



# Thailand's Policy to Promote **Bioplastics**

By

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**InnoBioplast 2006**

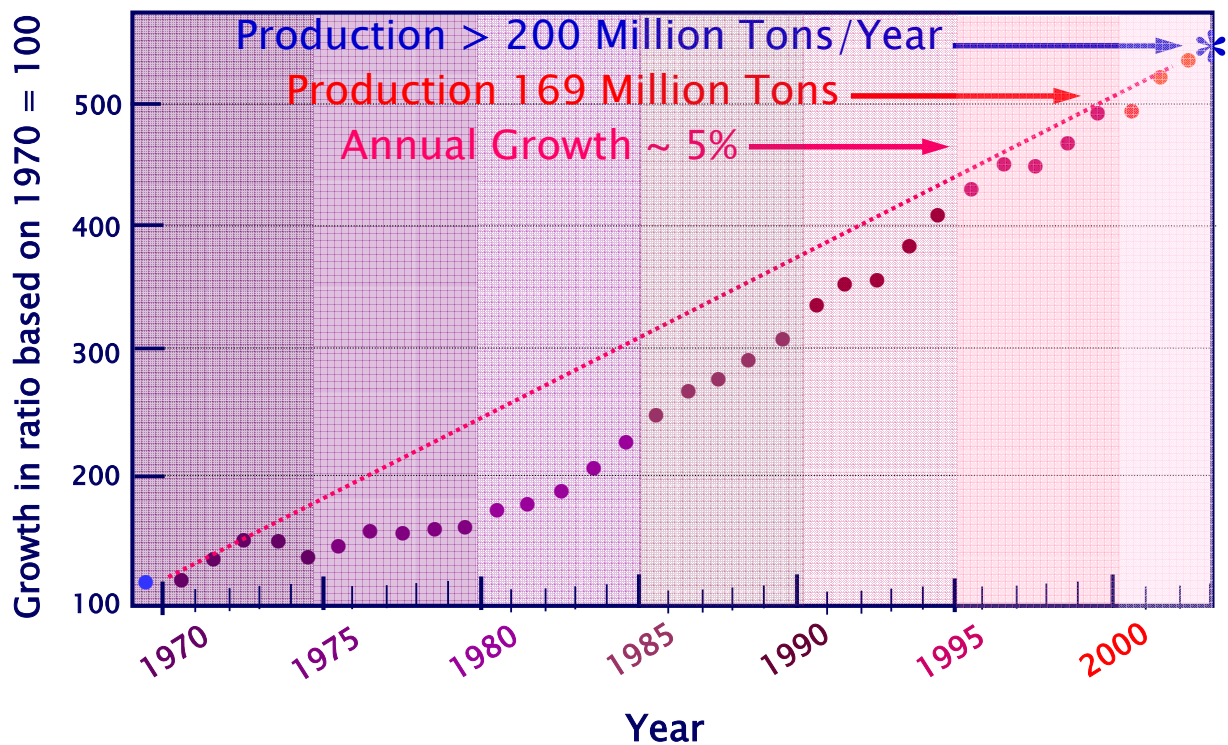
21 September 2006, 11.30–12.00 a.m.  
at Siam Paragon, Bangkok

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## The Growth of Plastics Consumption

