



The Public Agricultural Extension System in China: Development and Reform

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The Development of Public Agricultural Extension System in China

China's government re-established its public agricultural extension system (PAES) gradually since the end of the 1970s. The system is a inclusive top-down system.

China's public agricultural extension system is inclusive:

Number of institution and staff for government agricultural extension system in China, 2006

Ministry of Agriculture (MOA):

5 extension service centers: (crop, livestock, fishery, agr. Machine)

382 staff, **305** technician

31 provinces:

475 extension service centers: (crop, livestock, fishery, agr. Machine)

14940 staff, **9924** technician

333 prefectures (cities):

3942 extension service centers: (crop, livestock, fishery, agr. Machine)

58138 staff, **38123** technician

2862 counties:

24769 extension service centers: (crop, livestock, fishery, agr. Machine)

317563 staff, **212120** technician

41636 townships:

80816 extension service centers: (crop, livestock, fishery, agr. Machine)

396713 staff, **299645** technician

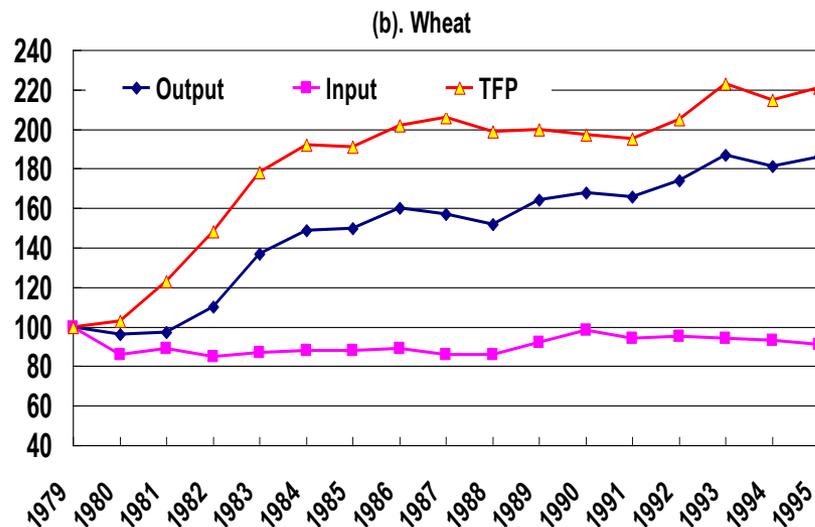
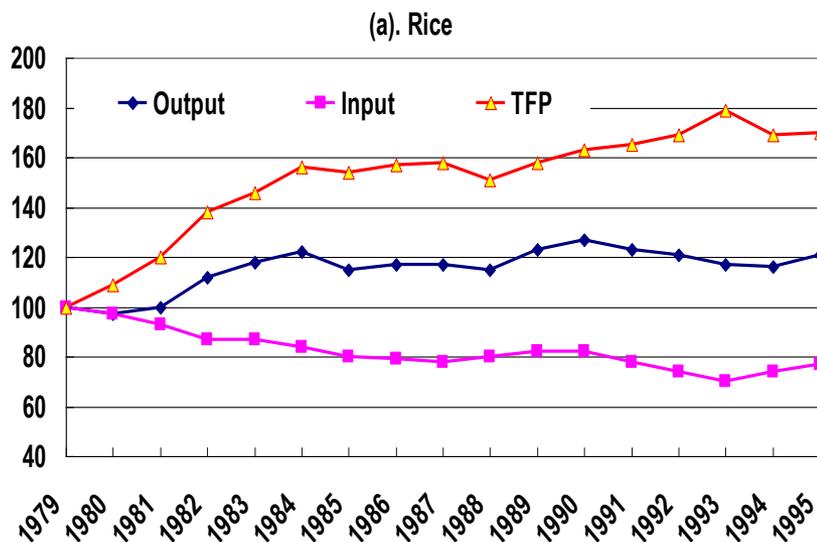
In each township, even in the most remote regions, there are agricultural extension stations.

