

发挥优势 科学种植 促进林浆纸业和谐发展

Promote the Coordinated Development of Forest Pulp and Paper with Advantage and Scientific Planting Activities

广西壮族自治区发展和改革委员会工业处

Industry Dept. of Development and Reform Committee of Guangxi Autonomous Region of Zhuang Nationality

(2006年4月4日)

(April 4 2006)

一、优越的地理环境和气候条件，强有力的国家政策支持，是广西大力发展林浆纸业的基础。

The favorable geographic environment and climate condition and the powerful support of domestic policy are the essence of the development of Guangxi's Forest Pulp and Paper in large scale.

广西壮族自治区属亚热带地区，夏长冬短，阳光充沛、气温高、降水多，年平均气温 21.1℃，年均日照时数 1396 小时，年均降雨量 1500 毫米。在这种优越条件下，广西“种什么长什么”。广西土地面积 23.67 万平方公里，在土地总面积中，山地和丘陵占 70.8%，平原和台地占 27.1%，河流水面占 2.1%。现有耕地面积 256 万公顷，占土地总面积 10.8%。广西人口 4925 万，人均耕地面积 0.052 公顷。

Guangxi Autonomous Region of Zhuang Nationality locates in the sub-tropical zone with long summer time and short winter period, sufficient sunlight, high temperature and abundant rainfall. The annual mean temperature is 21.1℃, annual mean sunlight 1396 hours, annual mean rainfall 1500mm, so in such favorable condition, whatever planted can grow in Guangxi. Guangxi has an area of 236700 square kilometers, among which 70.8% is hilly area, 27.1% for plain and mesa area, 2.1% for river area. The area of farmland is 2.56 million ha, which occupies 10.8% of the total area of Guangxi. With a population of 49.25 million, the mean farmland area per person is 0.052 ha.

在人多耕地少的现实下，种植业向山地和丘陵地发展是民生必由之路，其中种植速生丰产林是最佳选择之一，因为广西林木年平均生长量是全国平均水平的 2~3 倍。广西林业用地面积 1367 万公顷，占土地总面积 57.7%；森林面积 980 万公顷（不含灌木林），森林覆盖率 41.3%。广西林业按生态林、防护林、商品林三大类经营，其中商品林经营区面积 780 万公顷，占林地面积 57.2%。商品林经营区中适宜发展速生丰产林的林地面积约 500 万公顷，在南方省区中列第一位。因此，国家从“十五”规划起就将广西定位为中国林浆纸一体化产业重点地区。在国家规划指导下，广西经过多年的发展，现已种植速生丰产林 133 万公顷，其中桉树 57 万公顷，竹子 10 万公顷，松、杉等 66 万公顷。

Under the fact of low allocation of farmland area per person, expending afforestation towards hilly and mesa area is an inevitable course for development, and planting fast-grow-high-yield forest is the best choice because the MAI of forest of Guangxi is 2-3 times as much as hat of domestic value. The area of forest land is 13.67 million, which occupies 57.7% of the whole area of Guangxi; the area of forest (excluding bushes forest) is 9.8 million ha, which makes the forest coverage reach 41.3%. Forest operation of Guangxi classes into 3 categories, namely, ecological forest, shelter forest and commercial forest, among which commercial forest occupies 57.2% of the total forest land. Among the commercial forest operation area, 5 million ha is suitable for fast-grow-high-yield forest, ranking the top of southern China. So, Guangxi has been oriented as the key area of the integrated industry of forest, pulp and paper since the plan of "the tenth of five years" was set. Under the guiding of national scheme and after years of development, Guangxi has an area of 1.33 ha of fast-grow-high-yield forest, among which, 0.57 million ha is for eucalyptus, 0.1 million ha for bamboo, 0.66 million ha for pine, fir and other species.

