Technology and R&D are the seeds of growth in Terengganu’s hi-potential agriculture sector.

Agriculture has always been a core competency of Terengganu, given its fertile soil and rich marine life. Nearly 30 percent of the Terengganu workforce currently works in fishing, livestock rearing and farming. Efforts are underway to improve R&D, automation and technology in order to add value to this key sector, in line with strategies outlined in the 9th Malaysia Plan and the ECER Masterplan to position agribusiness as a core sector.

While expanding the GDP, the ECER’s blueprint for hi-tech agricultural development is also geared to combating poverty. Since Terengganu is still largely an agricultural State, generating extra income through expanding agricultural capacity will improve incomes and livelihoods for a majority of its population. To achieve its goals, the ECER has chosen to focus on three mainstays of agriculture in Terengganu: crops (industrial and food), livestock and fisheries.

The main issues facing this sector include ways to increase competitiveness, adoption of new techniques for better productivity, deepening linkages with related sectors, pioneering ventures – all of which require more sophisticated crop production and processing facilities.

**ECER: Agriculture Sub-Clusters in Terengganu**

<table>
<thead>
<tr>
<th>Crop-based</th>
<th>Livestock-based</th>
<th>Fish-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits &amp; Vegetables</td>
<td>Mutton</td>
<td>Marine Capture Fisheries</td>
</tr>
<tr>
<td>Herbs</td>
<td>Poultry</td>
<td>Freshwater Aquaculture</td>
</tr>
<tr>
<td>Tobacco</td>
<td>Breeder Animals</td>
<td>Recreational Fishing</td>
</tr>
<tr>
<td>Kenaf</td>
<td>Animal Feed Production</td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocoa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOBLE INTENTION:** Terengganu’s green revolution will combat poverty and decrease food insecurity.
ECER Agricultural Initiatives

Hi-tech Goat Hub
Terengganu is poised to become a leading mutton producer and goat-breeding facility with the establishment of Taman Teknologi Kaprima Bestari, a RM10 million goat technology and research centre in Serating, Marang under the ECER’s livestock farming initiatives.

The hi-tech goat park, which will be built and managed by the Department of Veterinary Service Terengganu (JPHT), will modernise the country’s goat breeding industry and establish the State as a prominent hub for mutton production and research. Showcasing the latest information and research on goat breeding, this goat park is being positioned as a research and knowledge centre for goat breeders across the Asia-Pacific region. The goat technology park will be equipped with a farm house, a mini-slaughterhouse, and a fertiliser processing factory. Aside from goat breeding and research activities, the park also incorporates tourist/visitor facilities such as a restaurant and a petting zoo to support Terengganu’s eco-tourism strategies.

On a larger scale, the goat hub strategy is aimed at achieving national self-sufficiency in mutton supplies for Malaysia, which consumes 10 million goats a year. The goat park is also envisaged to offer better economic prospects as well as knowledge-building and employment opportunities for local entrepreneurs and agribusiness graduates.

Aquaculture in Kenyir
Under the ECER’s thrust to promote aquaculture in Lake Kenyir, the Terengganu Agrotech Development Corporation Sdn Bhd (TADC) is targeting a rise in its fish farm production from the current 200 tonnes to 2,000 tonnes per annum by end-2008 and up to 6,000 tonnes per year over the next three years.

By creating new fish farming entrepreneurs, this programme aims to increase the income of participants in the TADC’s fish farms, thereby addressing the issue of poverty reduction while expanding fish supplies to feed the nation.

Money in Mushrooms...
Terengganu is emerging as a major producer of mushrooms, categorised as an industrial crop by the Ministry of Agriculture, in order to create food self-sufficiency and curb imports while creating farming entrepreneurs from mushroom cultivators. More than 2.6 million tonnes of mushrooms valued at over RM25 million were imported into Malaysia in 2004. Currently, the country’s best selling mushroom is the white oyster.

and Kenaf
Terengganu is carving a niche in kenaf farming and processing. Cultivating kenaf in Terengganu will diversify the income of the tobacco farming community and help farmers to cope with low demand for tobacco in the wake of the global backlash against cigarettes, which are perceived as costly health hazards.

Kenaf when processed becomes a powder which is used for the manufacturing of composite materials. Terengganu now exports kenaf powder to Japan and South Korea at prices ranging between RM700 and RM1,200 per tonne.

To spearhead developments in the agricultural field, investors in the form of anchor companies are invited to set up nucleus contract farming arrangements with local farmers as well as establish one-stop collection, processing, packaging and distribution centres (CPPC) in the ECER, to supply raw materials and processed products to manufacturers and retailers locally and abroad. This move will cut down the intermediaries present in the current business model, reduce post harvest losses due to better handling of produce and ensure a high level of quality control.
Building on Biotechnology

The complex biotechnology industry in Malaysia encompasses various biotech products and services derived from the use of technology involving the application of living organisms, their parts and components, or biological systems and processes.

Currently, Malaysia ranks as one of the world’s 12 mega biodiversity centres with abundant natural resources in flora, fauna and marine ecosystems. Terengganu in particular enjoys a natural advantage in biotechnology given its million-year old rainforests rich in genetic biodiversity. The Federal and State governments are committed to promoting biotechnology in Terengganu as one of the new growth areas and these concerted efforts have resulted in the realisation of more joint-ventures and collaborations between local and foreign parties in undertaking research and development (R&D) activities for the production of pharmaceuticals, vaccines, and other biotech-related products.