The Development of Public Agricultural Extension System in China

- **By the end of the 1980s, the system employed more than one million staff**
- **More than 70 percent of these staff graduated from formal agricultural colleges or professional technical school**
- **More than 90 percent of them work at PAES stations at the county and township levels, with most agents at the township level**
- **By the mid-1980s, China had established stations in every rural county and township, even in remote regions**
- **This large and inclusive system provided high-quality agricultural extension services (AES).**

The public agricultural extension system had contributed great to China's agricultural growth and technology progress

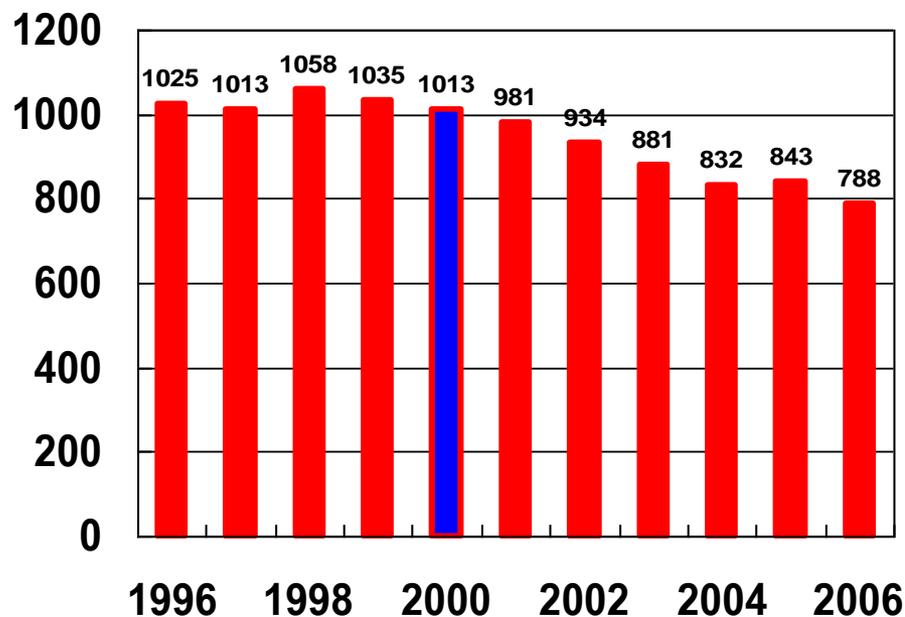
Output, input and TFP indexes in China, 1979-1995 (1979=100)



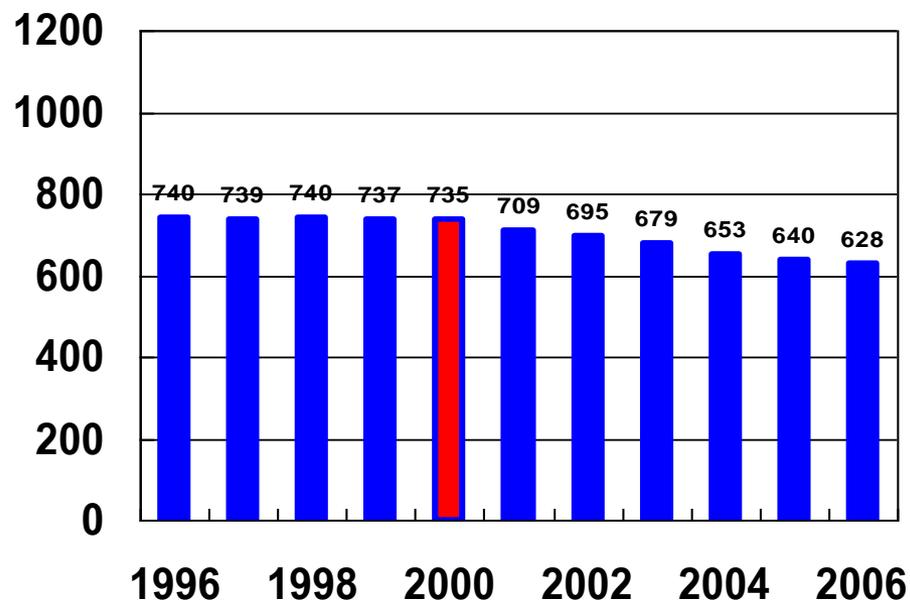
Source: Huang et al., 1999

However, the proliferation of specialized stations make the PAES became overstaffed

Staff under government agricultural extension system in China (1,000 persons)



Agricultural administrative villages (1,000 villages)



Sources: Hu et al. 2009; 2010

Each extension staff only provides agricultural technology services for 0.73 village (The average farmer households are 359 in each village).

The overstaffing has created a financial burden for local governments

Per-capita budget for agricultural extension units, 2002

Budget item	<i>Yuan/agent/year</i>		
	Mean	Township	County
Total	14,304	9,416	16,496
Government funds	11,197	6,136	13,467
Operating budget	8,990	4,871	10,837
Project grants	2,031	1,111	2,443
Other	176	154	186
Commercial	3,107	3,280	3,029

Note: 1 USD = 8.25 Yuan in 2002

Source: Hu et al., 2009

Our survey found that the salary of extension staff in township government was 20 – 50 % lower than the government officers in the same township

The reform of the public agricultural extension system in China

To overcome the financial burden problem, China's central government has decreed a series of policy to reform its public agricultural system since the mid-late 1980's.