广西发展林浆纸一体化产业的条件正在逐步成熟。我们规划，广西经过未来五年至十年的努力，2010 年制浆能力达 200 万吨（不含蔗渣浆，其中竹浆 80 万吨），造纸能力 250 万吨；2015 年制浆能力 420 万吨（其

中竹浆 135 万吨)，造纸能力 500 万吨，把林浆纸产业培育成为新的支柱产业，使广西成为全国最重要的制浆造纸基地之一。为实现这一目标，2010 年全区速生丰产林发展到 200 万公顷，其中造纸工业原料林 100 万公顷（竹林 13 万公顷），年产浆纸工业用材 500 万 m<sup>3</sup>，鲜竹 320 万吨；2015 年速生丰产林发展到 253 万公顷，其中造纸工业原料林基地 133 万公顷（竹林 23 万公顷），年产浆纸工业用材 1200 万 m<sup>3</sup>，鲜竹 550 万吨。

The prerequisites of the development of the forest, pulp and paper integration have been gradually satisfied in Guangxi. We plan, after applying efforts in the coming five or ten years, by year 2010, the pulp yield can reach a capacity of two million tons (excluding sugarcane pulp, including 80 tons bamboo pulp) and the paper production can hit the target of two and a half million tons, and by the year 2015, pulp yield can reach 4.2 million tons (including 1.35 million tons bamboo pulp) and paper production can achieve 5 million tons, which makes forest, pulp and paper industry become a new supporting industry and put Guangxi into the key base of pulp yield and paper making. To concert this plan, by the year 2010, the area of fast-grow-high-yield forest will reach 2 million ha, and among this, forest for fiber base will be 1 million ha (bamboo will be 0.13 million ha), and the annual pulp wood production will be 5 million m<sup>3</sup> and bamboo will be 3.2 million tons; by the year 2015, the area of fast-grow-high-yield forest will reach 2.53 million ha, and among this, forest for fiber base will be 1.33 million ha (bamboo will be 0.23 million ha), and the annual pulp wood production will be 12 million m<sup>3</sup> and 5.5 million tons.

二、选择速生桉作为制浆造纸原料的主要树种是科研和实践的结果

Selecting the eucalyptus, the fast-grow species as the material of pulping and paper making is the result of scientific research and practical operation.

我国引种桉树已有 100 多年的历史。目前我国有 17 个省市种植 200 多个桉树品种，人工林面积达 100 万公顷以上，是世界仅次于巴西的第二植桉大国。广西培育种植速生丰产桉树已有 20 多年的历史，是中国最大的种植桉树的省区。从广西科研单位 20 多年研究成果和众多林场、斯道拉恩索、金光集团、日本王子，及至农民多年的实践看，大面积桉树种植并不会引起环境生态恶化，只要科学造林，将能建成青山绿水、鸟语花香、与人和谐的生态环境。总结我们的经验，主要有以下六个方面的体会：

Planting eucalyptus as introduced species has a history more than one hundred years. Eucalyptus planting has been conducted in 17 provinces with more than 200 species, and the area of man-made plantation has reached 1 million ha, which ranks the 2nd top of eucalyptus planting in the world to Brazil. The breeding and planting of the fast-grow eucalyptus in Guangxi has a history of 20 years, which runs as the biggest eucalyptus province in China. Judging from the joint research results which are obtained by research institutes and forest farms of Guangxi, Stora Enso, App, Oji and many farmers, planting eucalyptus in large scale will not arouse deterioration of the ecological environment and planting eucalyptus under scientific instructions will build up a environment with pleasent nature surroundings and the harmonized ecology of human beings. The following 6 aspects are summarized from our experiences:

（一）林地清理、整地对水土流失的影响

The impacts of erosion from site cleaning and site preparation

在林地清理、整地过程中，特别是在坡度较大（15 度以上）的地区，地表失去植被覆盖，会产生一定的水土流失。但严格按速生林营造的环保规程，采用沿等高线带状整地挖穴种植或块状整地，带间保留生草地，可以防止水土流失，植被恢复也很快（1—3 个月时间的草本层就能恢复），项目造林建设不会导致生态环境恶化

The process of site cleaning and site preparation, especially in the steep area (with the steepness more than 15 degree) the coverage of ground vegetation will be lost, which will somehow arouse erosion. If the operations stickly adhere the environmental protection rules of fast-grow afforestation, and site

preparation, digging holes and planting in streap style along the contour line can be applied, and the grasses in between the streaps can be preserved, erosion can be prevented and ground vegetation will be recovered quickly (grasses layer will be recovered in a time period of 1-3three months). In this way, planting operation will not lead to the deterioration of ecological environment.

