic point of view, this is an outflow of assets as well as money from developing countries leading to devaluation of native currency.

Notably, nearly all researchers contribute to this devaluation in the name of evaluation of our research. Moreover, the senior academicians and scientists encourage their juniors to do so.

The reversal of 'knowledge drain' is possible by participation of all concerned researchers, academicians, administrators and funding agencies along with the setting up of publishing platforms back

home. The lack of quality journals in different subjects is a point of contention for many researchers in leaning towards foreign journals. The revival of once reputed indigenous journals may be a step to begin with. The modern emergence of digital online systems has made it easy to create the platform for journal processing along with global content distribution. The 'sincere' involvement of senior experienced researchers can help in this endeavour. Some countries like China and Japan are already doing this to some extent, while few other countries like Brazil and Iran have recently begun efforts in this direction.

The final published contents should be modelled in such a way that the articles remain available freely for researchers at the minimal cost to institutions and libraries. The research publishing is not for profit, rather it must be supported (with amicable control) by institutions and libraries. The regulatory bodies such as UGC, DST, ICMR, etc. should have collective policies towards promotion of indigenous journals. This could be done by giving more credit to researchers in recruitment and promotions for publishing in 'selected' (through evaluation) quality indigenous journals.

A reverse drain and retention of knowledge will promote job creation and help to prevent devaluation of indigenous currency. Also, the scholars will have more freedom to explore freely.

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Indicators of changing ecosystems: aquatic bird mass mortality in Sambhar Salt Lake, Rajasthan, India

India is a part of the Central Asia Flyway (CAF), in which migratory aquatic birds come to Rajasthan and Gujarat. These two states have a wide range of protected areas including important bird areas (IBAs) and bird sanctuaries, wildlife

sanctuaries and national parks in wetlands, which provide convenient stagnation and wintering areas for migratory birds. Sambhar Salt Lake in Rajasthan, the largest saline depression in the desert in western India was declared a Ramsar

site in 1990 for its biological and biotic importance. Since November 2019, more than 75,000 aquatic migratory birds have been found dead in Sambhar Salt Lake (Figure 1). The Indian Veterinary Research Institute (IVRI), Bareilly, has

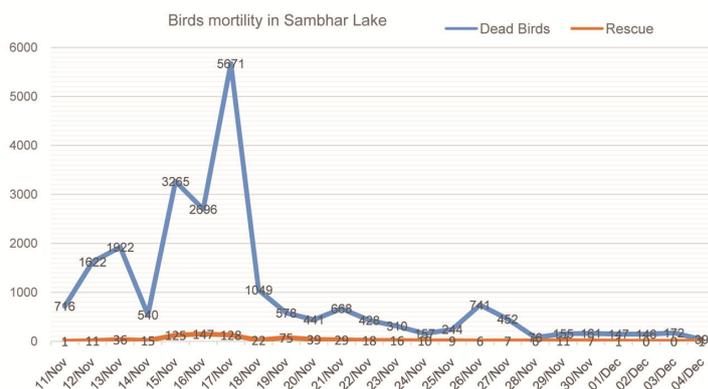


Figure 1. Birds mortality rate in Sambhar Ramsar site.



Figure 2. Burials of dead birds at near Sambhar Salt Lake.

reported avian botulism as the cause of death. About 735 sick birds were treated by the Animal Husbandry Department, IVRI, of which 368 survived, and 36 have been released. Bird carcasses began appearing on the banks of the Sambhar Lake from November 2019 near Jhapok area. The numbers increased with time until the banks of the Lake were carpeted with dead birds (Figure 2). The deaths affected around 29 species, majorly 11 of them, including the Northern Showler (*Anas clypeata*), Pintail (*Anas crecca*), Tufted Duck (*Mergus merganser*), Common Teal (*Rhodonessa rufina*), Gadwall (*Anas penelope*), Brown-headed Gull (*Spylornis cheela*), Gull-billed Tern (*Gelochelidon nilotica*), Pallas's Gull (*Circaetus gallicus*), Pied Avocet (*Milvus migrans*), Ruff (*Larus ridibundus*) and Kentish Plover (*Ichthyophaga humilis*) from Europe, Mongolia and southern Russia¹.