- **The reform before 2000**
- **New round of reform**

The reform before 2000

- Commercial reform:
 - In 1985, the central government decreed a policy that encouraged PAES to earn their own income through commercial activities
 - The reforms were designed to encourage the stations to earn money to make up for the increasingly tight budgets
 - PAES agents were encouraged to provide better services to farmers by supplying appropriate input technologies
- some studies indicated that the reform make farmers input more pesticides, fertilizers, or expensive seeds than farmers really need

The reform before 2000

- Deep commercial reform:
 - In the early 1990s, the Chinese government formalized the commercial reforms by classifying stations by their source of funding:
 - fully funded stations,
 - partially funded stations, and
 - self-funded stations.
- The survey found that in some counties that all the PAES stations have become self-funded stations or partially funded stations

The reform before 2000

- Administrative rights reform:
 - At the end of the 1990s, the Chinese government carried out another reform. The reform shifted the administrative rights (including personnel, finance, and materials, or “three rights”) from county agricultural bureaus to township governments.
 - The reform was intended to enhance the capacity of township governments to manage the agents in township agricultural extension stations
- However, several studies have shown that the reform cut the links between the county agricultural extension stations and the township agricultural extension stations, thus interfering with technical services to farmers

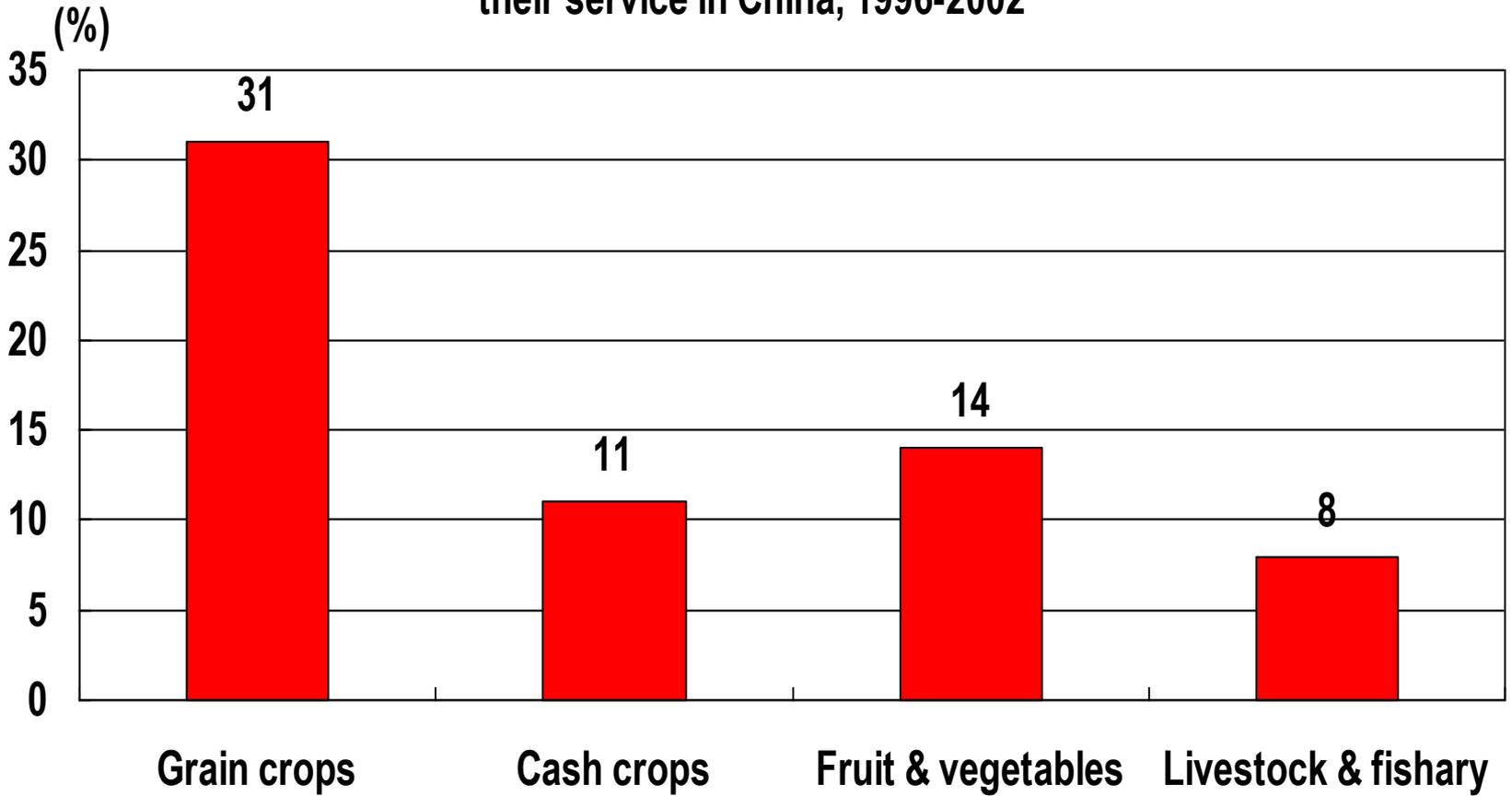
Time allocation for agricultural agents by institution and public investment, 2002

