

The supply chain of bamboo industry and fully utilization of bamboo materials – A Revolution brought by primary processing factories

竹产业产业链及全竹利用 – 初加工厂为竹子工业带来革命性的变革

- ▶ Zhu Zhaohua竺肇华, INBAR
- ▶ Jin Wei金薇, INBAR



PART I

Challenges of the bamboo industry in China

1. Challenges of the Bamboo Industry in China (1)

中国竹产业所面临的挑战 之一

- ▶ The improvement in industrial processing technologies increases the utilization rate of raw materials

竹材原料利用有待提高

Great challenges is posed on the efficient utilization of raw materials, if only one product is produced, for example, bamboo flooring, the utilization rate of the culm is less than 25. The utilization rate of bamboo toothpicks is only 10%.

如果只生产单产品，原料利用率将很低，例如只生产竹地板，利用率少于25%。牙签的利用率不足10%。

1. Challenges of the Bamboo Industry in China (2)

中国竹产业所面临的挑战 之二

- ▶ The price of raw bamboo materials increases

毛竹原料价格上涨

Take Anji County for example:

以安吉县为例：

Year	Price of moso bamboo/ton	
1985	160 RMB	54.4 USD
1992	240 RMB	46.15 USD
1995	400 RMB	47.90 USD
2002	460 RMB	56.09 USD
2005	700 RMB	85.47 USD
2007	810 RMB	112.5 USD
2010	860 RMB	134.37 USD
2012	850 RMB	135.00 USD

1. Challenges of the Bamboo Industry in China (3)

中国竹产业所面临的挑战 之三

- ▶ Raw materials of bamboo becomes short in supply
原料供应紧张

Take Anji county for example:
以安吉县为例：

	2003	2005	2006	2008	2010	2013
Local Moso production 产竹量 (million culms)	20	22	22	23	30	30
Moso consumption 消耗量 (million culms)	49	80	109	120	135	140
Production value (Billion RMB)	4.51	5.31	6.90	10.58	11.75	12.87

工厂门前 堆积的废料



Wasted materials
piled up at the gate
of the factory



Bamboo waste materials pile at the riverside – Vietnam



Wasted bamboo material were burnt - Ecuador

Since the 1990s, independent primary processing factories were established which brought huge changes to bamboo processing industry. The utilization of rate of raw materials was greatly improved and brought revolutionary changes to the whole industry, the supply chain was grammatically extended.