In the initial phase, studies done at the High Security Animal Disease Laboratory, Bhopal, rejected the bird flu as the cause for death. A huge difference was noticed in the number of samples collected and the number of deaths. Studies conducted by the National Wildlife

Health Center-USGS showed that several environmental factors, including pH, salinity, temperature and oxidation-reduction potential in the sediments and water column significantly influenced the likelihood of botulism outbreaks in wetlands². According to IVRI, birds were infected by avian botulism, a serious neuro-muscular illness caused by a toxin produced by the bacterium *Clostridium botulinum*. Clinical signs shown by the affected birds included dullness, depression and anorexia, placid paralysis in legs and wings, and neck touching the ground. The birds were unable to walk, swim or fly³. According to the avian botulism theory, the mass death of birds is due to the birds eating the maggot-carcass. It is a paralytic disease caused by the botulinum neurotoxin (BoNt) of the *Clostridium botulinum*. This bacteria depends on the high salinity of water in the lake. Metagenomic test should have been done in such a tragedy. The IVRI study reported the death of insectivorous and omnivorous birds only. There were no deaths among herbivorous birds, including flamingo. But after a month, the Iran Veterinary Organization (IVO) declared the cause of death of over 8000 migratory birds, mostly flamingos, in the Miankaleh Peninsula, Iran due to avian botulism⁴, which spreads by feeding on infected maggots. So two different international agencies (IVRI and IVO) confirmed the same cause of mortality for different types of birds (insectivorous, omnivorous in India and herbivorous in Iran) in different geological areas and the same CAF. Some other causes for the death of migratory birds could also be due to viruses, high sodium salts, pollutants and toxins by fungi.

Another possible cause of death of migratory birds could be the virus found in domestic and wild birds, which could also be of the novel genome. Different viral subtypes of the avian influenza virus could have entered via CAF, East Asian–Australasian Flyway and Asian–East African Flyway through migratory birds. Recently, between 16 November 2018 and 15 February 2019, China and Vietnam reported a zoonotic reasserting of HPAI A (H5N6) epidemic in poultry⁵. In January 2019, Namibia reported the first outbreak of HPAI A (H5N8). The virus was spotted in jackass penguins (*Spheniscus demersus*) on Halifax Island near Lüderitz in Karas area in the southern part of the country. Pakistan also reported several detections of HPAI A (H5N8) in mallards (*Anas platyrhynchos*), common guinea fowl (*Numida meleagris*), Coscoroba swan (*Coscoroba coscoroba*) and house crow (*Corvus splendens*) in Islamabad in February 2019 within CAF⁶.

The presence of open electric wires in the Sambhar Lake Basin (Ramsar site) may also have caused death of birds. Thousands of people have illegally installed pump sets in the Lake to drain water from the basin. Due to good rainfall in 2019, the water remained high in the lake till November. People who used to extract salt illegally, set up illegal pump sets in the middle and sides of the lake to drain the salt water. Open wires are used to power the pump set. Therefore, due to high water level, open wire and salt water may have created an electromagnetic field resulting in the death of migratory aquatic birds.

Recently, the Government of India banned illegal salt extraction to protect this Ramsar Site with implementation of International wetland legislation⁷. Similarly, we should develop Sambhar Lake while reducing the risk of migratory birds and human health.

1. <https://www.indiatoday.in/india-today-in-sight/story/mass-bird-deaths-sambhar-lake-point-problem-within-1621186-2019-11-21> (accessed on 11 April 2020).
2. https://www.usgs.gov/centers/nwhc/science/avian-botulism?qt-science_center_objects=0#qt-science_center_objects (accessed on 10 April 2020).
3. <https://www.indiatoday.in/india/story/avian-botulism-migratory-birds-death-sambhar-lake-rajasthan-1621433-2019-11-22> (accessed on 11 April 2020).

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4. Migratory birds were killed in Miankaleh, Iran's Metropolises News Agency, 2020; www.imna.ir/news/410799/ (in Farsi).
5. Adlhoch, C., Brouwer, A., Kuiken, T. and Miteva, A., *EFSA J.*, **16**, 1831–4732, 40; doi:10.2903/j.efsa.2018.5573
6. http://www.oie.int/wahis_2/temp/reports/en_fup_0000029765_20190307_135757.pdf (accessed on 11 April 2020).
7. www.ramsar.org/sites/default/files/documents/library/sitelist.pdf (accessed on 11 April 2020).