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# World Plastics Production



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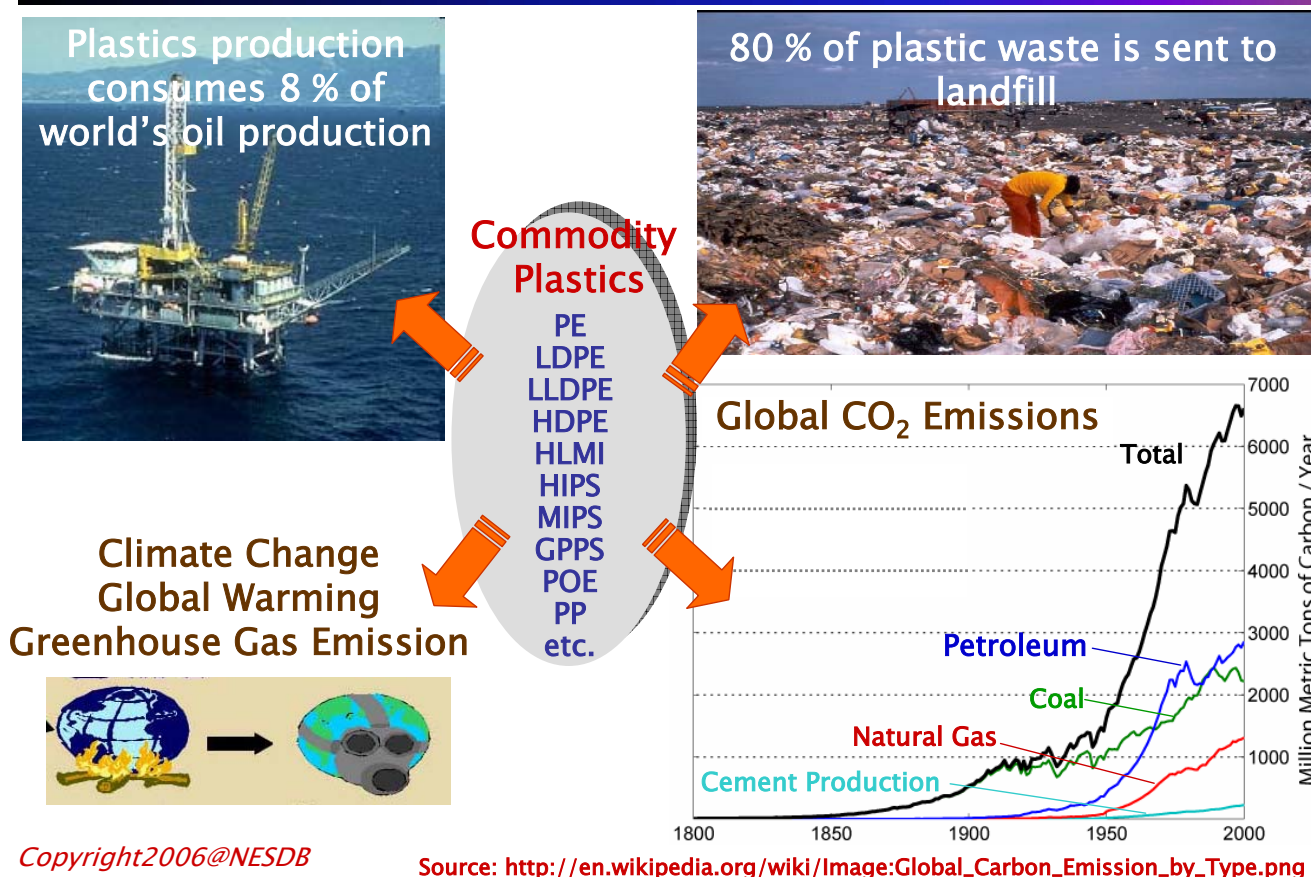
Source: Plastics Europe 2002&2003

## The Need for Change and the Challenges Involved:

From Commodity Plastics to Biodegradable Plastics

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# Commodity Plastics and the Environment <sup>5</sup>