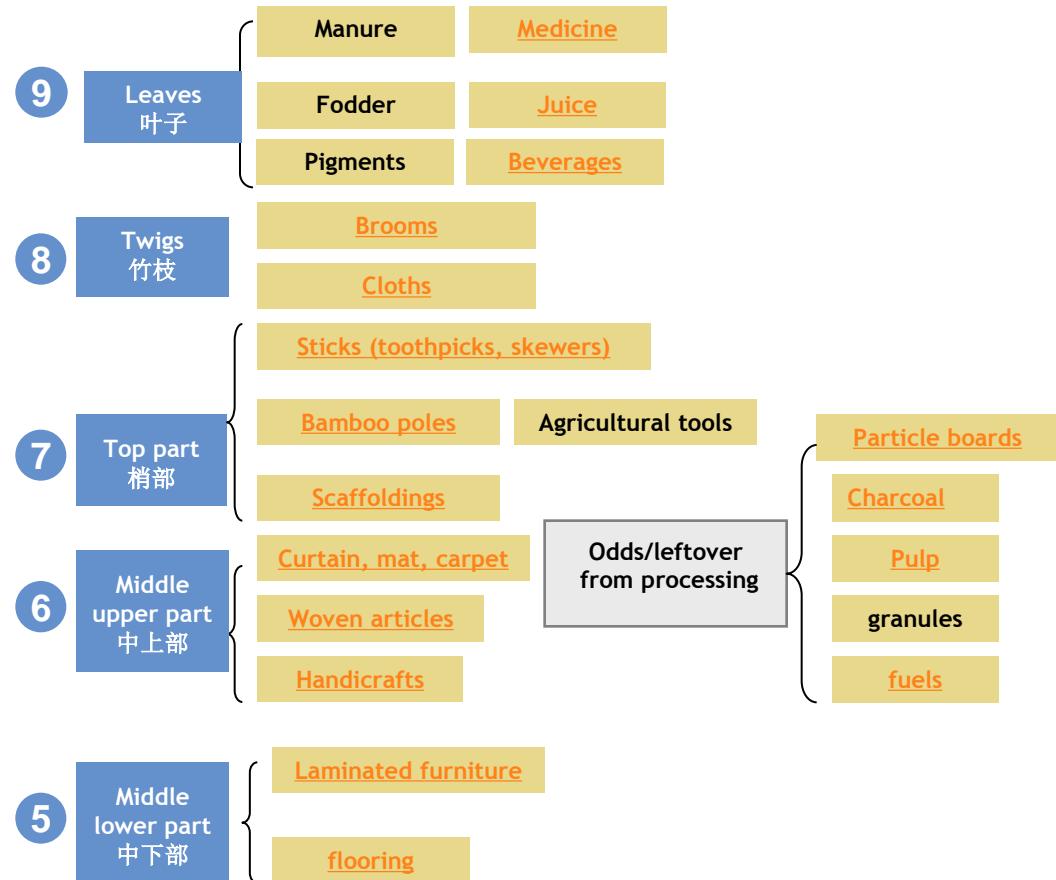
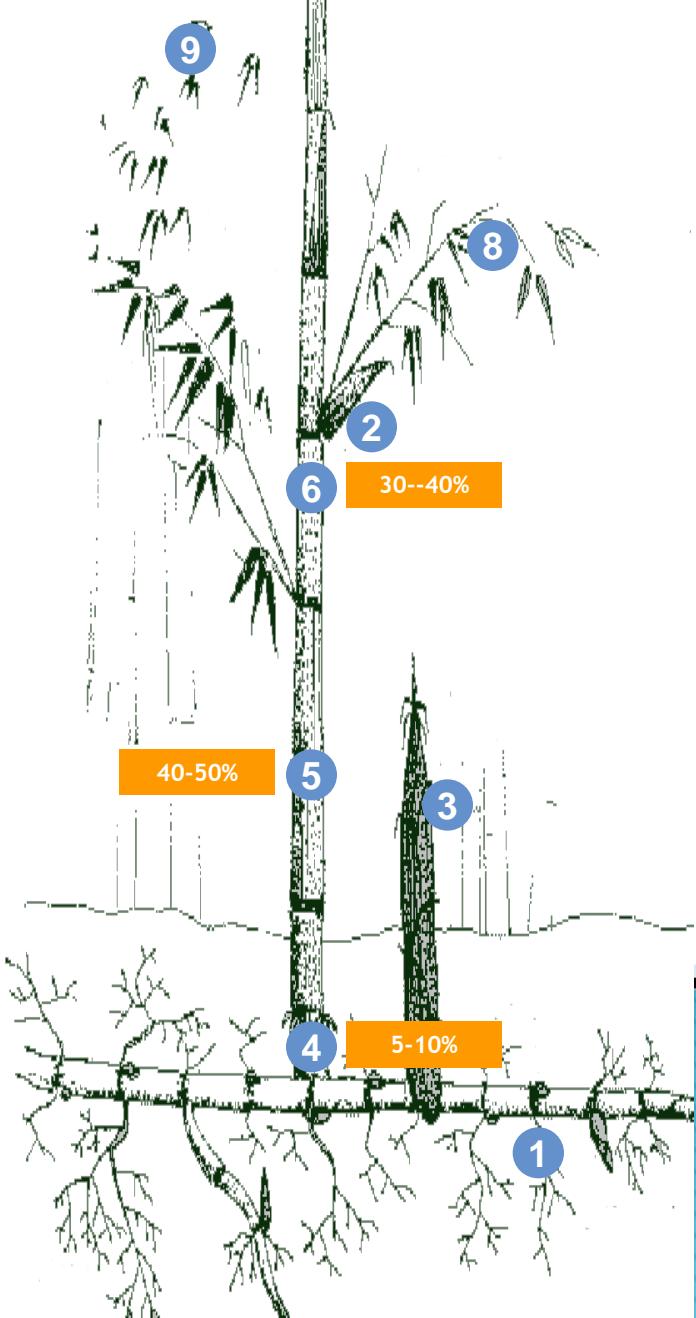


» PART II
Supply Chain of Bamboo
Industry

7

5-10%

2. 1 The utilization of different parts of bamboo (不同部分竹原料的利用)



