

Central Intelligence Agency



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DIRECTORATE OF INTELLIGENCE

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Assessing China's "Spark Plan" for Rural Development [redacted]

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Summary

Concern over lagging rural development led Beijing to initiate the "Spark Plan." The plan seeks to use technology to improve agricultural production, develop equipment for rural commodity production, and improve the skills of rural workers. Initial returns include a number of small-scale benefits, and we expect additional improvements in output, per capita income, and exports. [redacted]

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Nonetheless, the impact of the Spark Plan will be limited. Problems in funding and choosing projects are hampering implementation. Beyond this, we believe that the plan's strategy is seriously flawed in failing to provide continuing technical support for rural areas. The level of technology is often low; the plan is not effectively organizing trained personnel into supportive extension services; and the poor quality of most Spark training is not helping to alleviate shortages of skilled people. Finally, Spark does not address other key needs of the rural sector, such

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as chronic energy shortages, which require national strategies. Other programs that provide technical support to the rural sector may ultimately prove more useful. [redacted]

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Stumbling Rural Development

China's leaders are worried that problems in the rural sector, and the growing inequities between the richest and poorest areas of the country, will hamper China's modernization program. The growth in agricultural productivity is slowing--grain production has leveled off since the 1984 record harvest, for example. The leadership realizes that cultivated area cannot be expanded and that most of the increase in production from rural labor reallocation has already occurred. Rural policy guidelines are therefore reemphasizing the use of technology to boost development. In his work report to the March 1987 National People's Congress, for example, party chief Zhao Ziyang called for upgrading the scientific and technical level in agricultural production.

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Problems in China's rural industries created another important impetus for improving technical support for rural development. Rural enterprises proliferated under reform policies that encouraged their development to absorb excess farm labor and diversify the rural economy. Started by either individual peasant households or local rural authorities, they include sideline poultry and fish breeding, food processing, light industries, mining, and services. In 1985 alone, rural enterprise employment jumped from 14 to 20 percent of the total rural labor force. In 1986 the total output value of rural enterprises exceeded that of agricultural production for the first time. [redacted]

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Yet even supporters of rural enterprises admit that the sector is troubled because of low technology and poor management, inefficient use of energy and materials, poor safety and environmental standards, and low-quality products.¹ The Minister of Agriculture told US officials earlier in 1987 that roughly 10 percent of these enterprises are going bankrupt every year. In addition, some conservative leaders charge that rural enterprises have led peasants to scorn vital--but less profitable--grain production, and diverted scarce funds and materials from basic agriculture and from state sector enterprises. [redacted]

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The Spark Plan

To address these problems in rural development, the State Science and Technology Commission (SSTC) formulated the Spark Plan.² The State Council and the Central Party Committee approved the plan in mid-1985, and Zhao Ziyang, Vice Premier

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² The plan draws its name from a Chinese proverb that "a single spark can start a prairie fire." [redacted]

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Wan Li, and others have publicly endorsed it to better the lot of China's 800 million peasants. According to SSTC Chairman Song Jian, the plan is intended to "inject elements of a modern civilization, transform outdated modes of production and lifestyles, drive off poverty, and build a new civilization." [Redacted]

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The Spark Plan involves three avenues for "spreading the sparks" of S&T:

- Improving agricultural production by introducing measures such as intensive farming, breeding techniques, and water conservancy projects.
- Developing equipment and technology for rural commodity production in town and township enterprises, particularly in food processing, agricultural, machinery, mining, and services industries.
- Training peasants and rural workers. [Redacted]

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Spark projects are to draw on local resources, reflect market needs and pollution concerns, and consider export potential. According to Chinese officials, the program concentrates on "what people eat, wear, live in, and use." Priority is given to methods and equipment for:

- Farming on mountainous terrain.
- Exploration of resources in hilly areas.
- Raising livestock and breeding aquaculture.
- Cultivation of products ranging from mushrooms to oranges and rapeseed.
- Processing agricultural, forestry, animal husbandry, and specialized local products into finished goods (brewing soy sauce, making soft drinks, producing leather and silk goods).
- Preserving and storing products (including refrigeration and packaging).
- Production of construction materials.
- Small-scale mining. [Redacted]

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Plans call for Spark activities to rely on technologies that can be easily applied, are quick to produce results, and are inexpensive. Originally, Beijing focused on readily available domestic technologies. When Zhao Ziyang endorsed the program in 1985, for example, he said China's rural areas did not need advanced or imported technologies, but should apply domestic research achievements. By late 1986, officials broadened the program to include more international cooperation and foreign capital, equipment, and technology. [Redacted]

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State-supported Spark projects, begun in late 1985, now number over 800, and local governments are supporting over 3,200 more projects, for a total investment of 2.3 billion yuan (\$718 million). Officials expect the projects to increase annual output value by over 10 billion yuan (\$3.1 billion) and increase profits and taxes by 2.5 billion yuan (\$780,000) within 2 to 3 years. [redacted]

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Early Returns . . .