## Biodegradable Plastic Products <sup>6</sup>

### PLA Applications

#### Service-ware



#### Bottles



#### Flexible & Films



#### Rigid Containers



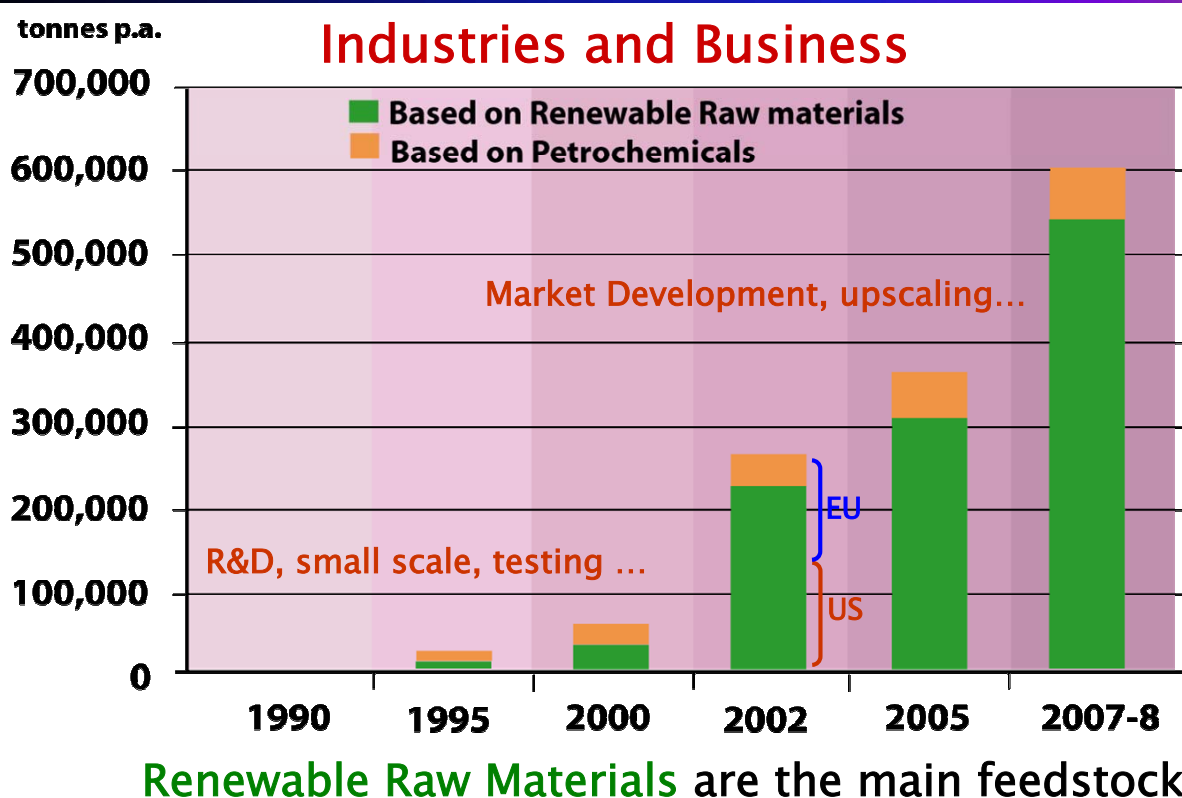
### PHA Applications



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Source: NatureWorks LLC, Metabolix, Inc.

# Current Status of Biodegradable Plastics <sup>7</sup>



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Source: PlasticsEurope 2002&2003

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## Future Direction for Biodegradable Plastics in Thailand:

### The New Wave Industries

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# Thailand's Strengths for Biodegradable Plastics

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## Thai Government

Recognize the **need** for biodegradable plastics and the **potential** for Rapid Growth



### Global Movement

- International Environmental Regulations on Plastic Products
- Current Industrial Technologies
- Price Competitiveness
- Role of Biomass Rich Country
- New Line of Industries and Business



### Thailand's Strengths

- Biomass Rich Country
- Strong Plastics Industries
- Active Research in the Area
- International Alliances
- Supportive Governmental Policies



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## Thailand's Strengths:

### Biomass Rich Country

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# Possible Biomass Sources in Thailand

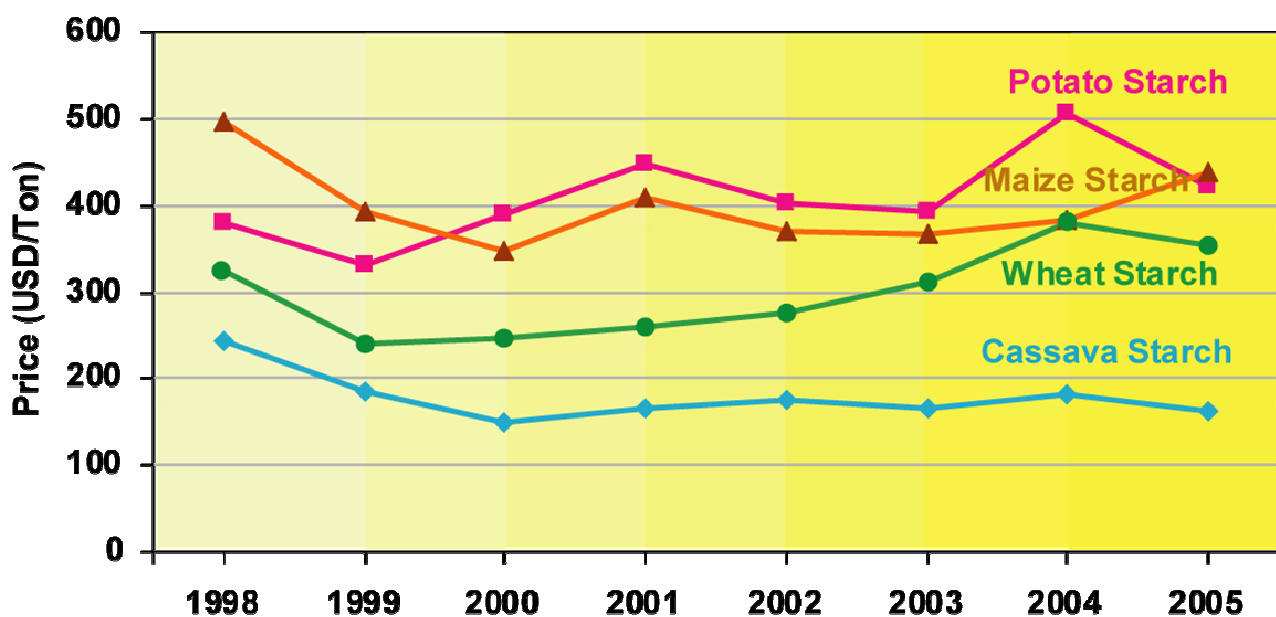
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## Competitiveness of Cassava Price