4	Base part	Charcoal 竹基部 (竹浦头)
3	Shoots	Vegetable 筍
2	Sheaths	Handicrafts 筍壳
1	Rhizome & roots	Handicrafts, brushes 竹鞭

2.2 Primary processing factory – key of the supply-chain of the bamboo processing industry 粗加工厂——竹加工产业链的关键



原竹进入加工厂后，把竹杆按不同部位，分成不同部分进行初加工。粗加工厂虽然不生产成品，但它成为各企业相互依赖和提高效益的纽带。

The bamboo culm was cut into several sections, each section is used for specific products. The primary processing factory has become a key chain on the whole supply-chain of the industry, where different factories rely on each other to reduce costs, and raise profits.

2.3 The utilization of the base part (浦头)

The best material for charcoal and carving

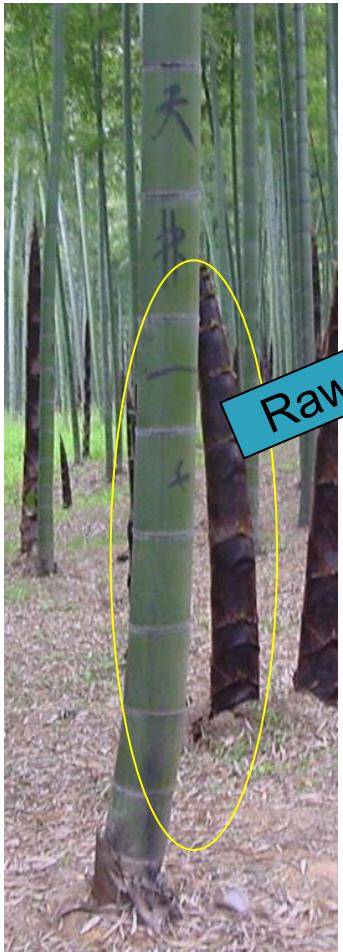
bamboo



2.4 Middle Lower Part (中下部)

bamboo

The best material for flooring and furniture panels



Splitting



Floor strips



Final floor product



2.4 Middle lower part (中下部)

bamboo



Hot press

热压



Bending

弯曲



Furniture

家具

2.5 Middle Upper part (中上部)

bamboo