#### (二) 林道、防火道修建对环境的影响

如果林道、防火道的布设不合理，会对环境产生不良影响。如路面修建得太宽，纵坡坡度大，密度布设不合理，均会产生水土流失破坏环境，导致环境恶化，并降低林地利用率。因此，项目在修建林道时，按路面 2—3m，最大纵坡 13%，密度每公顷≤7m 布设，而且充分利用现有林道。防火隔离带以营建防火林带为主，如必须修建防火道，则其宽度和布设要根据林地的实际情况进行合理布设。故项目修建林道和防火道时不会引起严重水土流失和破坏环境。

#### (三) 施用化肥、农药对环境的影响

长期施用化肥，土壤板结，土质恶化，土壤肥力降低；在地表撒施化肥、农药，会污染水源，污染环境，杀伤有益生物，影响人畜安全。如果在施用化肥时，采用挖施肥沟施放，施后立即覆土，肥料以有机肥和复合肥为主。在病虫害防治时，尽量使用生物药剂或低毒、高效、残留期短的农药。保护措施得当，桉树种植并不会污染水源和环境，不会杀伤有益生物和危害人畜安全。

#### (四) 对生物多样性的影响

##### The influence to the diversity

桉树人工林与天然林没有可比性，科学的做法应该是与大面积的水稻田、甘蔗田、松林、杉林、各类果树等相比。根据东门林场对桉树人工林群落生物多样性的研究结果分析表明，桉树连栽会降低群落的生物多样性，但这并不是桉树树种自身的原因。任何树种只要采取大面积、高强度机耕整地、短轮伐期和多代连栽，都将会导致物种多样性的减少。这是农业和林业生产上早已证实了的客观规律。如果原料林种植能够充分考虑桉树、相思树的块状混交，尽可能营造和保护各类生物适生的森林生态环境，对生物多样性的影响可以降低到较低的程度。在广西营造的桉树林中，现实情况是林下的灌木和杂草等植被生长茂盛，生物多样性仍很丰富，并不是“寸草不生”。桉树不是其他生物的克生树种。

Planted eucalyptus and natural forest is not comparable. More scientific way is to compare with large area paddy, sugarcane, pine trees, fir trees and other fruit trees. According to the result of Guangxi State-owned Dongmen Forest Farm's research on biodiversity of eucalyptus, after several rotation of eucalyptus growing, the biodiversity of the land will become worse. But that is not because of the eucalyptus species itself. Any type of species will cause the biodiversity problem if planted in a large scale and heavily machinery site preparation, short rotation and continually planting eucalyptus. If the fiber base can consider the mixture of eucalyptus and acacia, and try the best to protect the ecological environment wich are suitable for all plants and animals to live in, the influence of the biodiversity could be minimized. In pratical, the eucalyptus plantation is full of all types of bushes and grass, it is not like it is said "without any grass". Eucalyptus does not damage the other plants.