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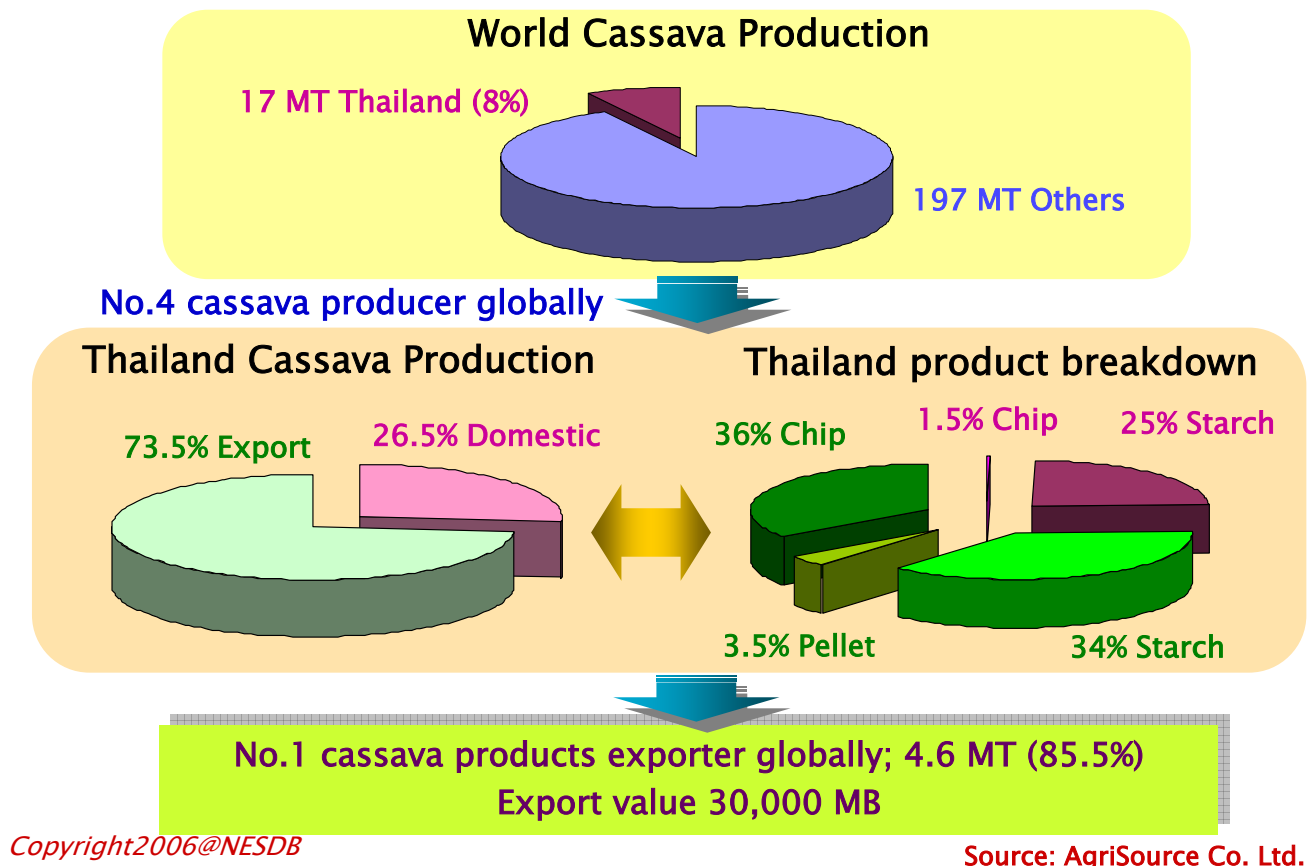
**Cassava starch** is the most competitively priced raw material

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Source: AgriSource Co. Ltd.

# Thailand's Biomass Candidate: Cassava

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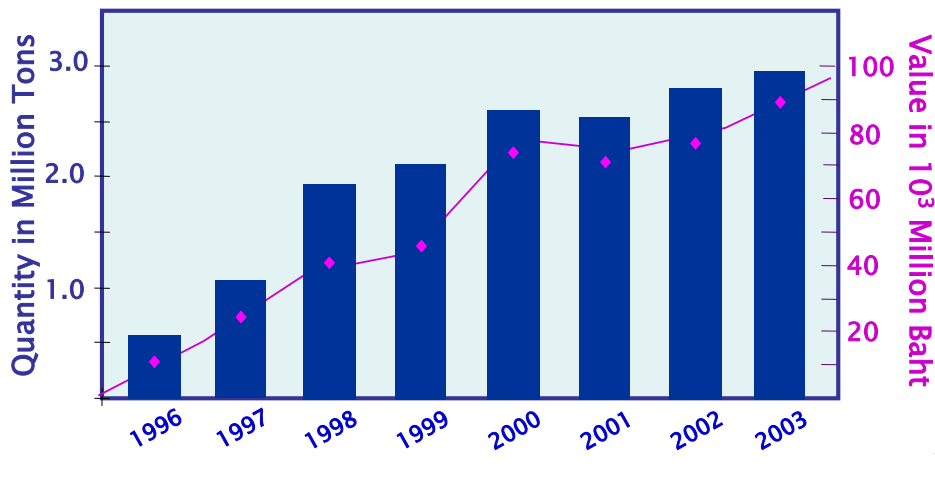
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## Thailand's Strengths:

