Recommendations

The inherent power of GMCs, which can go a long way in serving mankind, is not doubtful. However, its sustainability in the current agricultural set up of our country is highly questionable. Analysis of tangible economic aspects and intangible ecological, social and health impacts of GMCs showed no crystal clear benefits. Therefore, following recommendations are outlined on the basis of the research study

1. Public awareness and effective science communication

On ethical basis, it becomes our moral responsibility to generate awareness on the issue. We need to bring to foreground the real benefits and impacts of GMCs based on logical and scientifically rigorous study. Utmost important is generate massive and effective science communication in the country. And then give the public the right to choose with mandatory labeling of all GM products.

2. Comprehensive and crystal clear policy framework

To develop an effective GMC policy, all the stakeholders including farmers, retailers, and common man should be made a part of decision making process at every level of GMCs production, research and use. It is important that regulatory attitudes change. Urgent need is to change the fundamental underlying statute to suit the needs of the current innovations/technologies and their repercussions on the society.

3. Long term research

The science of GMCs is a very novel technique with little on field data. Thus, it is very important to follow a cautious approach towards release of these crops in open environment. The need is to garner long term ecological and chronic health/biosafety data to scientifically validate its safety.

4. Need based research

It is very important that GMCs are produced according to the need and requirement. There is a need to give a new direction to current GMC R&D which
concentrates on producing insect or pest resistant or herbicide tolerant plants. Instead more impetus should be given on research to develop minor crops which are already pest resistant but are not being eaten for various reasons like minor millets into possible food crops. The need is to diversify the existing food pool and give new direction to the evolutionary process.

5. Achieve food security by checking post harvest losses

As providing food for all, remains at the heart of the entire problem. But research and development has lost focus from this important need and wandered in different directions. Providing food to all not only requires producing more but also maintaining, storing and transporting it hygienically with minimum wastage. According to Food Corporation of India, food worth Rs.500 billion ($120 bn) is wasted every year. These post-harvest losses are about 25-30 percent of total agricultural produce (Boxall, 2001). More startling are the post harvest losses. Over the past decade in the country, there has been little change in area under food grains. Productivity has increased by 6.7% but at the cost of increase by 29.17% in fertilizer use alone. Although the pesticide use has decreased by 15.56%, the post harvest losses during storage alone have gone up by 5.59%. It is apparent that when the rate of loss of food-grains is close to that of production, no real gain in productivity is felt.

Table 7.1 Food-grains In India

<table>
<thead>
<tr>
<th>Time span</th>
<th>Area (mha)</th>
<th>Fertilizer consumption (million ton)</th>
<th>Pesticide usage (t³)</th>
<th>Production (million ton)</th>
<th>Post-Harvest losses (million ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-99</td>
<td>125.17</td>
<td>16.76</td>
<td>49.16</td>
<td>203.61</td>
<td>18.94</td>
</tr>
<tr>
<td>2006-07</td>
<td>123.71</td>
<td>21.65</td>
<td>41.51</td>
<td>217.28</td>
<td>20</td>
</tr>
</tbody>
</table>

%change over decade  
-1.17% 29.17%* -15.56% 6.7% 5.59%**

* -Marked increase in fertilizers threatening pollution.
** - Large losses equating rate of increased production.

Source: Department of Agriculture and Co-operation, MoA ,2010

11th Planning Commission report, Ministry of Food and Civil supplies, GoI, 2010
Food saved is food produced. So the need is to save the existing food than producing more by altering genetic path and disturbing ecology. The question arises as to would the GMC based increase in agricultural output, solve the problems and give food security. Or instead planning and encouraging the policies and research focusing on storage infrastructure to minimize post-harvest losses would be an intelligent option.

6. Alternative techniques
Along with it, increasing the existing food production with minimal energy inputs like pesticides, fertilizers, from the existing land under agriculture is required. This is possible only if we change our input intensive form of cultivation to a sustainable one. Reducing pesticide, fertilizers and irrigation facilities to bare minimum and using alternatives like organic farming, will help in solving the problem of climate change to an extent as well as a befitting replacement to GMCs. Unless this is done, international efforts, like Conventions on Biodiversity and Climate Change, will continue being failures. Such conventions are more of political and economic negotiating efforts with little result. Until economic concerns remain the main driving force behind such conventions, drawing any real, remarkable gains from them appears impossible.

“Saying Don’t is easy but telling how to Do it Right is difficult” aptly said by Prof. M.S. Swaminathan during the personal interview. Debating on the issues without any consequential outcome is of no use. “Do Ecology” is the need of the hour. Our agricultural priorities should be in sync with the ecological principles. Focus of man should be on ecological sustainability rather than economic benefits. Economic benefits are short-term and if these are based on disturbing ecological sustainability than it is suicidal. On the contrary if ecological sustainability impinges marginally upon the economic benefits, in long run it will be beneficial. Consequently, we need to rethink our agricultural innovations and technologies, change our industrial approach to agriculture and collaborate with indigenous knowledge of locals to give it a new direction.