The best material for curtain/mats/carpets, and woven products



Raw cutting



Slicing

拉丝

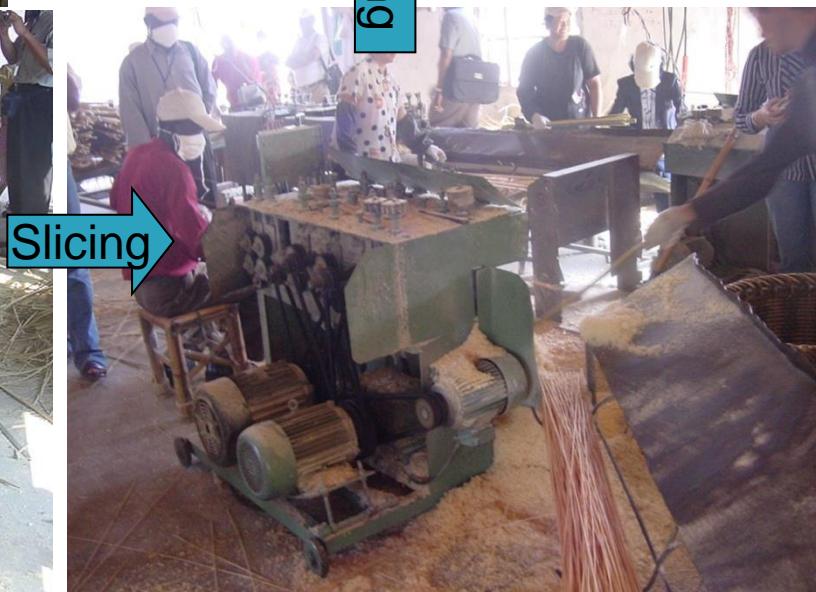


Slicing



Picking

分级





Green part

青丝



Yellow part

黄丝



bamboo

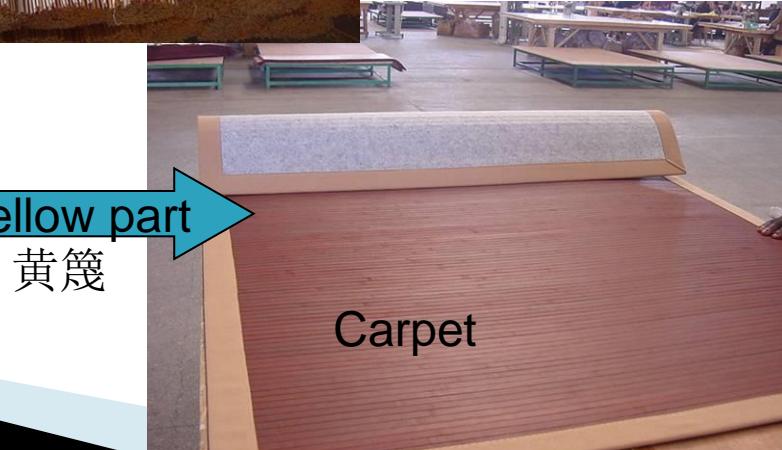


Curtain/mat



Yellow part

黄篾



Carpet

Cement molding board



2.5 Middle upper part (中上部)



Manual slicing
破篾



weaving
編織

編織



bamboo

Handicrafts

Final products
成品



2.5 Middle upper part (中上部)



Manual slicing

破篾



Weaving handicrafts

编织



bamboo

2.6 Top part (梢部)

The best material for scaffolding, sticks and fences



sticks



Top part



Hand slitting

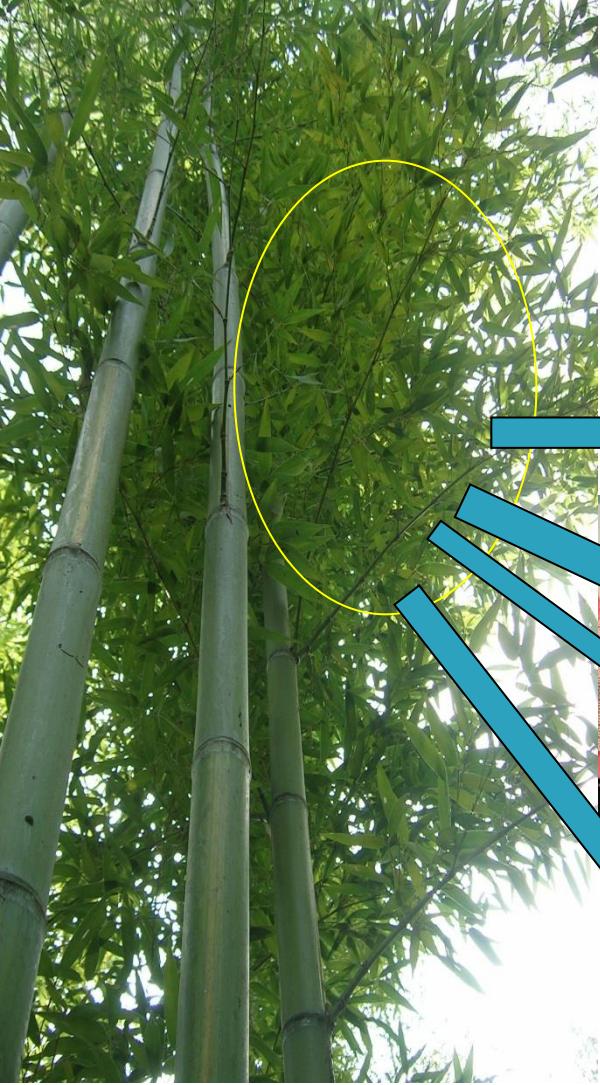


Footplate for scaffoldings



bamboo

2.7 Other parts beside the bamboo culm - full utilization of the bamboo biomass



Bamboo tips/twigs

竹枝

The best material for brooms

Bamboo leaves (竹叶)

Bamboo leaves are good materials for covering shoots and for medicine (flavonoid) and other health products