	Obs.	Office and admin.	AES delivery	Comm. work	Other	Total
<i>By actual working days:</i>						
Overall	1245	135	81	56	92	365
County	770	136	86	39	103	365
Township	475	134	73	83	75	365
<i>By percentage (%):</i>						
Overall	1245	37	22	15	25	100
County	770	37	24	11	28	100
Township	475	37	20	23	21	100

Source: Hu et al. 2009

Our survey also found that most farmers have not received the public agricultural extension agent's services for long time

Percent of farmers who met agricultural extension agents and accepted their service in China, 1996-2002



Issues

- **Why inclusive public extension system can not provide farmers inclusive services?**
- **How to reform the system to make the public extension agents provide inclusive service to farmers?**
- **What are the impacts of the reform?**

The rest presentation

- **Operation balk of China's public agricultural extension system**
- **Policy experiments: Inclusive public extension system reform**
- **Impacts assessment**

Operation balk of China's agricultural extension system

- **Financial problem led to the local government stopped supporting the public extension system:**
 - **Permit the extension station sell agricultural inputs, that make some environment problems (Huang et al. 2000)**
 - **Technicians in township take most of their time on non-agricultural extension works, for example, family plan, tax, administrative managements, etc.**
- **The system does not make the extension staff put their main time on the extension service to farmers**

Operation balk of China's agricultural extension system

- **Function: to make sure grain security**
- **Services decision: by government top-down made – top-down system**
- **Farmers' needs for diverse extension services can not be considered fully**

Operation balk of China's agricultural extension system

Five “OLD” extension:

- **Old crops:** grain crops
- **Old methods:** training farmers by prelection
- **Old technologies:** nearly no changes in different years
- **Old villages:** same villages (demonstration village if there is)
- **Old farmers:** same farmers in different years

The system make the extension staff lack incentives to improve their ability to provide better service to farmers

The services are exclusive:

- **The services are not inclusive to all farmers**
- **Can not meet farmers needs for diverse extension service**

Summary

- **In China, although the institutional arrangement of public agricultural innovation system is inclusive, it is exclusive for the system's operation currently**
 - **Extension staff take most of their time on non-extension works**
 - **Top-down system can not meet farmers diverse service demands**
 - **The system make staff lack incentives to improve their ability to supply better service to farmers**

To overcome the above operation balk, we designed an inclusive public agricultural extension service reform program:

Inclusive agricultural extension system reform – Policy experiment

(CCAP's design and experiment since 2005)

New round reform

New round of reform

- Farmer demand-driven reform
 - CCAP's policy pilots
 - MOA's policy pilots
 - MOA's Extension

CCAP's design and experiment

- **Randomly select technicians and experiment villages:**
 - randomly selected technicians (township level) to participate the reform -- We call these technicians as responsible agents (RAs)
 - randomly selected experiment villages that the selected RAs take charges the extension services -- We call these villages as responsible villages (RVs)
- **Objectives:**
 - To make RAs provide promises services in their RVs to meet all farmers' diverse agricultural extension needs

CCAP's design and experiment

- **Responsibility:**

- Each RA provides extension services to all farmers of three RVs
- The RA's responsibility covers a wide range of agricultural extension services: plant protection, fertilizer use, technology related to seed, irrigation, machinery and farm management, marketing information, and *etc.*

- **Promises service:**

- Promises all farmers in the RVs to provide in time service

Promises and monitor



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Promises and monitor



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CCAP's design and experiment

