RESEARCH AND DEVELOPMENT

Our business is heavily reliant on our annual harvest and the processing of the palm oil fruits and we invest heavily in research to improve the crop and manage it in a sustainable way. Our research institute, SMART Research Institute ("SMARTRI") is dedicated to supporting us and the palm oil industry through innovation, developing best practices, and improving the current palm oil breeding programme. In 2010, our spending for research and development was approximately Rp64.98 billion or US$7.15 million.

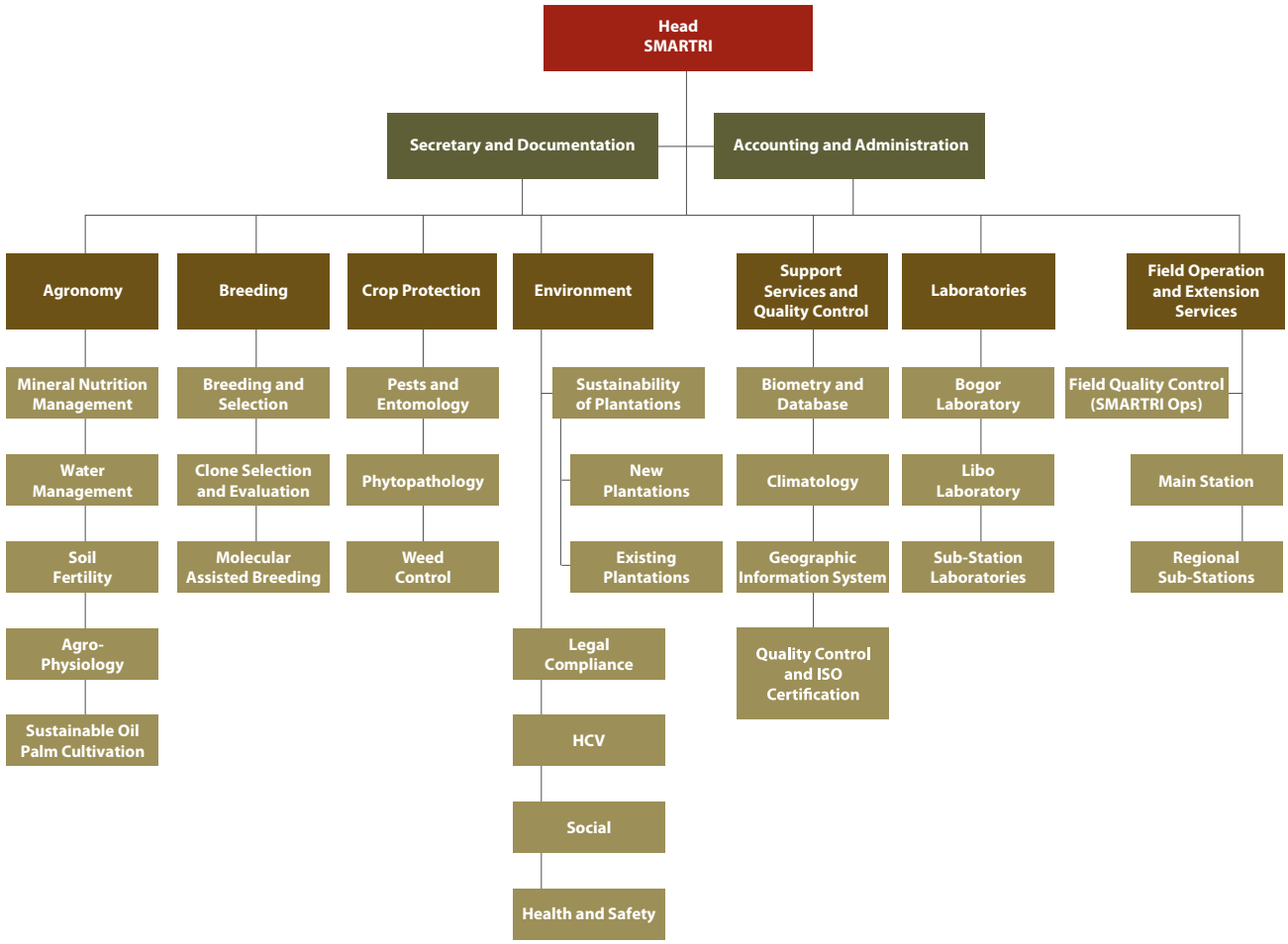
We seek to be on the cutting edge of palm oil research and development and work at various levels, collaborating, conducting projects, joint training programmes and case studies with reputable research institutes and universities. Among them are the Centre de coopération Internationale en Recherche Argonomique pour le Développement ("CIRAD"), Monash University, McGill University and University Putra Malaysia ("UPM"). This is all part of our continuing drive to improve best practices in global palm oil breeding and developmental indicators.

SMARTRI's scope covers:

- Agronomy, which includes the study of the oil palm tree's nutritional and water intake, soil fertility, eco-physiology studies and the development of sustainable practices and measurement guidelines;
- Breeding, which is the continual improvement of the oil palm trees through selective breeding programmes, the development of tissue culture and assisted molecular breeding;
- Crop protection, which is predominantly our Integrated Pest Management ("IPM") project, covering entomology, phytopathology and weed control;
- Environmental practices, which focus on supporting our estates regarding sustainability certification and legal compliance.

These activities are managed by seven different departments. In total, we have approximately 90 graduate researchers working in our research institute.

Chart 5.1: Structure of SMARTRI



SUSTAINABLE AGRONOMY

We understand that measuring the impact of our agricultural practices is an important step towards environmental sustainability. This is why, in conjunction with CIRAD and with the support of the National Research Institute for Agronomy in France, we are developing Agri-Environmental Indicators based on the INDIGO® methodology that is used for several agricultural commodities already. To date, we have developed four indicators:

- ***IN*** for the management of nitrogen in mature plantations. This indicator assesses the risk of nitrogen pollution in our plantations;
- ***IPhy-Palm*** which evaluates the risk of water and air pollution for pesticide management;
- ***ISOM*** which assesses the future levels of soil organic matter based on current practices; and
- ***ICOV*** which is a soil cover indicator that is used for the evaluation of the risk of soil erosion.

PALM OIL BREEDING

A primary focus of SMARTRI's work is increasing the productivity of our palm oil. This is a key factor in the success of the business and improving sustainability. By increasing our yields, we use land more effectively. The oil palm breeding programme at SMARTRI is geared towards developing trees that are genetically diverse and to meet the needs of growers and consumers. As part of the programme, we received more than 3,000 seeds from the 54,000 seeds that were obtained from 105 different species of wild palm oil trees in Cameroon, where the oil palm tree originated. These seeds have been distributed to all the members of this project, which include the research units of a dozen Indonesian palm oil producers and the Government of Indonesia.

We are also participating in the Oil Palm Genome Project, an international collaboration between 16 reputable research organisations from seven different countries aimed at unraveling the genetic sequence and genome of the oil palm. By mapping the genome of the oil palm, we are able to identify the markers or genes associated with traits that can be strengthened – for example, markers relating to pest and disease resistance and mineral nutrition efficiency. These markers will also supplement our current traditional breeding programme to make it more effective and more efficient.