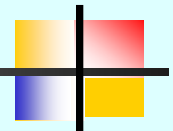


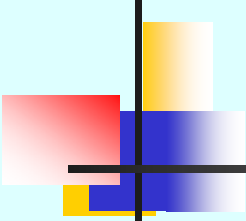
Research on China Forestation Campaign & Green Employment



Research Team: Pan Chenguang, Ke Shuifa, Wang Cuihuai, Wang Canfa

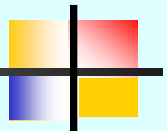
March 2009, Beijing





This study result is based on:

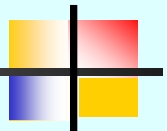
- **Project: *Research on Low-carbon Development & its Impact on Employment*** presided over by researcher Pan Jiahua
- **Sub-project: *Research on Forestation Campaign in Response to Climate Changes & Employment*** presided over by researcher Pan Chenguang





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- 2. Forestation & Green Employment**
- 3. Example of carbon credit forestation in China**
- 4. Forecast on carbon credit forestation potential and employment potential in China**
- 5. Conclusions & Recommendations**



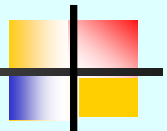


1. Situation of Forestation Campaign in China

1.1 Forestation campaign

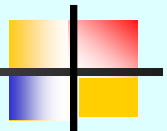
Since the reform and opening up, with the implementation of major forestry eco-system construction projects, forestation works have achieved a great success. According to the 6th National Forest Inventory Investigation, the existing reforestation area in China amounts to 54 million hectares, and the forest stock volume amounts to 1.505 billion m³. China ranks first for its artificial forestation area in the world.

National forest area reaches 174.91 million hectares. Forest coverage in China rose from 13.92% in early 1990s to 18.21% in 2005.



Figures from previous forest investigations

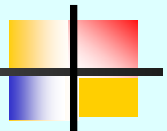
Period of Investigation	Live stumpage (10000 m ³)	Forest Area (10000 hectares)	Forest Stock (10000 m ³)	Forest coverage(%)	Annual growth rate during the investigation period
The first period (1973-1976)	953227.00	12186.00	865579.00	12.7	
The second period (1977-1981)	1026059.88	11527.74	902795.33	12.0	-0.14
The third period (1984~1988)	1057249.86	12465.28	914107.64	12.98	0.196
The fourth period (1989~1993)	1178500.00	13370.35	1013700.00	13.92	0.188
The fifth period (1994~1998)	1248786.39	15894.09	1126659.14	16.55	0.526
The sixth period (1999~2003)	1361810.00	17490.92	1245584.58	18.21	0.332