- **Identification of farmers extension services needs**
 - **RRA survey:** find farmers' technologies adoption problem and farmers technology demands
 - **Questionnaire service:** find farmers' in time technology demands
- **Monitoring:**
 - RA's contact information is displayed on a banner in each RV and his name card is required to send to each farmers' home
 - The information includes RA's promises, monitor persons etc.
 - Farmer's callings were recalled:
 - If farmers can not find RA when they call him
 - If farmers call RA but he have not gone to farmer's fields in time

CCAP's design and experiment

- **Assessments:** “3A” indicators were used to assess RA's works in the past year
 - **Availability:** whether the farmers in the RV met the RA
 - **Acceptance:** whether the farmers in the RV accepted the service from the RA
 - **Adoption:** whether the farmers in the RV adopted the service provided by the RA
- **“3A” indicators assessment:** Twenty farmers in each RV were randomly selected and interviewed in the end of each year
- **Incentives:** According to the assessment, each RA was eligible to receive a bonus 0 - 4,000 yuan a year

CCAP's design and experiment: Experiment sites



Impacts assessment

- **CCAP policy experiments sites:**
 - Pengzhou city, Sichuan province
 - Wuchuan county, Inner Mongolia
- **Pengzhou government sites, partly adopt CCAP's reform program: Service mainly to big farmers or demonstration farmers**
- **MOA policy experiments sites , partly adopt CCAP's reform program:**
 - Kalaqin qi, Inner Mongolia
 - Pixian county, Sichuan province

Date:

- Random sample
- CCAP sites :
 - Pengzhou: 15 reform villages **vs** 15 non-reform village (CK)
 - Wuchuan: 15 reform villages **vs** 15 non-reform village (CK)
- Pengzhou government sites : 15 reform villages
- MOA sites (4 counties, each county 15 villages):
 - Kalaqin **vs** Songshan county (neighbor county, non-reform)
 - Pixian **vs** Doujiangyan city (neighbor county, non-reform)
- 10 farmer households in each survey village, 950 households, and 95 villages total

Questions and indices:

- **Three questions:**
 - **Whether you have met the technician?**
 - **Whether the technician provide services to you? What services he provided to you?**
 - **Whether you adopted the services the technician provide to you? Which services you adopted?**
- **Other control variables**

- **Three indices (3 A):**
 - **Availability: whether the reform is effective**
 - **Acceptances: whether the reform is effective + whether the services are inclusive**
 - **Adoption: whether the services are inclusive + service quality**

Models

- To control farmers characteristics
 - **Availability: whether the reform is effective (Probit)**

$$A_{ijkt} = \alpha_0 + (\beta_0 + \beta_i R_{ikt}) D_j + \gamma X_{ijkt} + \varepsilon_{ijkt}$$

- **Acceptances and Adoption: whether the services are inclusive + service quality (Probit and Zip)**