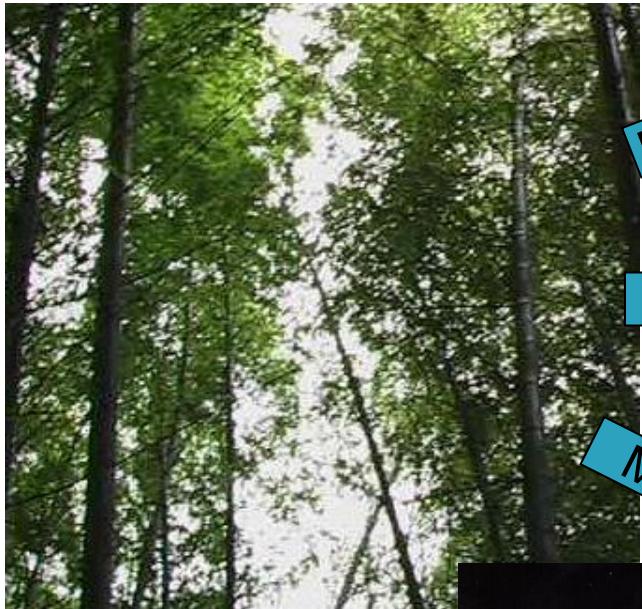


bamboo



Extracts of bamboo leaves- Flavone products

提取黄酮



Bio-chemical

Beverages

Medicines

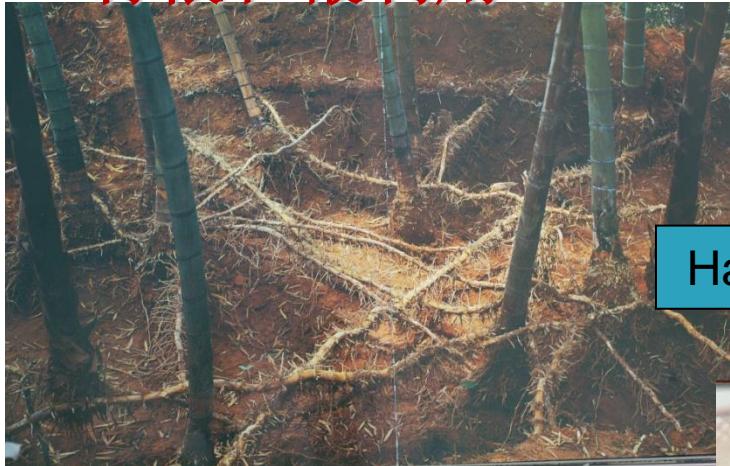


bamboo

Bamboo roots and rhizomes utilization

Good materials for handicrafts

竹根和鞭利用



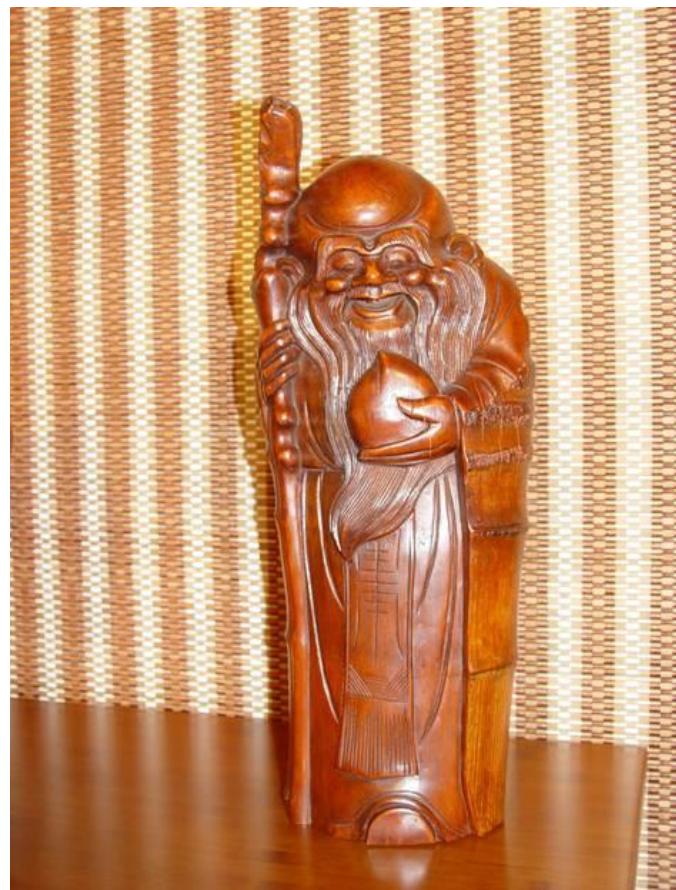
Handicrafts



brushes



Root part 竹根 – bamboo carving handicrafts (竹雕工艺品)