Malaysia also offers skilled human resources, where Malaysia's current National Education Policy emphasises on science and technology. In Malaysia, there are 13 universities offering biotechnology programmes with about 3,000 undergraduates studying biotechnology annually, besides other post graduates programmes. The Malaysian government estimates that over the next five years, there will be about 23,000 research personnel and more than 5,000 R&D scientists available in this field.

Terengganu provides strong R&D support to investors, which is the key to success in biotech. The State government takes its cue from the Malaysian government, which is implementing new initiatives to accelerate the development of the biotechnology industry. Measures have been undertaken to integrate research activities, encourage industry participation and attract investments and quality human talents, and provide specialised commercial support services (patents, legal advisory, business plans, marketing plans and partner sourcing). The State works closely with the Forest Research Institute (FRIM), a major research institution actively conducting research into the commercial cultivation of herbs and medicinal plants. FRIM provides research-based services for the conservation, processing, management, development and commercial use of these forest resources.

Priority areas identified include plant biotechnology, animal biotechnology, medical biotechnology, food biotechnology, industrial and environment biotechnology, biopharmaceuticals, molecular biotechnology and bioinformatics.

Terengganu has identified the following focus areas for further development in the biotechnology industry:

- Food biotech/Agro biotech;
- Biopharmaceuticals (antibodies and vaccines);
- Nutraceuticals;
- Biodiagnostics;
- Industrial enzymes;
- Strategic alliances and research partnership/joint discovery of bioactive compounds for healthcare.
Maximising Marine Biotech

It makes sense for Terengganu to focus on marine-linked biotechnology to improve fish yields and discover new applications that could offer health and economic benefits. Terengganu is a natural choice for marine biotech, thanks to its oceans, rivers and lakes teeming with over 4,000 species of fish and the world's most diverse coral communities.

Both the Federal and State governments have created a highly supportive infrastructure for marine biotech, focusing on first-class research and development facilities. Notably, Universiti Malaysia Terengganu (UMT) has established key centres of R&D excellence in oceanography, aquaculture and marine biotechnology. The Fisheries Institute of Malaysia conducts research into the development of a sustainable national fisheries industry and trains the required manpower.

Healing Through Herbs

Herbal biotech offers massive potential thanks to Terengganu's rainforests which contain over 15,000 species of flowering plants and more than 1,100 species of ferns. Research into this impressive biodiversity is the platform for the production of natural medicines and herbs, which is already a trillion-dollar global business.

Institutions like UMT and the Universiti Darul Iman (UDM) play a pivotal role in herbal R&D by supplying facilities and researchers. Significantly, UMT researchers have produced commercial and health innovations such as Malaysia’s first lotion to treat diabetic wounds, which is derived from the plane tree (pokok kapal terbang) or Chromolaena odorata.

INNOVATIVE: Terengganu's tertiary education institutions such as UMT play leading roles in marine R&D activities.

IMPRESSIVE: Terengganu's rich biodiversity has become the platform for the trillion-dollar herbal medicinal business.
Potential in Pharmaceuticals

Terengganu is also keenly eyeing the high potential for investment in pharmaceuticals. Currently, the local pharmaceutical industry has the capability to produce almost all dosage forms, including sterile preparations such as eye preparations, injectibles, soft gelatin capsules and time release medications.

Pharmaceutical manufacturers in Terengganu are focusing on high-margin niche segments, adding value to existing products through improved drug-delivery technologies, and increasingly moving into biopharmaceuticals and branded generics including biogenerics in order to remain competitive.

With the admission of Malaysia as a member of the Pharmaceutical Inspection Convention and Pharmaceutical Inspection Cooperation/Scheme (PIC/S) in January 2002, exports of pharmaceutical products have received a boost, especially among the member countries, which include the EU, Australia and Canada.

The principal regulatory authority on the production, import and sale of pharmaceuticals (including traditional medicines) in Malaysia is the Drug Control Authority (DCA) of the Ministry of Health. As of 31 Dec 2004, 205 pharmaceutical companies with Good Manufacturing Practices certification have registered with the DCA.
Terengganu offers ample intellectual protection for investors in line with Malaysia’s legal framework. Intellectual property laws conform to international standards. The Intellectual Property Corporation of Malaysia (IPCM) was formed in March 2003 taking over the functions of the Intellectual Property Division (IPD) of the Ministry of Domestic Trade and Consumer Affairs Malaysia, an indication of Malaysia’s commitment to providing a more conducive environment for better implementation of IP rights.

Malaysia is also a signatory to the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). In addition to this, Malaysia had ratified the Patent Co-operation Treaty (PCT) in 2003, facilitating patent registration and consequently protection to foreign inventions.

Currently, manufacturing of pharmaceuticals and related products (which include pharmaceutical goods, clinical diagnostic reagents, gelatin or gelatin products, intravenous, dialysis or irrigating solutions, vaccines, and medicaments) are eligible for normal Pioneer Status or Investments Tax Allowance incentives.

The development, testing and production of pharmaceuticals promoted under biotechnology is eligible for High Technology Pioneer Status or Investments Tax Allowance incentives.

**ELIGIBLE:** Manufacturing of pharmaceuticals and related products stand to benefit from a host of incentives and tax allowances.