



Biotechnology and scientific agricultural progress

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In my diplomatic role I have been spending the last few days interviewing senior bio-scientists from developing countries to gain their views and aspirations in their field of study. It has been a fascinating experience and having preconceived ideas shattered barely describes the

experience of these detailed conversations!

When discussing milling and grain-associated technologies, as well as developments the area of bioscience is assuming greater importance globally, it helps produce the grains or whichever crop is concerned but it also increasingly involved in the adding of value to waste streams or as they are now called, bi or co products. The areas I was investigating in my interviews were green biotechnology (agriculture and forestry) and white (industrial) biotechnology, is about the use of living organisms and processes to achieve specific outcomes. Composting, bread-making, molecular plant breeding and brewing are all biotechnologies whereas the general public often seems to think it is all about this genetic modification of organisms.

What really stood out in the interviews were not only the enhanced scientific rate of progress in developing countries but also the very significant pool of home grown scientific talent. This was accompanied by an immense desire by the interviewees to energise their home countries and social development. This bodes very well for future Milling4Life supported projects, as clearly the necessary homegrown and in-location talent required to give successful outcomes is ready and willing to act. This is a significantly different position to when I was young and projects in developing countries were often conceived and driven externally, never being adopted into the countries in the hoped for way. Often these projects were also exploitative and shunned by the local population who were integrated into them, other than possibly as cheap labour or as a means to secure and use an overseas asset.

All this potential bodes very well for milling industries in emerging countries in terms of the large range of indigenous grains available for development. To date, these crops have benefitted from very little scientific input in terms of breeding effort in comparison to the current crops of soy, wheat or rice. Also, bi or co product lines and associated processing techniques are areas of potential development for these under-explored crops.

Modern bioscience intimately explores, evaluates and

develops living yeasts, enzymes and other chemicals of life to the benefit of us all. Rye, wheat and oats are the temperate grains that are used to produce the breads that I enjoy daily, and durum grains are used for pasta and these benefit daily from significant scientific and financial investment. These are also all temperate grains that grow well in Europe, but as soon as you venture into other geographical and climate areas that are experienced in developing countries then different staple grains rule. Going deeper into the role of science in these developments in the subject of grain, feedstock choice also covers methods of crop production and technological developments in that area. The modern trend is away from synthetic inputs of insecticides, herbicides, fungicides and fertilisers that were developed to challenge nature. We are now moving more and more towards working with nature and using techniques and processes that respect that difference in approach. A basic example of this is our changing treatment of soil, which, in many developed economies including my own in the UK, has been severely damaged, by its treatment as a growing medium rather than the complex living biome that it actually represents. Only a teaspoon of healthy soil contains vast numbers of living organisms.

The advent of no-tillage techniques in the Americas and elsewhere is slowly spreading throughout global agriculture. This is where ploughing and soil inversion techniques are eradicated in favour of allowing the soil complex to remain undisturbed and the activity of beneficial bacteria and fungi in the soil is encouraged and complimented to provide crop health, protection and nourishment. The science, knowledge and understanding required to successfully carry this out is immense but this is where emerging economies can score heavily. Link this to the encouragement in production of a wide range of grains being grown and development of the food and other products, and they support an exciting milling industry with numerous markets and opportunity.

In a world where many industries, already highly developed, mean that the future of commercial opportunity usually exists somewhere between the wallpaper and the wall, essentially, the business case is often marginal. The encouragement of the development of new grains and processing techniques and new products opens up a veritable Aladdin's cave of business opportunities. Simultaneously preserving and promoting biodiversity and the sustainable agriculture we all depend on.

Our planet took a long while to develop our soils and plants – the milling industry stands to gain from developing them.