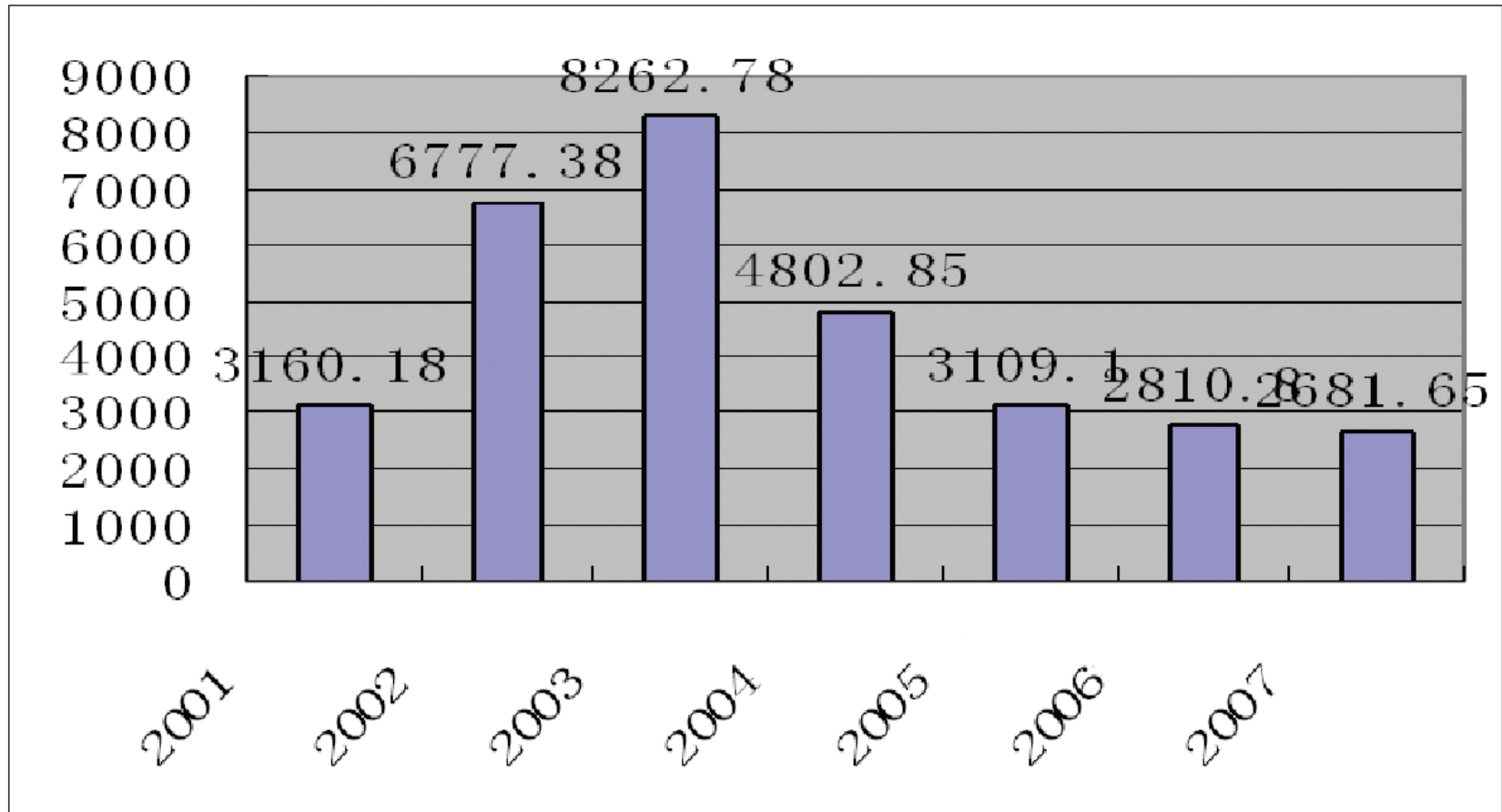


Forestation campaign in China

A number of major forestation projects have been implemented in succession, such as Natural Forest Protection Project, Shelter Forest System Project in Key Areas including the Three-North Shelter Forest system Project, the Yangtze River Basin Shelter Forest system Project, Grain for Green Project, Projects of Wild Life and Nature Reserve Establishment, Wetland Protection Project, Coastal Shelter Forestation Project, Construction of ecological civilization Project, and so on. In addition, China are actively implementing policies on eco-system construction and protection such as natural forest protection, return farmland to forests or grassland , construction of natural reserves. This further helps strengthening forest capabilities to absorb greenhouse gas.



2001-2007 Forestation Area of Major projects

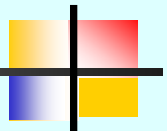


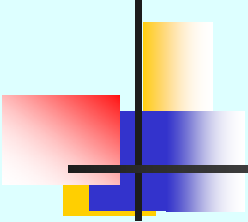
In 1000 hectares

1.2 The role of forestation in coping with climate change

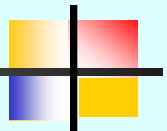
Among various efforts to slow down climate changes, forestation has played essential and irreplaceable role

According to experts, after forestation, every cubic meters of newly growing stock can absorb 1.83 tons of CO₂, and release 1.62 tons of oxygen. This figure shows that forestation has a remarkable carbon absorption capacity.