**Strong Plastic Industry**

# Thailand's Plastics Business

## Thailand Export Capability and Economic Value



### Records:

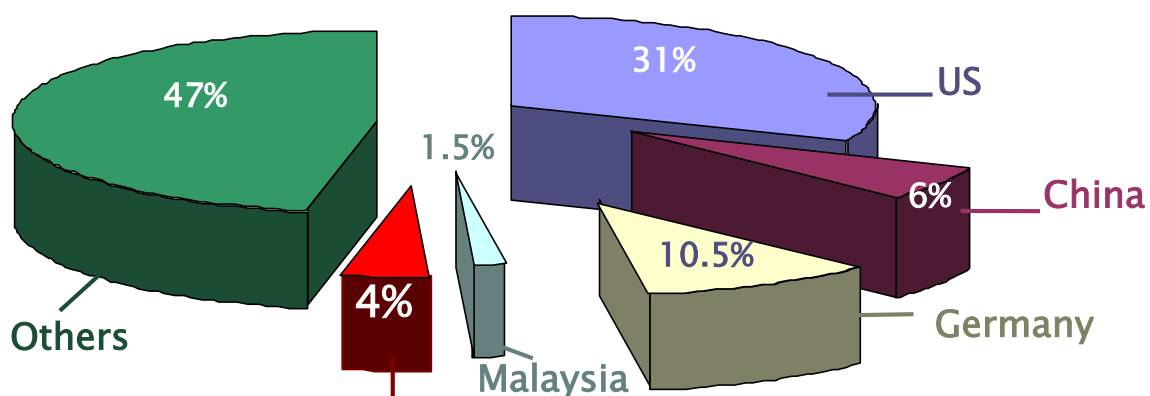
- Market value grew **9 fold** in the eight years (1996–2003)
- Production quantities grew **5 fold** in the same period
  - Provides **>300,000** jobs
- Total Market Value (Export and Local) **>200,000 MB**

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Source: The Federation of Thai Industries, Plastic Industry Club

## Thailand in the World Plastics Industry<sup>16</sup>

### Global Market Share



### Thailand

#### Resin Industries

- No. 1 in Asia and No. 8 Globally
- Number of Factories: 30
- Production Capacity 6.5 MT
- 40% Export (2.5 MT, 90,000 MB)
- 60% Local (4 MT)

#### Production Industries

- No. 1 in Asia
- Number of Factories: 4,100
- Production Capacity 4 MT (160,000 MB)

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Source: The Federation of Thai Industries, Plastic Industry Club



## Thailand's Strengths:

### Active Research in the Area

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## Active Research

Processes	Upstream	Intermediate	Downstream
Key Technologies	Plant breeding/transformation Post-harvest/Plant processing Fermentation Bioseparation	Polymerization Biotransformation	Compounding Processing
Research Organizations	Universities		
	Burapha, Chiang Mai, Chulalongkorn, Kasetsart, Khon Kaen, KMUTT, Mae Fah Luang, Mahidol, Naresuan, Prince of Songkla, Rajamangala, Srinakharinwirot, Suranaree		
	Institutes and Centers		
	KMITL, KMITNB, National Metal and Materials Technology Center (MTEC), National Center for Genetic Engineering and Biotechnology (BIOTEC)		
Leading Researchers		> 100	Students > 400

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## Thailand's Strengths:

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### International Alliances

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## International Alliances

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### Active Alliances



Gesellschaft für Technische Zusammenarbeit  
(Germany)

### Future Alliances



Biodegradable Plastics Society  
(Japan)



Biodegradable Products Institute  
(USA)

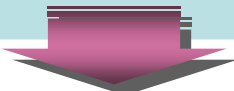
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## Thailand's Strengths:

### Supportive Governmental Policy

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## Supportive Governmental Policy

Current Policy
<ul style="list-style-type: none"> <li>Policy objectives concerning future utilization</li> <li>Legislation to promote bio-refinery and biotechnology</li> <li>Tax legislation e.g. corporate income tax, custom tax, environmental tax, investment support</li> <li>Preferential treatment of products in public procurement programs</li> <li>Creation of community recovery systems for biowaste</li> <li>Provision of equity and venture capital to small and medium-sized businesses</li> <li>Government R&amp;D programs for the co-financing of industry and university projects</li> <li>Activities related to communication and market introduction</li> </ul>
Governmental and Private Organizations
<ul style="list-style-type: none"> <li>NIA, BOI, SMEs, TEI, TBS, TPIA</li> </ul>