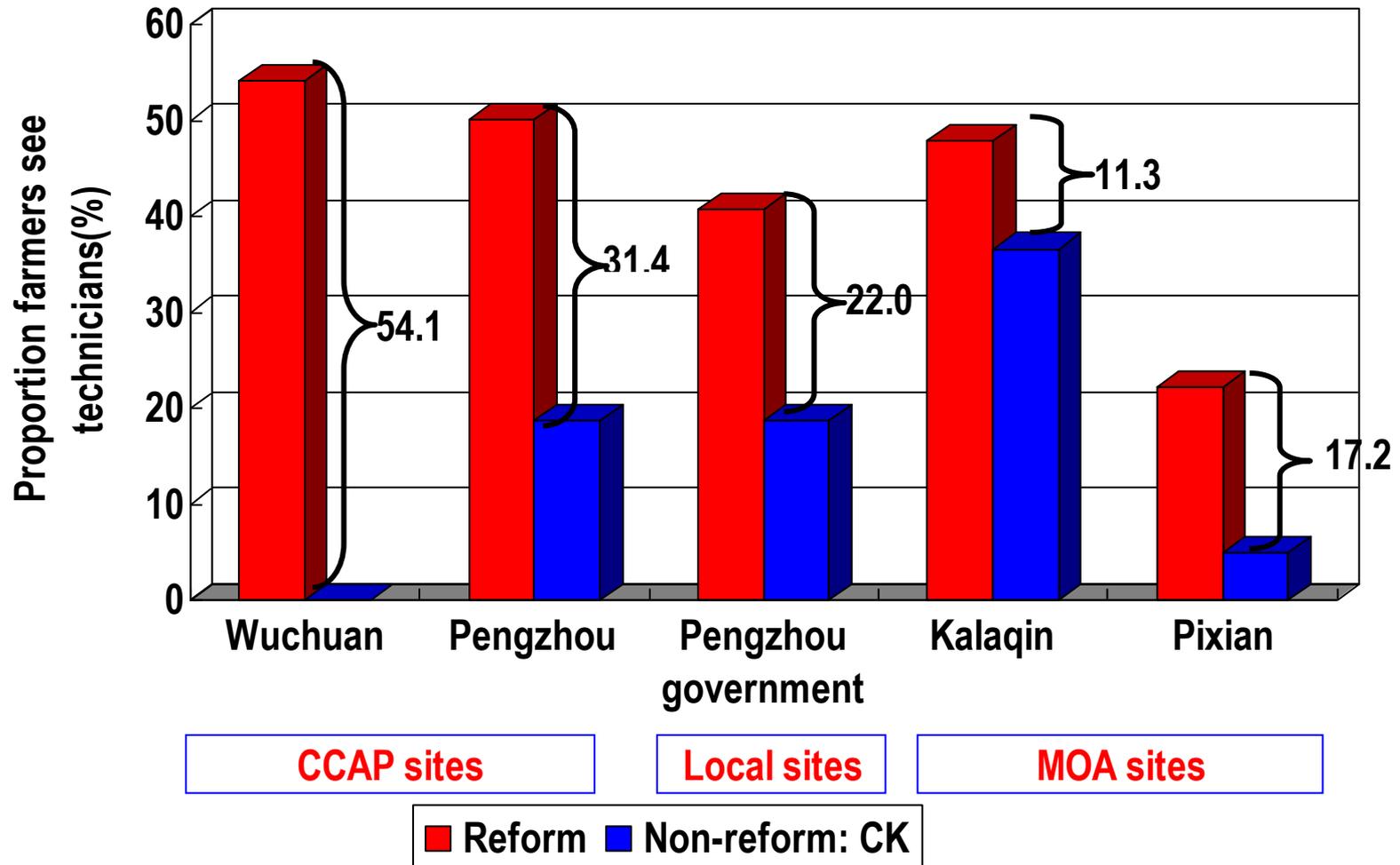
$$A_{ijkt} = \alpha_0 + (\beta_0 + \beta_i R_{ikt}) D_j + \gamma X_{ijkt} + \varepsilon_{ijkt}$$

$$TA_{ijk} = \alpha'_0 + (\alpha'_{1i} + \beta'_i R_i) D_i + \gamma'_{ij} X_{ij} + e'_k Y_k + \varepsilon'_{ijk}$$