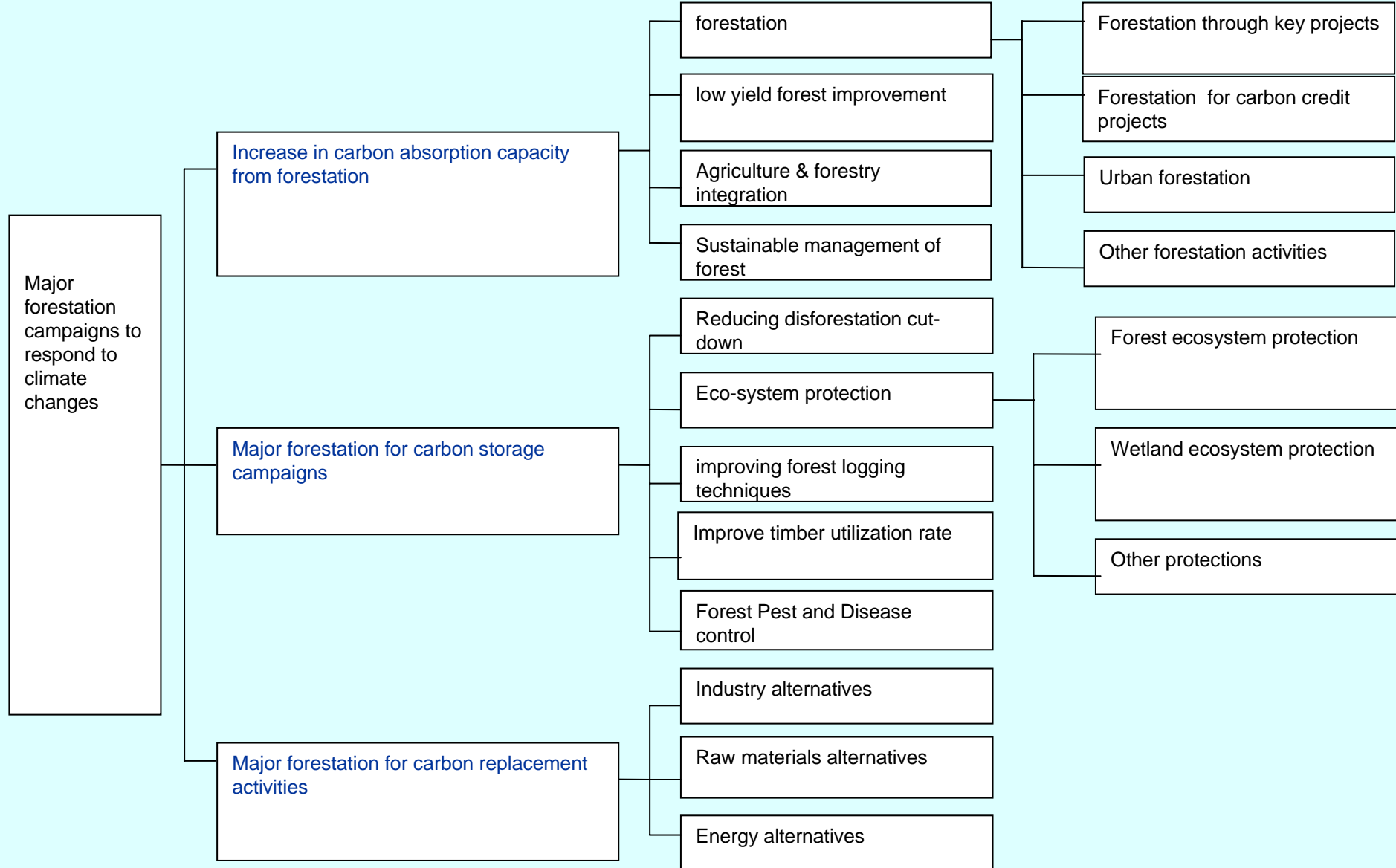




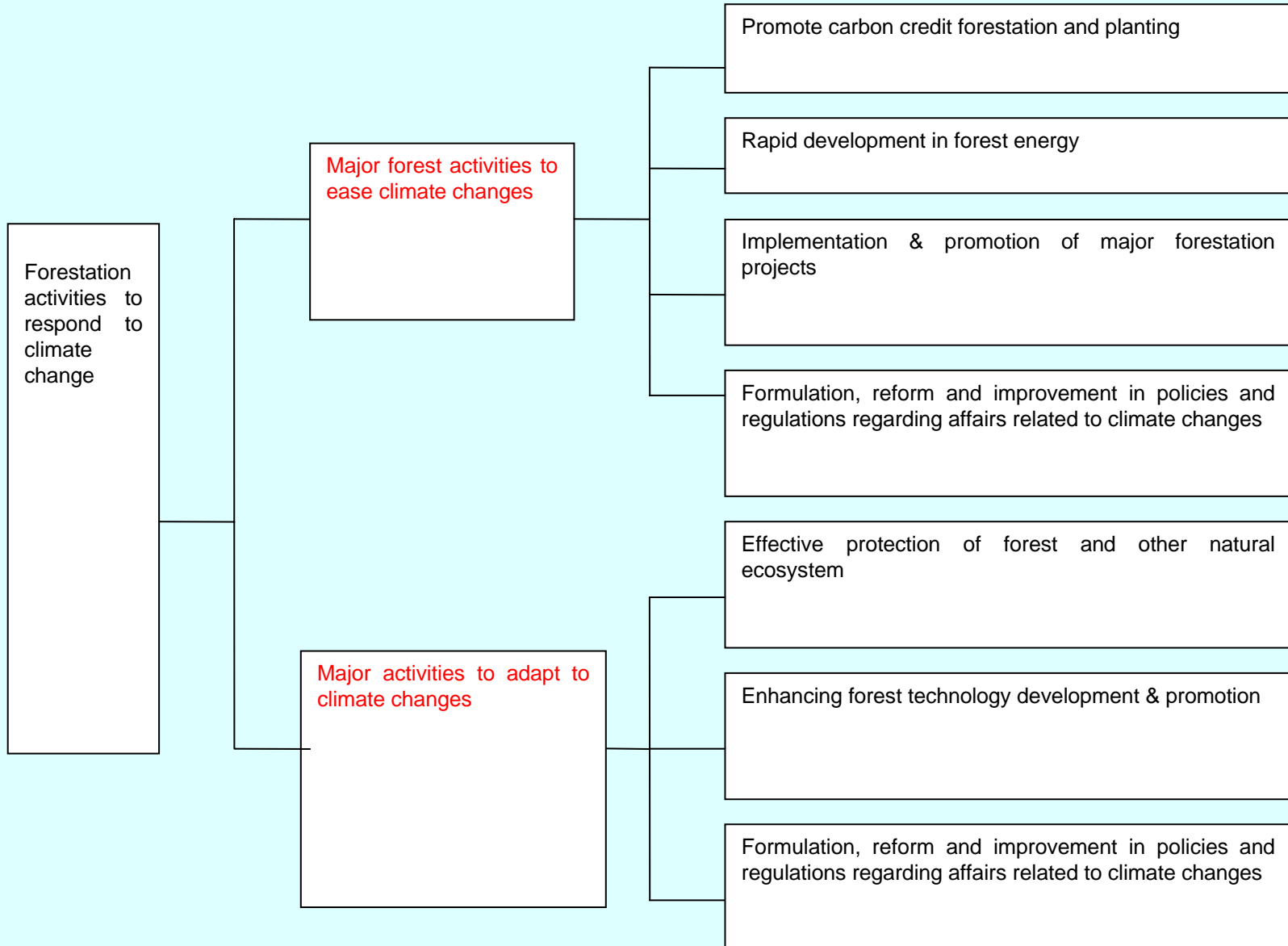
In 2007, China formulated and issued the *National Plan to Address Climatic Change*. China stressed that, forestation, forest protection and the maximization of carbon credit capacity of forest should be valuable measures to respond to climate changes.