<p><b>Promote Biodegradable Plastics rather than discriminate against conventional plastics</b></p>

# Industrial Restructuring Project

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## Biodegradable Plastics as a New Wave Industry

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# Industrial Restructuring Project

## Biodegradable Plastics as New Wave Industry

Industrial Restructuring Committee



National Economic and Social  
Development Board (NESDB) :  
Policy and Strategy



National Innovation Agency, The Ministry of Science and Technology  
Develop a Roadmap for  
Biodegradable Plastics as a New Wave Industry

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# Policy to Promote Bioplastics

## Biodegradable Plastics Roadmap 2006–2021 (15 Years)

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## Biodegradable Plastics Roadmap: Vision for 15 Years

### Biodegradable Plastics Roadmap for 15 Years (2006–2021)

#### Ultimate Goal

One of Regional Leaders in Biodegradable Plastics Industries

#### Vision for the Biodegradable Plastics Industry and Business in Thailand

2006	2011	2016	2021
<i>Phase I</i>	<i>Phase II</i>	<i>Phase III</i>	
<b>Vision</b>	<b>Vision</b>	<b>Vision</b>	
Development of biodegradable plastics as a New Wave Industry is accelerated	Technology and cooperation are developed and biodegradable plastics becomes a major industry	Thai biodegradable plastics business becomes competitive on global scale	

## Vision, Goal, and Budget



### Prospect

**Biodegradable plastics** will be one of the main domestic industries and businesses

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## Strategy 1 Sufficient Supply of Raw materials

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### Aim

- To ensure sufficient and continuous supply of agricultural raw materials

Action Plans	Organizations
<ul style="list-style-type: none"> <li>Strain and productivity improvement of raw materials                             <ul style="list-style-type: none"> <li>Formulate and implement agricultural development policies and plans</li> <li>Support and develop agricultural research</li> </ul> </li> <li>Create pioneer farming zones to maximize productivity and efficient supply to industry</li> <li>Transfer necessary agricultural knowledge and technology to farmers</li> <li>Provide suitable agricultural inputs (equipment, fertilizer, etc.)</li> <li>Manage supply of raw material in sufficient quantities to meet industrial demand</li> </ul>	<ol style="list-style-type: none"> <li>Ministry of Agriculture and Cooperatives</li> <li>Ministry of Industry</li> <li>Ministry of Finance</li> <li>Ministry of Science and Technology</li> <li>Ministry of Education</li> <li>Ministry of Commerce</li> <li>National Research Council of Thailand, Thailand Research Fund</li> <li>Thai Tapioca Development Institute</li> </ol>

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## Strategy 2 Technology Development and Cooperation <sup>29</sup>

### Aims

- To obtain necessary technologies for upstream, intermediate and downstream processes
- To develop innovative technologies for upstream, intermediate and downstream processes
- To create intellectual property with value in the commercial market

Action Plans	Organizations
<ul style="list-style-type: none"> <li>■ Study feasibility of technology, industry and business</li> <li>■ Support industry to license necessary technology technologies</li> <li>■ Support knowledge transfer to private sector to create skilled workforce</li> <li>■ Build strong research community                             <ul style="list-style-type: none"> <li>■ Set priorities and targets for research</li> <li>■ Develop integrated strategic research and process engineering</li> <li>■ Collaborations between researchers and industry</li> <li>■ Ensure efficient transfer of technology to industry</li> </ul> </li> <li>■ Create biodegradable plastics research and technology database</li> <li>■ Support filing of intellectual property developed</li> </ul>	<ol style="list-style-type: none"> <li>1. Ministry of Science and Technology</li> <li>2. Ministry of Education</li> <li>3. National Research Council of Thailand</li> <li>4. Thailand Research Fund</li> <li>5. Ministry of Industry</li> <li>6. Ministry of Commerce</li> </ol>

## Strategy 3 Innovation of Industry and Business <sup>30</sup>

### Aims

- To establish plants for upstream, intermediate and downstream industries
- To obtain investment in biodegradable plastic industries and businesses
- To develop domestic and foreign markets for biodegradable polymer resins and products

