In this issue

Linking Indian rivers

In this issue, a communication note (page 12) on the problem of linking Indian rivers and its consequence on the Indian SW monsoon based on the discussion meeting organized by V. Ramanan is included. The note brings out that the Bay of Bengal indeed has a low salinity layer, although only 10–20 m thick, and almost permanent on the northern part of BOB. Run-off from various rivers from the subcontinent to BOB has contributed to this low salinity layer. Common sense approach suggests that this low-salinity helps in the convection process over the BOB, a condition favouring monsoon intensification, by maintaining a relatively higher SST, again a necessary condition for convection. In the absence or reduction of runoff, there is likely to be an adverse effect on the monsoon and this aspect needs a detailed study.

Malaria in Assam

Assam with only 2.5% of the country’s population contributes >5% of the total malaria cases reported in the country. Transmission of the causative parasite continues to be perennial and persistent, mostly transmitted by Anopheles minimus. Majority are P. falciparum cases (>60%). For optimizing control operations, spatial distribution of the disease is an important consideration that is aimed at reducing transmission. Dev et al. (page 32) attempt to delimit the areas for prioritizing interventions, and propose that control programme targeted at population groups at high-risk (estimated to be ~40% that accounts for >60% of cases) can be potentially highly effective in reducing transmission of the malaria pathogen, and thus save operational costs. They call for greater coordination/political commitment for organized control operations, and strengthening of healthcare infrastructure along inter-border areas to ensure equitable growth and development of communities at stake.

Hot corrosion

Hot corrosion is a serious problem in boilers, gas turbines, internal combustion engines and industrial waste incinerators. It consumes the material at an unpredictably rapid rate. As a consequence, the load-carrying abilities of the components are reduced, leading eventually to their catastrophic failure. Apart from its monetary costs, it is more disastrous from the human point of view as premature failure of structures or operating equipment can result in human injury or even loss of life. Superalloys have been developed for high temperature applications. However, they are not able to meet the simultaneous goals of high temperature strength and high temperature corrosion resistance; therefore, protective coatings are used to counter the latter. Nickel-based coatings are widely used to protect the components from hot corrosion, erosion and wear. Sidhu et al. review (page 41) the hot corrosion performance of nickel-based coatings to understand their hot corrosion performance and mechanism.

Thorium breeder reactor

In this issue, Usha Pal and V. Jagannathan present (page 48) a new reactor concept called ‘A Thorium Breeder Reactor’ (ATBR). According to the authors, this reactor idea is evolved by combining the merits of existing heavy water and light water reactor technologies and is tailor-made for large scale utilization of thorium. One of the unique features of the ATBR concept is loading of thoria fuel rods with no externally fed fissile material in specially designed flux trap or fissile breeding zones. They show by detailed theoretical calculations that these seedless thorium rods are capable of achieving the same high discharge burnup of 50,000 MWD/T as other seed fuel rods with a fairly large initial PuO2 content of 14% to 20%. With about 2.2 T of reactor grade Pu in the fresh charge of 1/3rd core (120 fuel assemblies), the equilibrium reactor core is capable of delivering incessant energy of 600 MWe for two years with no refuelling and with no significant mechanical control manoeuvres. The reactor has a high fissile conversion ratio of 83%. The reactivity coefficients are mostly negative and low in magnitude. In view of the overall safe and economic characteristics, the ATBR idea, after the detailed engineering design and demonstrative trials, can play a key role in harnessing the energy from the large deposits of thorium in India.