2.8 Utilization of the whole culm



bamboo

Bamboo Poles processing (竹竿)



Pressed Bamboo materials



Bamboo Fiber



2.9 Utilization of residues

bamboo



Wasted materials

Bamboo sawdust (竹屑)

[bamboo](#)

Good material for particle board, charcoal and biomass-energy pellets



Bamboo powder (竹粉)

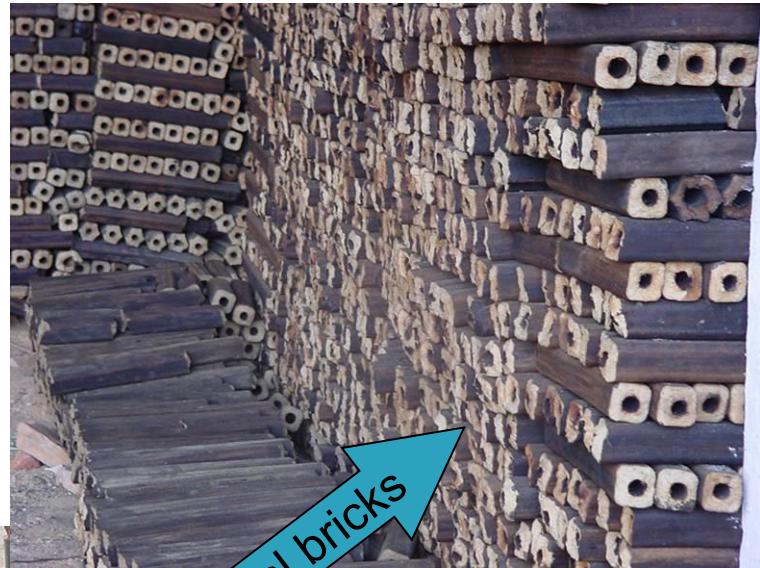


Transportation



Charcoal bricks

碳棒



Bamboo sawdust (竹屑)



Granules (by fuel)



Bamboo chips (废竹丝)





Wasted particles for fuel

Bamboo particles bamboo (竹屑)

Good material for fuel



Wasted parts of bamboo culm 加工剩的废料



Good material for
handicrafts/toys/disposable
food containers, etc..



bamboo

2.10 Bamboo shoot utilization 竹筍利用 bamboo

Bamboo shoot can be boiled and canned, or preserved for fast-food, or fermented, or baked.