Action Plans	Organizations
<ul style="list-style-type: none"> <li>■ Support joint ventures between Thai and foreign manufacturers for the establishment of plants for upstream and intermediate industries</li> <li>■ Support Thai downstream manufacturers to expand their businesses into the area of biodegradable plastics</li> <li>■ Support establishment of biodegradable plastics industrial estate</li> <li>■ Create industrial and business information center</li> <li>■ Promote biodegradable plastics products to the public                             <ul style="list-style-type: none"> <li>■ Promote through media advertisements, exhibitions, etc.</li> <li>■ Support manufacturers to exhibit at domestic and foreign Product Expos</li> </ul> </li> <li>■ Support establishment of Thai Bioplastics Society</li> </ul>	<ol style="list-style-type: none"> <li>1. Ministry of Science and Technology</li> <li>2. Ministry of Industry</li> <li>3. Ministry of Commerce</li> <li>4. Foreign Organization (GTZ)</li> </ol>

## Strategy 4 Establishment of Supportive Infrastructure <sup>31</sup>

### Aims

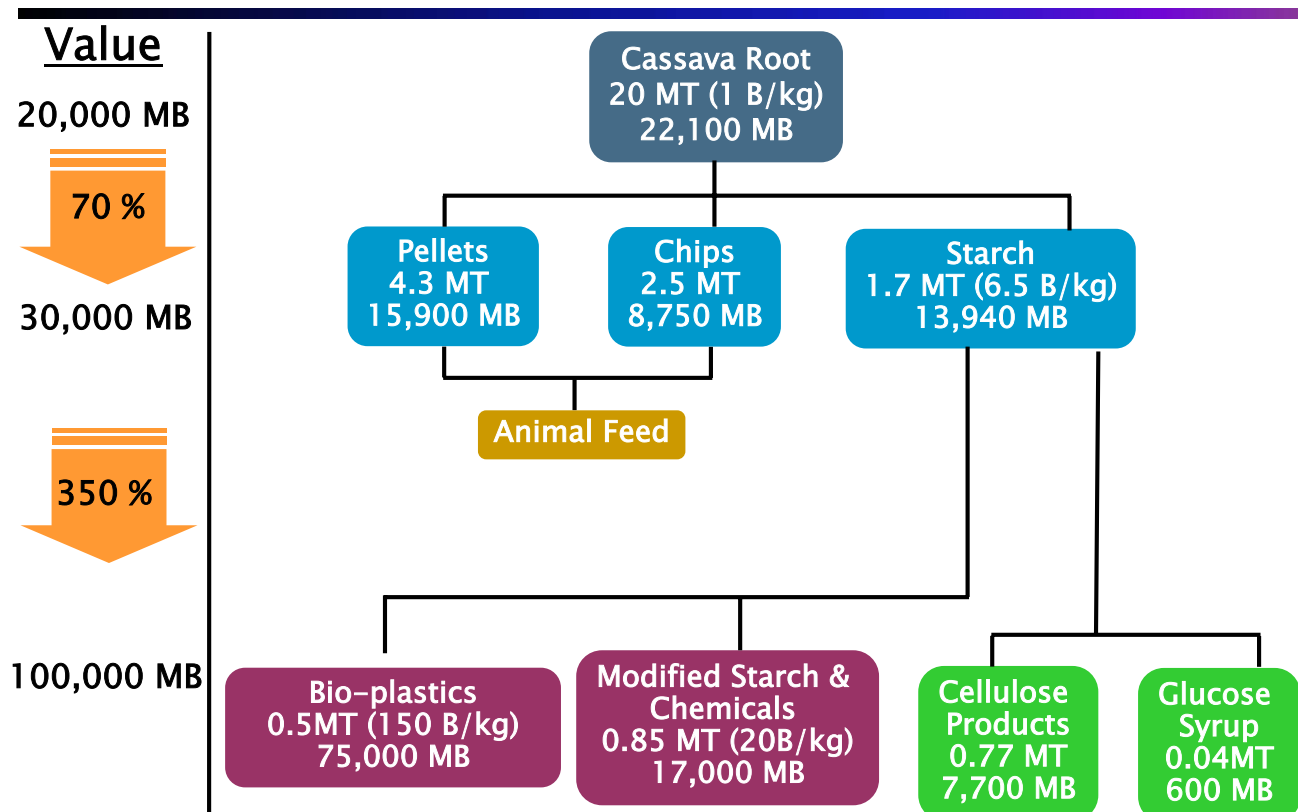
- To have policies for the establishment of biodegradable plastics industry and business
- To have policies for environmental protection
- To have biodegradation standards and test centers