#### (五) 对林地地力的影响

##### The influence to the fertility of the land

桉树生长快，对土壤肥力消耗较大，如果采取机耕全垦整地、多代连栽或把地表上的植被物和枯枝落叶全部收集取走或不施肥，会引起林地地力衰退。但是，林地肥力消耗是可逆的，只要采取适当的措施，如轮栽、树种混交、增加施肥量、保留林地上的植被物和枯枝落叶等以增加有机质，林地的肥力不但不会下降，而且还可以恢复和提高，桉树并不是“抽肥机”。

Eucalyptus grows very fast. It consumes a lot of nutrient of the soil. If overall ploughing method is used for site preparation, after several rotations, and if the other plants and the falling leaves on the ground is cleaned, or no fertilization, the soil will become poor. But on the other hand, if the proper treatments is

used, like mixture of the pieces, increasing the amount of the fertilizer, keeping the other plants and the falling leaves on the ground, it is good to increase the organic to the soil and the fertility of the soil will not become worse, but can be recovered and better. Eucalyptus is not a water pump.

#### (六) 对水源的影响

##### The influence to the water resource

桉树因其速生性，确实需要消耗大量的水分和养分。但据测定，桉树的蒸腾率和单株叶面积都比不上其他阔叶树高，每生产单位生物量所消耗的水分和养分都比其他阔叶树低。广西年降雨量 1500 毫米，南部地区降雨量更高，甚至达 3000 毫米，充沛的降水不仅给桉树生长供水，而且地下水也有充足的来源。桉树不但不像是“抽水机”那样将地下水位下降，相反还有涵养水源的作用。

科研和实践表明，桉树是适宜发展的环保树种，科学种植桉树，生态效益是良好的，发展桉树种植不会对环境产生危害，相反由于桉树的速生性，它承载了人民日益增长的木材需求量，减少了对其他树种木材的需求和采伐，间接地保护了其他林种，有利于改善生态环境。

Because the eucalyptus is a fast-growing species, it does consume a lot of water and nutrient. But according to the data, the rate of transpiration and number of the leaf per tree, as well as the consumption of water and nutrient for increasing the unit growth are less than the others broad leaf trees. In Guangxi the average raining fall is 1500 mm per year. In south of China it even can reach 3000 mm. The abundant rain fall not only provides water for eucalyptus, and also makes enough water resource for underground water. Eucalyptus is not a water pump that makes the water level drop down, on the contrary side, it is good for the water containing.

The research and the practice show that eucalyptus is suitable species for the development. If eucalyptus is planted in a scientific way, it has good ecological effect and will not have bad impact on the environment. In fact the due to the fast-growing character of the eucalyptus, it meet people's growing need of timber and decreases the need and the harvesting of other species timber, protecting the others species and good the ecological environment.

#### 三、政府部门对速生桉发展的引导和监管

##### The guide and management of fast-growing eucalyptus of the government

正如大面积种植其他作物和林木一样，大面积营造速生桉林并不是一点问题都没有，任何事物都不可能十全十美。因此，政府部门有责任引导和监管好人工桉树林的发展。一是依法行政，坚决不允许在生态林、水源林等区域发展人工桉树林；二是制定好规划，科学布局人工桉树林；三是坚持对大型人工林造林项目实行技术方案可行性评估和环境影响评估制度；四是鼓励科研机构和造林企业开展优化种植规程、优化树种、优化采伐方式等系列科研活动；五是加强水土流失、病虫害防治，生物多样性等方面的监管，及时发现问题及时纠正。我们相信，在政府、企业、农民的互动和合作下，速生丰产桉种植事业一定能顺利和可持续发展。

The same as other plants, if planted in large scale, to plant eucalyptus of large are do have some problems. Nothing is perfect. Therefore, the government has the responsibility to guide and supervise the development of planted eucalyptus. One way is to carry out the policy according to laws. It is absolutely not allowed to plant in ecological forest area and water resource forest area. The second way is to make a plan of how to have a scientific layout of planted eucalyptus; The third way is to carry out the feasibility study and EIA policy to big forestry project; The fourth way is to encourage the scientific research organizations and forestry companies to research how to optimize planting technology standard, species, harvesting method, etc. The fifth way is to strengthen the management of soil erosion, diseases prevention and biodiversity, finding the problem and correct it in

time. We believe the communication and the cooperation between government, enterprises and the farmers, fast-growing eucalyptus business will develop smoothly and will be sustainable.