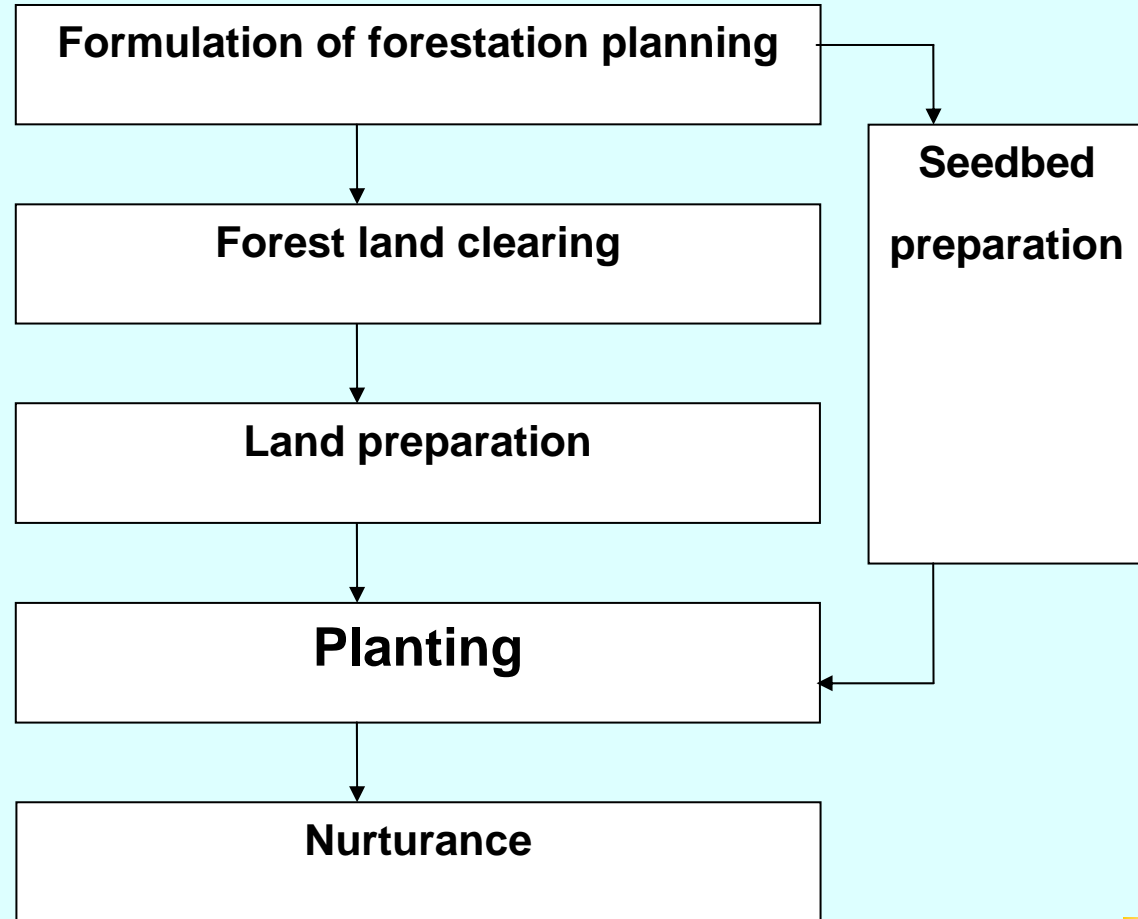
Framework on Forestation campaign to respond to climate changes



Key areas of forestation campaigns in the future



2 Forestation & Green jobs



Quantity of labor used in forestation

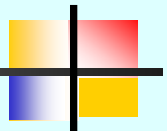
Works		Labor quantity	Notes
Forest land clearing	cavernous clearing	2-6 days	Ordinary mountain area, dig 2500 caves in a hectare.
	zonation clearing	6 to 10 days	Ordinary mountain area, intermediate sized zones.
Land preparation		30 to 60 days	Ordinary mountain area, loam soil, sandy loam soil, cave- or zone-liked land, first plant density of 2500 trees (caves) per hectare, land preparation specification:40cm×40cm×30cm
planting		18 to 35 days	Ordinary mountain areas, first plant density of 2500 trees (caves) per hectare
Nurturance		15 to 25 days	Ordinary mountain area, loam soil, sandy loam, nurturance in minor forestation land
Managing		Each person can manage 150 hectares annually	Ordinary mountain area, concentration of forest, good communication conditions