Boiled and canned



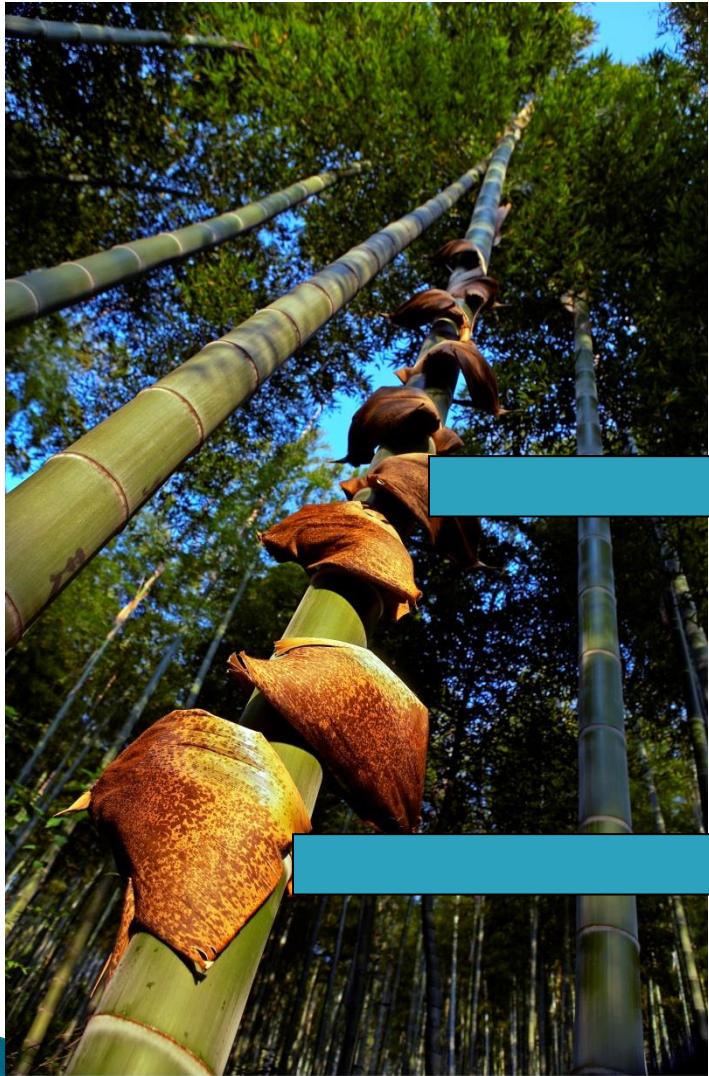
Fast food, leisure food



Bamboo shoot market



2.11 Bamboo sheath utilization 筍壳利用



Good material for fodder, packaging and crafts

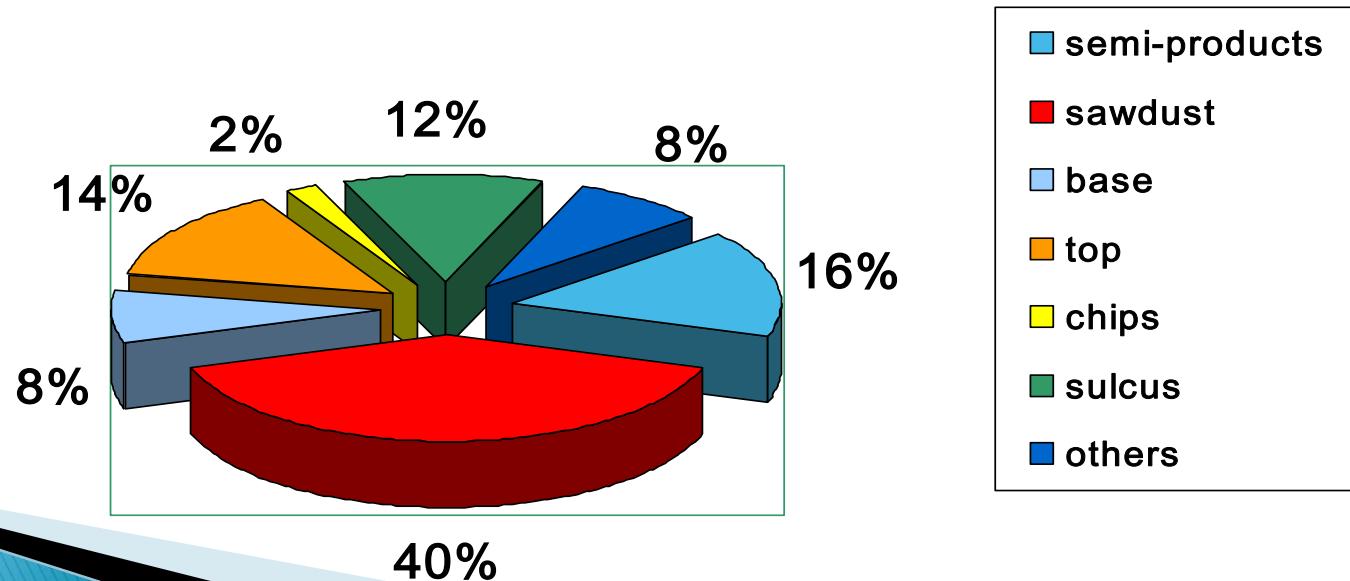


bamboo

3. A Case Study of a Primary Processing Factory (Anji, 2005)

以一个初加工厂为例, 安吉2005年

- ▶ Total raw material per day: 25 tons 每天加工25吨原料
- ▶ Processed into utilization rate 加工利用率



3.1 Utilization rate and price of different parts (Anji, 2005)

加工不同部分的比率和价格 (2005年)