NEWS

‘Accelerate Vigyan’ – Aggregating skill development in S&T

There are several existing capacity building programmes supported by various scientific departments as well as premier institutions/labs/organizations in the country, which facilitate students aspiring or engaged in R&D through regularly held thousands of nationwide seminars, symposia, workshops and other such training events. However, there is no collective and coordinated platform to aggregate these efforts in order to avoid duplication and consequent redundancies. The Science and Engineering Research Board (SERB) itself, through its existing ‘Seminar/Symposia’ programme facilitates hundreds of such events by providing partial grant-in-aid to organize them. Such funding support and conference organization are also true for other departments and ministries. However, the efforts toward capacity building, training programmes, and skill development by various ministries/departments often remain unnoticed by the intended beneficiaries for the want of an aggregating data base and a well-populated web portal.

The ‘Accelerate Vigyan (AV)’ is a SERB scheme conceptualized to bridge this gap. This scheme was conceived upon the broad recommendations of the Group of Secretaries (SGO-8), to provide a big push toward high-end scientific skill and knowledge development by preparing capable skilled scientific manpower which can contribute to the growing R&D ecosystem of India, get relevant training in niche S&T domains, in order to contribute and participate in knowledge-based Indian economy. This inter-ministerial initiative of the Government of India would turn out to be an effective complementary enabler for the ‘Skill India’ mission launched five years ago and is managed by the National Skill Development Corporation.

Recognizing that modern research stands on the foundations of state-of-the-

art knowledge, and well-trained and skilled researchers, AV intends to initiate and strengthen mechanisms of mentoring, training, skill enhancement, and hands-on workshops, on the national scale. The overarching aim will be to transfer desired skill sets, useful knowledge, and creation of trained S&T manpower, with three broad goals – consolidation/aggregation of all scientific training programmes, high-end workshops and creating opportunities for development of research skills. The AV scheme was launched online on 1 July 2020, marking the announcement of first call for its various programmes through multi-modes like press release, pan India newspapers, social media platforms, web portals of S&T departments, mass autogenerated emailers, etc. The first call cycle shall be concluded by 31 August 2020 (refer Accelerate Vigyan website <http://www.acceleratevigyan.gov.in/> for more information).

The scheme Accelerate Vigyan has two main components – ‘Skill Development’ and ‘Bring Together’, being referred in Hindi language as अभ्यास (Abhyaas) and समूहन (Samoohan). These components have been further sub-divided into two programmes each (Figure 1).

The ‘Abhyaas’ component will strive to boost research and technical skill development in the country by enabling and grooming potential students by augmenting their skills in high-end thrust areas across S&T disciplines. It is further sub-divided into two programmes: High-End Workshops (‘Karyashala’) and Technical Internships (‘Vritika’). These two programmes are especially vital for those who have limited opportunities to access such learning capacities/facilities/infrastructure in their own centre of learning. ‘Karyashala’ is aimed mainly to give support for hands-on experience in learning operations and handling of high-end scientific instruments and other pre-identified theme-based skills essential to become a contributing member of the R&D ecosystem. ‘Vritika’ is the call for practice in science through flexible duration research skill development internships. This capacity building is expected to be executed at premier institutions with the help of mentors who are willing to train students in niche tools and techniques.

As part of this acceleration drive, we envisage to organize/aggregate ~1000 high-end workshops to provide opportunities for ~25,000 postgraduate and

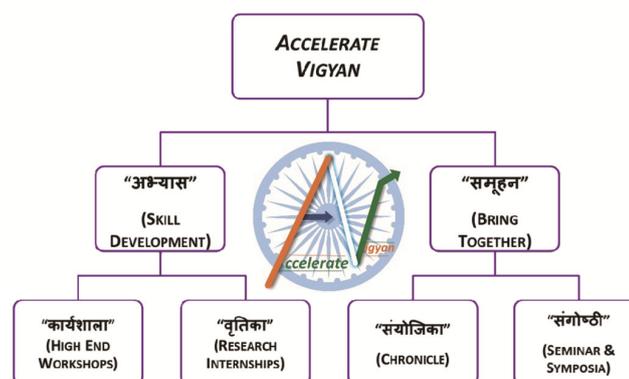


Figure 1. Components of Accelerate Vigyan.