Forestation labor quantity per hectare:71 to 135 days (average at 103 days) (management excluded)



Forestation & Job opportunities

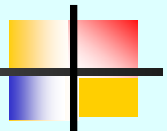
- On Feb. 24th, 2009, the People's Daily reported that, nearly 1,200,000 of the over 6,800,000 migrant workers from Jiangxi province have returned to their hometowns. Planting and forestation projects have created new job opportunities for the returned rural migrant workers.
- According to the statistics, among the returned rural migrant workers, more than 18,000 have become major forestation planters. Totally, they have contracted forestation for nearly 10 billion acres with a gross investment amounting to over RMB60 million. About 130,000 returned rural migrant workers engaged themselves in forestation projects on land preparation and planting works. They find jobs near their homes.





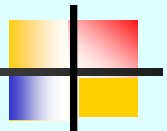
Forestation & Job opportunities

- According to the statistics collected from the districts and counties of Chongqing Municipality, during August of 2008, when its forestation engineering campaign started, to Feb. 25, 2009, a total number of 2,280,000 rural residents took part in the Forest Chongqing Project. They spent total 11.85 million working days and earned an income totaling RMB688 million, where a total of 2.75 million working days spent and a sum of over RMB97 million income earned by a number of 450,000 returned rural residents.
- On Jan. 12th, 2009, China News Service reported that in 2009, China plans to plant 2.5 billion trees in 82.2 million acres to achieve a forest output of RMB1400 billions. This will lay a good groundwork for the goal of achieving a forest coverage of 20% in 2010. Moreover, this plan will not only enable an increase in forest resource but also create more job opportunities and contribute to economic growth, expansion of domestic demands and adjustment of economic structure.



3 Examples of carbon credit forestation in China

In order to promote the value of Chinese forest ecological benefits, develop the forest carbon credit market, attract more international funds to invest in ecological construction in Chinese forestry, and get a better understanding of the entire process of the CDM (clean development mechanism), the Carbon Credit Management Office under the State Forestry Administration launched the Forest Carbon Credit Pilot Project in Guangxi, Inner Mongolia, Yunnan, Sichuan, Shanxi, Liaoning in 2004 (Li Nuyun, 2007). Among them, projects in Guangxi and Inner Mongolia are both projects in strict compliance with the Kyoto Protocol. In other words, both these projects are CDM carbon credit forest projects.



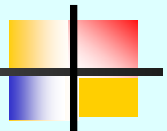
Implementation of carbon credit project in China





The Watershed Management along Pearl River & Reforestation Project in Guangxi, China

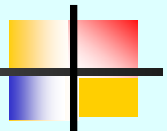
- With the completion of this project, the volume of fixed CO₂ is expected to achieve 770,000 tons by 2035. According to the Purchase Agreement, the BCF (Biologic Carbon Fund) of World Bank will buy \$2.2 million equivalent biologic carbon credits from this project.
- With the implementation of this project, it is expected to increase an income of \$21.1 million for local rural residents and create 5 million jobs for them. It is also expected to achieve remarkable benefits in environment improvement, increase in food production, and other aspects.





The Watershed Management along Pearl River & Reforestation Project in Guangxi, China

- The implementation of this project include construction and operation management stages. The construction period lasts from 2006 to 2009. During this stage, works such as land preparation, seeding nursery, forestation, fertilization, weeding, nurturance and so on. Forestation will be carried in two years. 1,660 hectares was planted in 2006, and another 2,340 hectares of forestation was completed in 2007. After forestation, the forest shall be nurtured for 3 years continuously.
- The operation management period lasts From 2009 to 2037. Works during this period include forest disease & insect prevention, fire prevention, forest protection, nurturance and forest harvesting, reforestation, management, survey on greenhouse gas reduction, etc.

