xenobiotics, etc. should get research priority here. Modification of micro-organisms or plants through the introduction of genes controlling the degradation pathways may enhance bio-remediation. For example, a research team has been able to introduce bacterial genes into plant genome for conversion of toxic mercury into its less dangerous volatile form.

Rising global energy demand poses a real and growing threat to the world's energy security. Fossil fuels will remain dominant, accounting for 84% of the projected increase in primary energy demand. Estimates for global production of fuel ethanol indicate that it has tripled from 2000 to 2007 to reach 52 billion litres. Bio-diesel production has increased from less than 1 billion litres in 2000 to over 10 billion litres in 2007. These data provide a number of very important indications. The accumulative production of CO2 will not decrease, but only the rate will be slowed down. The climate will still worsen, but more slowly.

Finding an alternative low cost energy source is the ultimate goal, however, there is no such alternative. We have to move for bio-fuel, even if we have much less cultivable lands and may get, if any, less food aid in future, as much of the aids will be gone for fuel production by the donor countries.

In 2008 Bangladesh spent around 12% of total national budget to subsidise fuel, food, and fertiliser. Decreasing importation of fuel may save national budget. Brazil, leading producer of bio-ethanol, saved some $52 billion in avoiding oil import between 1975 and 2002. Though, bio-fuel is often considered as a blessing for tropical developing countries like Bangladesh for comparative advantages of sun and excellent energy crops, this simple prediction might be complicated by the uncertainties in climatic behavior. Engineered plant varieties with enhanced adaptability with higher content of fermentable sugars may overcome many of these uncertainties.

Developing countries like Bangladesh have a markedly different profile of the type of biopharmaceuticals consumed compared to US or Europe. Whereas erythropoietins, oncologics, anti-diabetics and auto-immune agents constitute the bulk of biopharmaceutical sales globally, the leading therapy classes here are anti-diabetics and vaccines. The simple truth is that many biopharmaceuticals, such as oncologics, are simply too expensive for widespread distribution in countries with low healthcare expenditure like Bangladesh. Access to the more expensive treatments continues to be restricted here.

In Bangladesh, where the environmental management system is very poor, reducing the use of chemical as pesticides may lessen the burden of pollution.

The much vaunted pharmaceutical industry in Bangladesh has much responsibility for bringing these out-of-reach biopharmaceuticals to the reach of the poorest section of the country. Though the worldwide market for bio-technology pharmaceuticals was estimated around $80 billion in 2007, representing 9.6% of the total global pharmaceutical sales, biopharmaceutical companies here seem to be reluctant in expending on research on less focused endemic diseases.

For example, salmonella infection is highly endemic in Bangladesh and is an important cause of high morbidity and economic loss. We have high incidence of tropical skin diseases, heart diseases, tuberculosis, dengue and others. Recombinant DNA based diagnostic kits, drugs and vaccines may be developed for endemic diseases to make diagnosis and treatments available for all.

Due to their potential for producing more affordable food and for mitigating some of the challenges associated with climate change, bio-tech crops are also gaining increased support from organizations such as the G8 countries, the European Commission and the World Health Organisation (WHO). WHO has emphasised the importance of bio-tech crops for their enormous potential to bring benefits by providing more nutritious foods, decreasing their allergenic ingredients and also improving the efficiency of production systems.

Our neighbouring country India can be an example for us for adopting genetically modified crops in agriculture. In India, 54,000 farmers grew 50,000 hectares of Bt cotton in 2002. Six years later in 2008 the Bt cotton cultivated area soared to 7.6 million hectares by 5 million farmers, with a 23% growth rate between 2007 and 2008. Bt cotton now occupies 82% of total cotton sown in India.

On an average, conservative estimates of benefits for small farmers indicate that yield increased by 31%, insecticide application decreased by 39%, and profitability increased by 88% which is equivalent to $250 per hectare. India is also one of the major producers of bio-fuel now. Needless to say that the political will and support for bio-tech crops in India is very high.