1. **Semi products** : curtain strips, mat strips, carpet strips, flooring strips, toothpick strips: totally 4 tons. In the case of curtain strips: 83334 strips/ton * 0.06RMB = 4999/ton (半成品—16%)
2. **Sawdust**: 10 tons, 60 (**240***) RMB/ton (竹粉—40%)
3. **Base**: 1.8-2.0 tons, 100 (**200***) RMB/ton (浦头—8%)
4. **Top**: 3-4 tons, 300(**400***) RMB/ton (竹梢—12-16%)
5. **Wasted chips**: 0.5 ton, 200 RMB/ton (废丝—2%)
6. **Sulcus (or water way – the part under a branch which is groove)**: 3 tons, 350 (**400***)RMB/ton (流水—12%)
7. **Others**: evaporation and dust, 2 tons (蒸发和灰尘—8%)

*figure updated in year 2008

3.2 Income of the factory

初加工厂的收入分析（2005年）

- ▶ Income:
- ▶ Semi products: 4999 RMB/ton * 4 tons = 19996 RMB
- ▶ Saw dust: 60 RMB/ton * (10tons - 2.5tons) = 450RMB
- ▶ Base: 1.9 tons * 100RMB/ton = 190RMB
- ▶ Chips: 0.5 tons * 200RMB/ton = 100RMB
- ▶ Sulcus: 350RMB/ton * 3 tons = 1050RMB
- ▶ Total: 21785 RMB

3.3 Costs, profits and added-value

成本、利润和增值分析

- Raw material: 700 RMB/ton * 25tons=17500 RMB (原料 25吨)
- Labor: 1400 (工资)
- Insurance: 30 RMB/person/month, 200 RMB/day (保险)
- Fuel: 2.5 tons per day (燃料)
- Depreciation: 66 RMB/day (机器损耗)
- Tax: 425 RMB/day (税收)
- Profit: 2195 RMB per day (每天纯利润)
- The value increase for each tons of raw material is 171.4 RMB, the increase rate is 24.5%.
- 经过初加工，每吨原料增值171.4元，增值24.5%。

Note: Bamboo farmer's income from branches, leaves, top part and sheaths is about 2,500 RMB/he every two years; the income from shoots (winter, spring and rhizome) is about 19,300 RMB per two years (figure in year 2003).

4. Main obstacles in the further development of the bamboo sector

当前阻碍竹产业链继续延伸的主要障碍

- ▶ 4.1 公司间的无序竞争造成企业,特别是生产优质产品的大型企业受到伤害,企业间互相压价造成利润率下降,逐渐降至零和负利润.下面我们可以以竹地板生产为例可以看出问题的严重性:
- ▶ **4.1 The chaotic competition among enterprises brings harms to all businesses, especially harms to large and excellent enterprises, the price competition results in zero or minus profit. The following case of bamboo flooring production shows the seriousness of the problem:**

4.2 Cost of production raised 生产成本增加

Because of the shortage in raw materials and labor, product costs had been increasing, the profitability of bamboo products reduced.

The average costs and price of bamboo floor board for each year (horizontal and vertical pressed)

历年竹地板(平压板和侧压板平均值)生产成本及销售价格比较

Year	Cost of Raw Materials /m ² (RMB)	Cost of product/ m ² (RMB)	FOB (RMB)	Exchange rate with USD
1992-1993	52.1	86.04	250	1:5.5
1995-1998	56.1	92.7	220	1:8.7
2001-2003	59.6	98.43	145	1:8.2
2006-2007	62.5	103.2	110	1:7.5
Present				1:6.8

4.3 Lack of new products of high added-value

缺乏高附加值的新产品

- The development of high-added-value products are comparatively laid back, once a new product is released, the other enterprises may soon follow up, which results in dramatic drop of market price, the competitiveness of the product soon disappears.
- 高附加值的新产品相对滞后，一旦新产品问世,更多其他企业迅速跟进，使该产品市场价格下降，产品竞争力很快消失。
- Presently, products such as bamboo reconstituted boards, fiber boards and bamboo curtain and mats which used to be prospective new products for the markets are facing the above threads. At the same time, as the profit rate of bamboo products are decreasing, the capacity of new product development is also reducing.
- 目前竹重组板、纤维板和竹地毯等，这些曾被市场看好的新产品正在面临上述风险。同时，由于产品利润率下降，新产品开发的能率相应下降。

A dense forest of tall, slender bamboo stalks with green leaves at the top. The bamboo is arranged in a grid-like pattern, creating a sense of depth and texture. The lighting is natural, with the sun filtering through the leaves.

Thank You!