Action Plans	Organizations
<ul style="list-style-type: none"> <li>■ Reviewing and revising the law and regulation that can be barrier to private sector for establishment of biodegradable plastics industry</li> </ul>	1. Ministry of Science and Technology
<ul style="list-style-type: none"> <li>■ Promoting and stimulating demand for biodegradable plastics such as in packing, electronics appliances, automobile and so on,</li> </ul>	2. Ministry of Industry
<ul style="list-style-type: none"> <li>■ Enhanceing awareness of biodegradable plastics contribution to environment protection such as exhibitions and campaigns</li> </ul>	3. Ministry of Education
<ul style="list-style-type: none"> <li>■ Establishing biodegradable standards and test centers</li> </ul>	4. Ministry of Resources and Environment
	5. Ministry of Finance
	6. Ministry of Commerce
	7. Ministry of Interior
	8. Ministry of Public Health
	9. Ministry of Transport
	10. Thailand Environment Institute
	11. Private Sector (Thai Bioplastics Society, Thai Airways)
	12. Foreign Organization (GTZ)

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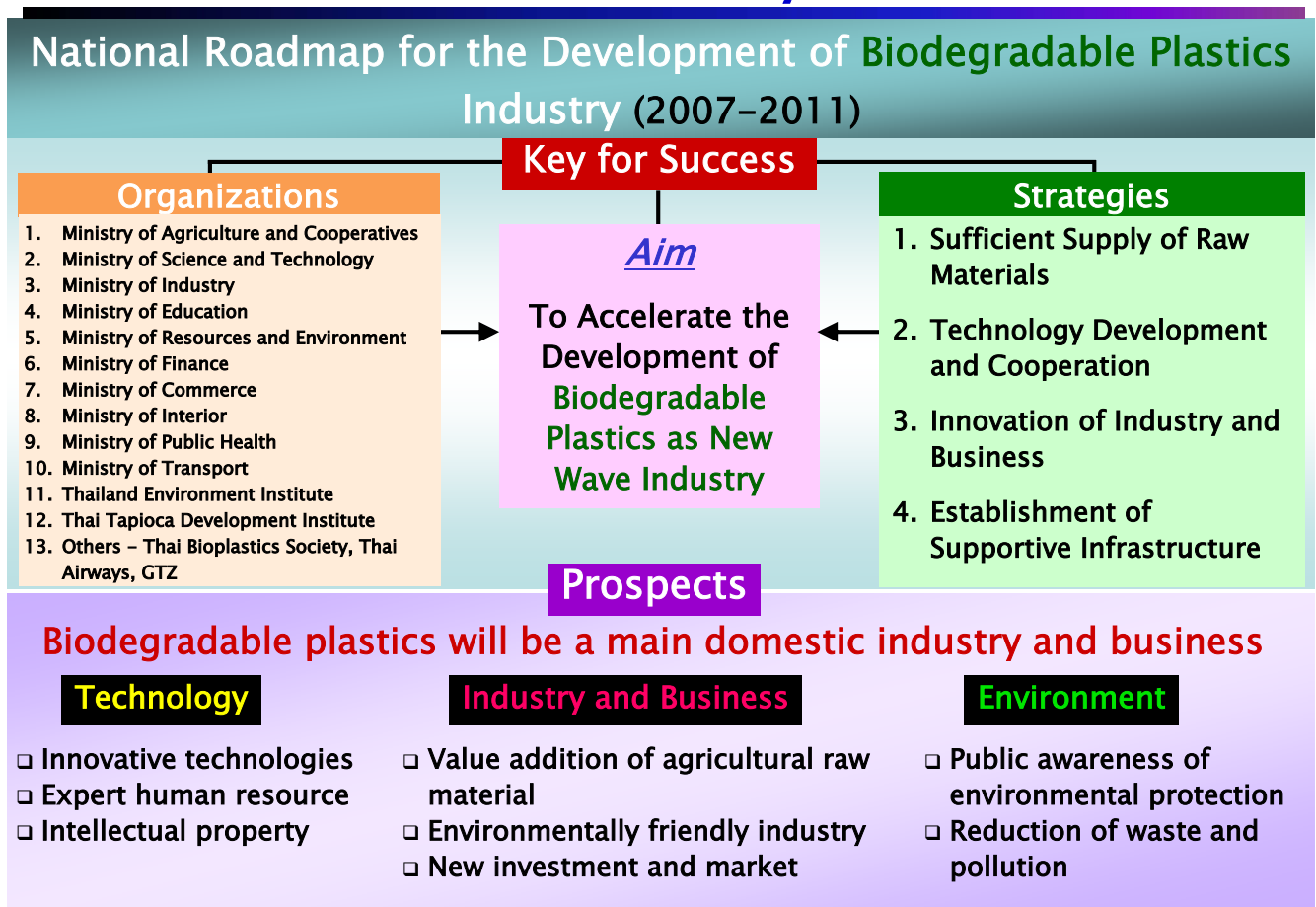
## Value Chain of Cassava

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Source: Strategic Plan for Agricultural and Agro-industry Research According to National Research Agenda during Economic Crisis for Country Development, Kasetsart University, April, 2000



## Thank you

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