Table 5. Estimated results for the farmers met and accepted technician services

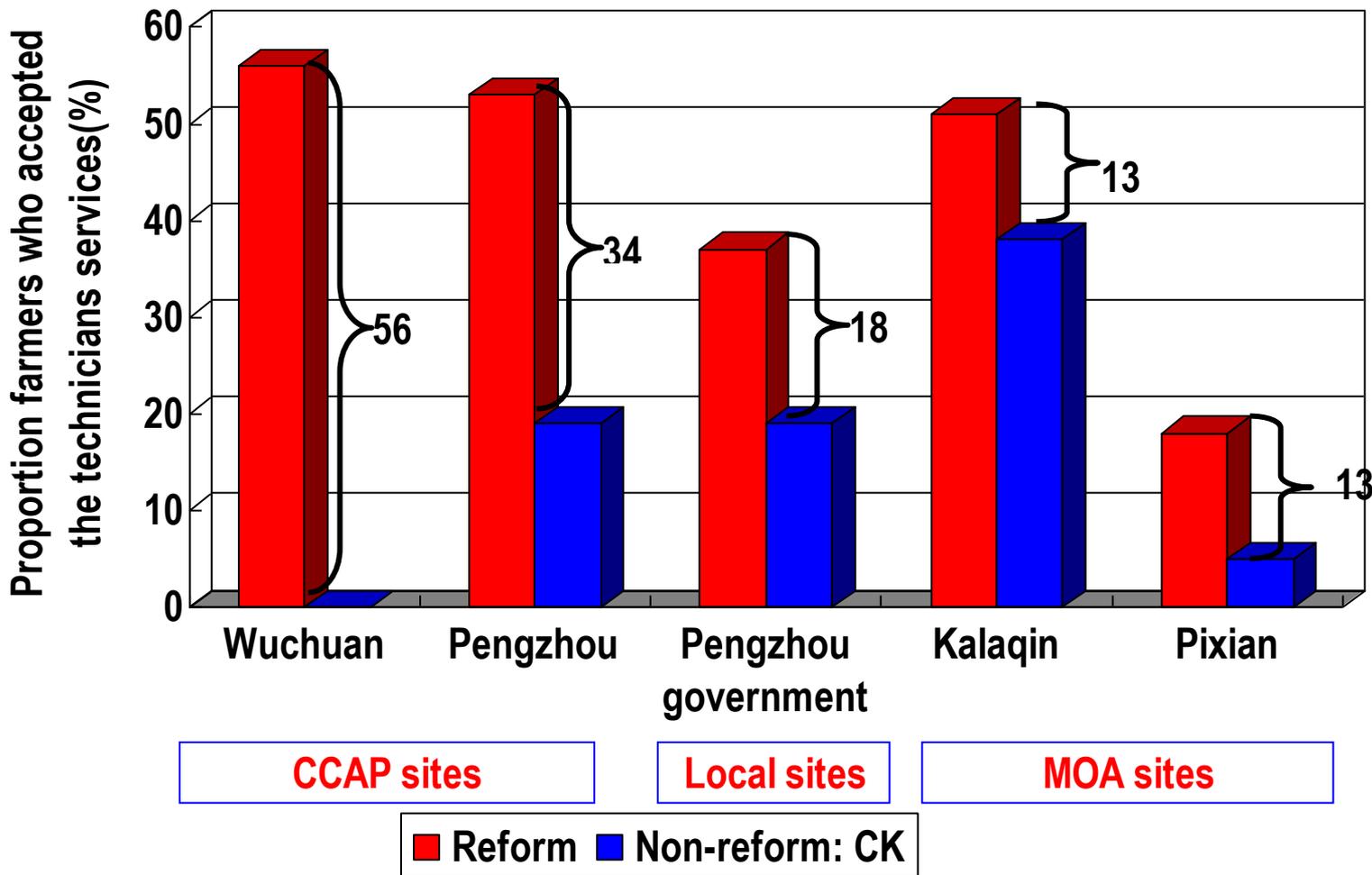
	Availability: met technician	Accepted services (DProbit)
CCAP's sites:		
Reform village * Wuchuan	0.541***	0.56***
Control non-reform village * Pengzhou	0.187***	0.19***
Reform village * Pengzhou	0.501***	0.53***
Pengzhou government reform * Pengzhou	0.407***	0.37***
MOA sites:		
Control non-reform county * Kalaqin (Songshan)	0.366***	0.38***
Reform county * Kalaqin	0.479***	0.51***
Control non-reform county * Pixian (Doujinagyan)	0.05	0.05
Reform county * Pixian	0.222***	0.18***
Householder's age (year)	0.001	0.00
Householder's education level (year)	0.03***	0.03***
Householder's off-farm time (100 days)	-0.035***	-0.03***
Whether the house has the cadre	0.245***	0.26***
Family size (persons)	0.012	0.01
Rate of family off-farm labor(%)	0.000	0.00
Family house area (100 m ²)	0.047***	0.04***
Farm size (ha)	-0.011	-0.01
2007 year dummy	0.083**	0.10**
2006 year dummy	0.021	0.03

Reform is effective: Changes of Availability that farmers met technician



Reform improved the availability of farmers meet the technicians

Reform is effective: Changes of Acceptance that farmers accepted the technician service

