

從台灣林業的發展看生技產業的未來

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中文摘要：

1867年，哈根對認為國有林應該作為全民族的世襲財產來對待，使其能為當代人提供盡可能多的成果，以滿足對林產品和森林防護效益的需要。這就是被後人稱頌的“森林多效永續經營”理論。森林已超越環境的掠奪式經營，到“接近自然之林業”及“新林業”的興起。再以單純索取木材及林產品，轉向重視森林的生態效益和社會效益，從盲目的破壞森林轉向培育、保護、發展和合理利用。

生物科技產業涵蓋十分廣泛，其範疇以生技、製藥、醫療器材三大核心領域，擴及農業、食品、醫療保健、機電資訊、環境資源、材料化工等六類產業。林業作為全球可持續發展基礎的新時代已經到來，林業正在向多功能、多價值和多目標經營的方向轉化。近代林業科學技術革命應該是以遺傳育種技術和集約經營技術為主導的人工林技術革命為標誌。多倍體育種、細胞融合、基因轉移等分子生物學技術與傳統育種技術的結合，為林木育種事業帶來了勃勃生機，最終選育高產、優質、多抗的樹木新品種，開發病蟲害檢疫及防治的新技術以及提高生物資源利用率的新方法。因此，非豆科植物固氮等技術遲早會突破；再則利用細胞培養方法，結合生物技術生產“全天然”的藥品、食品添加劑和色素等，已使從動植物組織直接提取的生產方法未來有機會異軍突起；以森林生物質加工、轉化、利用技術也會找到適當的解決方案。

森林面積的增加和林業的發達已成為一個國家社會發展和經濟繁榮的重要標誌。綠色科技也意味著新一代科學技術將承擔起保護並延續地球生物圈和人類生命的重任，包括支持人類重建沙漠綠洲、重返沙漠家園。運用綜合治理的觀點保護和開發森林資源，既不消極地管護和被動地保護；又要科學合理地利用，發展出較高速度、較高品質和高效持續發展的林業道路。

Looking at the future of biotechnology industry from the development of forestry in Taiwan

【Abstract】

In 1867, Hagen believed that state-owned forests should be treated as hereditary property of the whole nation, so that it can provide as many results as possible for the contemporary people to meet the needs of forest products and forest protection benefits. This is what the theory of “forest multi-effect sustainable management” that

is praised by future generations. The forest has surpassed the predatory management of the environment, to the rise of “close to natural forestry” and “new forestry”. By simply requesting timber and forest products, we will turn to the ecological and social benefits of forests, from blind destruction of forests to cultivation, conservation, development and rational use.

The biotechnology industry covers a wide range of industries, including biotechnology, pharmaceuticals, and medical equipment. It expands into six industries, including agriculture, food, healthcare, electromechanical information, environmental resources, and materials and chemicals. A new era of forestry as the foundation for global sustainable development has arrived, and forestry is transforming into a multi-functional, multi-value and multi-target business. The modern forestry science and technology revolution should be marked by the genetic forestry technology revolution led by genetic breeding technology and intensive management technology. The combination of molecular biology techniques such as Polyploid breeding, cell fusion, gene transfer and traditional breeding techniques has brought vitality to the forestry breeding industry, and finally selected new varieties of trees with high yield, high quality and multi-resistance, and developed pest and disease quarantine and New technologies for prevention and control and new methods to improve the utilization of biological resources. Therefore, technologies such as non-legume nitrogen fixation will break through sooner or later; and cell culture methods combined with biotechnology to produce “all natural” medicines, food additives and pigments have made the production methods directly extracted from animal and plant tissues have opportunities in the future. Technologies that use forest biological processing, transformation, and utilization will also find appropriate solutions.

The increase in forest area and the development of forestry have become an important indicator of a country's social development and economic prosperity. Green technology also means that a new generation of science and technology will assume the responsibility of protecting and continuing the Earth's biosphere and human life, including supporting humanity to rebuild desert oases and return to desert homes. It is the use of comprehensive governance perspectives to protect and develop forest resources, neither passive management nor passive protection, but also scientific and rational use to develop a higher speed, higher quality and efficient and sustainable development of the forestry road.