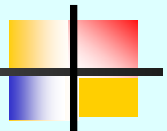




The Watershed Management along Pearl River & Reforestation Project in Guangxi, China

The project will be carried out by:

- **Kangyuan Forest Farm in Cangwu County**
- **Fuyuan Forest Farm in Cangwu County**
- **Luhuan Forestry Development Cor. Ltd in Huanjiang County**
- **Xinghuan Forestry Development Cor. Ltd in Huanjiang County**
- **18 peasant groups**
- **12 farmer families**



The anticipatory farmer beneficiary of this project

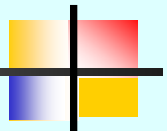
County	Implementing subject	Forestation size (hectares)	By right of land contract and operation		Benefited Peasant Households
			Village	Farmer family	
Total		4000	2901.6	1098.4	5000
Cangwu		2000	901.6	1098.4	4550
	Fuyuan Forest Farm	1291.9	293.9	998.0	3420
	Kangyuan Forest Farm	498.4	398.0	100.4	990
	15 farmer groups	159.2	159.2		105
	12 individual farmers	50.5	50.5		35
Huanjiang		2000	2000		450
	Xinghuan	1394.1	1394.1		330
	Luhuan	381.5	381.5		75
	3 farmer groups	224.4	224.4		45



The Watershed Management along Pearl River & Reforestation Project in Guangxi, China

Job creation

The planned CDM project will create about 5 million temporary jobs, mainly for planting, weeding, deforestation, and turpentine collection. During the project calculation period, it is expected to create 40 long-term jobs. Most of these jobs will be offered to local farmers/communities in the location of this CDM project. Some are taken by farmers from other areas (these farmers have no land inside the territory of this project). A temporary worker is expected to earn US\$3 a day. For long-term job holders, each of them can earn US\$900 per year. Residents in the area of this project inside Huanjiang County are mainly ethnic minorities and all jobs are provided for these local ethnic minority groups.



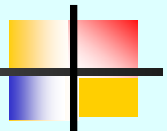
4. Forecast on carbon credit and job creation potentials in China

Year	Forest coverage	Forest Area	Forest growing stock	Forest biological carbon absorption	Forest carbon reserves	Value of forest' carbon credit	New forestation area	Labor in forestation	Job
	%	10,000 hectares	10000 m ³	Tons of carbon	Tons of carbon	US\$	10,000 hectares	Working days	Worker (on the basis of 100 working days per worker each year)
2003	18.21%	17490.92	1245584.58	5.92*10 ⁹	14.43*10 ⁹	158.73*10 ⁹			
2010	20%	19210.20	1367958.342	6.50*10 ⁹	15.85*10 ⁹	174.35*10 ⁹	1719.28	177945480	17,794,548
2020	23%	22091.73	1573152.093	7.47*10 ⁹	18.23*10 ⁹	200.53*10 ⁹	4600.81	476183840	47,618,384
2050	26%	24973.26	1778345.845	8.45*10 ⁹	20.60*10 ⁹	226.6*10 ⁹	7482.34	774422190	77,442,219



Projection

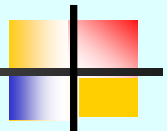
- Forest coverage=forest area/national land area
- Forest biologic carbon reserves(C_1)=forest stock \times amplification factor (1.9) \times volumetric coefficient (0.5) \times carbon content(0.5)
- The overall forest carbon reserves(C_2)=forest stock biological carbon reserves +fixed carbon by undergrowth + fixed carbon by forest soil= $C_1+0.195C_1+1.244C_1=2.439 C_1$
- Unit price of carbon permits set as \$11/ton of carbon
- Labor for forestation per hectare:71 to 136 days, average at 103.5 days
- The number of Jobs is calculated on the basis of 100 working days each worker per year.

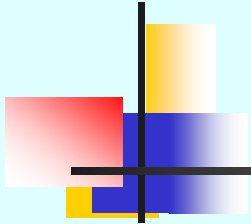




5. Conclusions

- 1. Forest industry contributes tremendously to easing global climate changes.**
- 2. Carbon credit forestation is rising sharply**
- 3. Carbon credit forestation may create green jobs**
- 4. The potential of carbon credit forest development is tremendous and may provide extensive employment opportunities**





Thank you!

***Any comments and suggestions or
corrections will be highly
appreciated!***