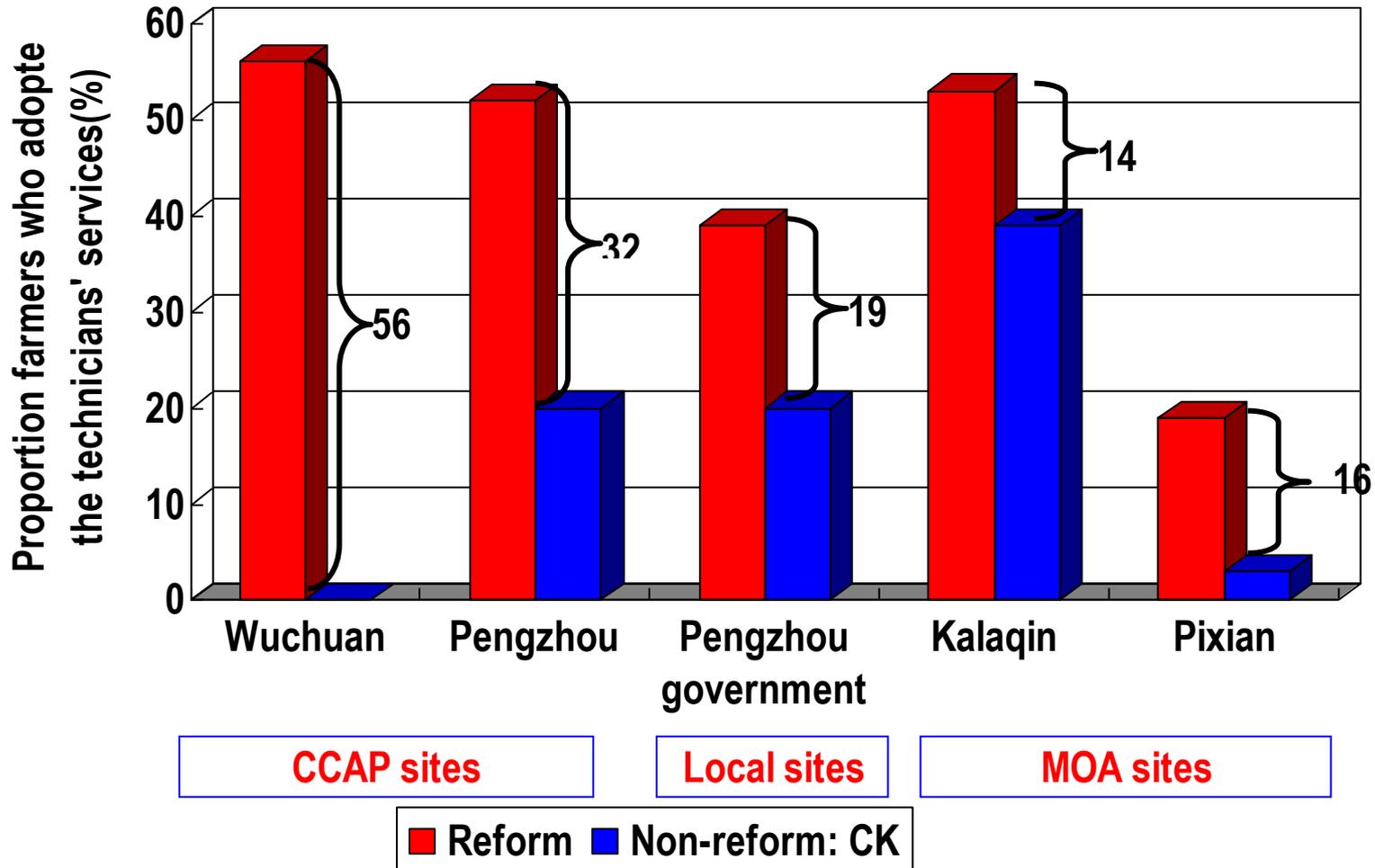


Reforms make more farmers accepted technology services

Estimated results for the farmers adopted the technician services (Adoption)

	Adopted services (DProbit)	Number-Adoption (Zip model)
CCAP's sites:		
Reform village * Wuchuan	0.56***	1.37***
Control non-reform village * Pengzhou	0.20***	1.30***
Reform village * Pengzhou	0.52***	1.64***
Pengzhou government reform * Pengzhou	0.39***	1.37***
MOA sites:		
Control non-reform county * Kalaqin (Songshan)	0.39***	1.48***
Reform county * Kalaqin	0.53***	1.66***
Control non-reform county * Pixian (Doujinagyan)	0.03	0.54**
Reform county * Pixian	0.19***	0.18***
Householder's age (year)	0.00	-0.01*
Householder's education level (year)	0.03***	0.01
Householder's off-farm time (100 days)	-0.03***	-0.03*
Whether the house has the cadre	0.24***	0.18***
Family size (persons)	0.01	-0.01
Rate of family off-farm labor(%)	0.00	0.00**
Family house area (100 m ²)	0.04**	0.06
Farm size (ha)	-0.01	-0.01
2007 year dummy	0.10**	0.09
2006 year dummy	0.02	0.04

Reform is effective: Changes of Adoption that farmers adopted the technician service



Reforms make more farmers adopted technology services

Conclusion (1)

- **China own the inclusive and biggest public agricultural extension system in the world.**
- **The system is inclusive but top-down system**
- **The commercial reform and administrative rights reform induced the extension staff provide few service to farmers**
- **The system can not provide farmers diversity service needs**

Conclusion (2)

- **The introduction of inclusive extension reforms increases the availability and acceptance of public agricultural extension services for all farmers; and farmers actually adopt more public extension services in the reform villages than in the non-reform villages.**

Conclusion (3)

- Targeted all farmers for the public extension services and systematic approach of identifying the farmers' needs are necessary for inclusive public extension
- Accountability through extension agent's commitment (or promises) and incentive based on well designed annual evaluation method are critical important in the reform initiatives