Spark projects are already producing results, according to Chinese press reports. We believe that many of these reports are exaggerated, such as the claim of an enterprise in Guangdong Province of a 620-million-yuan profit on a 19-million-yuan investment in a year. Nonetheless, we believe Spark projects are yielding benefits that include:

- Greater variety and quantity of food. Improved seeds and livestock breeds, and new cultivation techniques have improved the supply and variety of grains, meats, and vegetables for both rural and urban consumption.
- More on-site processing. Production equipment and technology enabled a duck-raising area in Guizhou Province, for example, to build plants for the production of duck feed and processing of ducks and duck eggs.
- Growing exports. Spark projects have assisted in the production of export goods such as handicrafts, fibers, mushrooms, and small farm machinery, contributing to the growth in exports by rural industries from \$2.6 billion in 1984 to over \$9 billion in 1986.
- Increased income. According to press reports, to cite one example, courses in bookkeeping, economic management, tree planting, fish breeding, knitting, and tailoring raised the average income of 2.37 million farmers in Hebei Province by almost 25 percent in 1986. [redacted]

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. . . And Early Problems

Evidence suggests several factors are slowing China's efforts to use Spark projects as engines for growth in rural areas nationwide. Various localities have reported problems both in funding and in choosing which projects to support. According to Chinese officials, Spark Plan funding is based on a matching funds principle, with the state, relevant local department, and village or enterprise each providing a portion. According to recently released figures, over 80 percent of Spark funding is provided by local governments, while the state provides another 15 percent in loans and 5 percent in grants. The implementation of the plan and widening the application of Spark technologies thus depend largely on local resources. [redacted]

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[redacted] some provinces and local governments, however, are unable or unwilling to contribute to Spark projects, which must compete with other local

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projects. Local enterprises and farmers often find it particularly difficult to contribute--sometimes as a direct result of central government fiscal policies. In late 1985, for example, Beijing temporarily tightened credit to slow excessive rural enterprise growth. Bank loans have once again become an important source of funds, but evidence suggests many loans are arranged by local officials with little regard for potential profitability. According to Chinese press reports, the president of the Agricultural Bank of China recently told branch directors to again limit rural loans after a rapid rise in rural credit. [redacted]

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Resistance from the local bureaucracy is also hampering the Spark Plan. [redacted] some farmers have found the program less helpful than anticipated because local officials assessed extra taxes on those profiting from Spark. Other successful enterprises have been taken over by local officials, or even sabotaged by jealous neighbors. We suspect the involvement of personnel from national, provincial, and local organizations in Spark Plan activities also requires time-consuming coordination of resources, including personnel and funding. Similarly, the announcement earlier this year by the Ministry of Agriculture of a "bumper harvest" plan to apply technology to rural areas--very similar to the Spark Plan--indicates that competition among organizations for resources will increase (see inset). [redacted]

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Why Problems May Persist

We believe the Spark program underestimates the level of technology needed to promote long-term growth, and the organization and personnel needed to spread technology--shortcomings that will limit its benefits. [redacted]

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Low Level Technology. The inexpensive, readily available domestic technology that Zhao Ziyang originally envisioned as the strength of the Spark program often offers only limited economic benefits. Some "off the shelf" techniques that are not efficient or practical are probably being employed simply because they are available. Introducing better methods to rural areas that currently practice outmoded or ecologically harmful cultivation techniques or teaching basics such as knitting to villagers will help. But, in our view, such steps are only a beginning in stimulating rural growth. Spark Plan officials and other organizations are working to introduce more effective domestic and imported technologies, but many local Spark projects apparently still involve less useful technologies. [redacted]

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Related Rural S&T Activities

The Spark Plan has quickly become the most visible program for upgrading rural science and technology, but it is hardly alone. The Ministry of Agriculture, Animal Husbandry and Fisheries has established over 500 county centers in recent years to spread technology to rural areas, coordinate the work of research units, and train rural cadres. Officials recently said such centers would be established in 70 to 80 percent of counties by 1990, despite original plans calling for one in every county by then--suggesting that progress has probably been slower than expected. In addition, researchers working for the Ministry and other organizations are developing new seeds and cultivation techniques, using remote sensing to survey resources and plan water projects, and controlling irrigation and pesticide applications with computers. [REDACTED]

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Minister of Agriculture He Kang highlighted the need for more S&T in early 1987 by outlining plans to improve the agricultural infrastructure, including increasing state investment for technical assistance. Central Committee Document Number Five on 1987 agricultural policy underscored this theme by calling for an almost 40-percent increase in agricultural investment over 1986. According to Chinese officials, the document calls for promoting agricultural growth by popularizing agricultural technology, strengthening rural technical strength, and developing industries that serve agriculture. In April 1987, officials announced the "bumper harvest" scheme that, like the Spark Plan, calls for applying technology to raise agricultural output and productivity in the animal husbandry, fishery, farm machinery, and food preservation and processing industries. [REDACTED]

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The announcement of the Spark Plan has prompted additional complementary activities:

- The Chinese Society of Popular Sciences--which taught skills to 84 million peasants during the past five years--plans to train 100 million more rural youths by 1990.
- Rural technical service companies offer a range of services--providing inputs (such as chickens), technical training, disease prevention and marketing information, and, sometimes, buying and marketing products.
- Popular science societies and rural skill research groups have proliferated. Households undertaking specialized production have formed over 2,000 associations with 50,000 members. [REDACTED]

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We believe the "short, quick, cheap" philosophy is particularly inappropriate for China's agricultural sector. Several trends have made this sector more dependent than ever on continuing technical support:

- China relies heavily on specially developed, high-yield plant varieties, which need constant research to maintain seed characteristics, technical support to adapt to local environments, and significant amounts of chemical fertilizers and pesticides.
- Over 45 percent of China's cultivated areas are irrigated, but many of these localities are fighting problems of poor drainage and salination.
- As use of small tractors and other agricultural machinery increases, China has a greater need for mechanics to maintain the equipment, and agronomists to advise on its use. [REDACTED]

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Weak Diffusion Mechanisms. Technology--unlike a prairie fire--needs more than a single spark if it is to spread and serve as a catalyst for development. The Spark Plan calls for establishing demonstration projects, but fails to set up mechanisms for disseminating information more widely and for providing ongoing technical support. At the same time, the shift from collective to family farming has weakened the organization of China's agricultural extension network, making it more difficult to spread technology to those who need it. Previously, cadres introduced a new technique to 6 million production teams. Now, agricultural extension workers must train and work with 200 million agricultural households. The Spark Plan sponsors many traveling S&T delegations that may suggest improvements yielding initial gains in productivity or output, but such short-term visits are often inadequate for introducing advanced techniques, addressing complex problems, or providing followup support. Similarly, Chinese postmortems of the poor results from technology imported to upgrade urban industries have focused on the importance of support services for adapting and maintaining equipment, but at least some Spark projects are neglecting the importance of providing technical advice on the use and maintenance of equipment. [REDACTED]

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In some areas, specialized agricultural households or individual peasants have organized informal networks to share technical information. A Spark project in Hubei, for example, involved setting up rural economic development groups, led by either competent rural people or urban scientists, that help members cooperate in the assimilation of new farming or breeding techniques. Such popularization systems, however, are only as good as the technical capabilities of the most educated member. Many apparently lack the services of trained personnel, and may be unable to deal with problems, or, in the worst case, may even distribute misinformation. [REDACTED]

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Shortages of Skilled Personnel. China's acute shortage of researchers and agrotechnicians exacerbates the difficulty of providing continuing technical support, and limits the number of projects that involve direct contact between experts and the recipients--usually the most useful type of training. [REDACTED]

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[REDACTED] the nation has 450,700 agricultural technicians, Song Jian has said there are only 150,000 qualified technical personnel in rural areas. Moreover, the quality of agriculture

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personnel is suspect because the relaxation of controls on rural mobility in recent years led to a "brain drain" of agricultural S&T workers as they left for more lucrative industrial jobs [redacted]. The overwhelming majority of the remaining scientists are located in urban research areas; even agricultural scientists are centered in urban institutions. According to Chinese statistics, rural areas average only seven technicians for every 10,000 people, one technician for 1,200 acres of farmland, one animal husbandry specialist for 7,000 head of livestock, and one technician for 160 village and township enterprises (see graphic). [redacted]

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The program's emphasis on training at first glance appears to be potentially the most valuable aspect of the program, but it is unlikely that Spark will make much of a contribution to China's critical need for trained people. Formal, full-time training programs run by the Ministry of Agriculture, Animal Husbandry and Fisheries have limited expansion capacity, and graduates are needed to staff the Ministry's own facilities. To fill the need for more teachers and schools, local governments, popular science societies, household associations, and even individuals have established courses, but such training is short term and probably of fairly low quality. The numbers reinforce this impression: SSTC officials say 1 million rural inhabitants received training in 1986 alone, 750,000 more than planned. [redacted]

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The Chinese press reports that 15 ministries and organizations have pledged to deploy technical personnel in support of Spark activities, but we are skeptical of these intentions. The Ministry of Astronautics, for example, announced plans to send 10,000 technicians to help in rural enterprises over the next three years. The Ministry will not shortchange its own programs, however, which suggests that it will release fewer, and the less qualified of its people. Students are also being sent to rural areas to provide training and technical services; Chinese press reports claim vacationing university students worked on 1,300 projects in Liaoning Province in 1986. [redacted]

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Limited Scope. Finally, the Spark Plan has failed to address larger problems confronting rural areas. It focuses on giving enterprises or villages the tools to help themselves, yet some of the most crucial needs of rural areas cannot be met individually. Providing more energy and developing water management systems, for example, will require external support--funding, material, and workers--and are regional, not local, problems. Hebei Province reported building highways to rural areas and providing other infrastructure development as part of its Spark program, but this is an exception. Although the plan originally called for regional development activities, few have been carried out. [redacted]

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Prospects

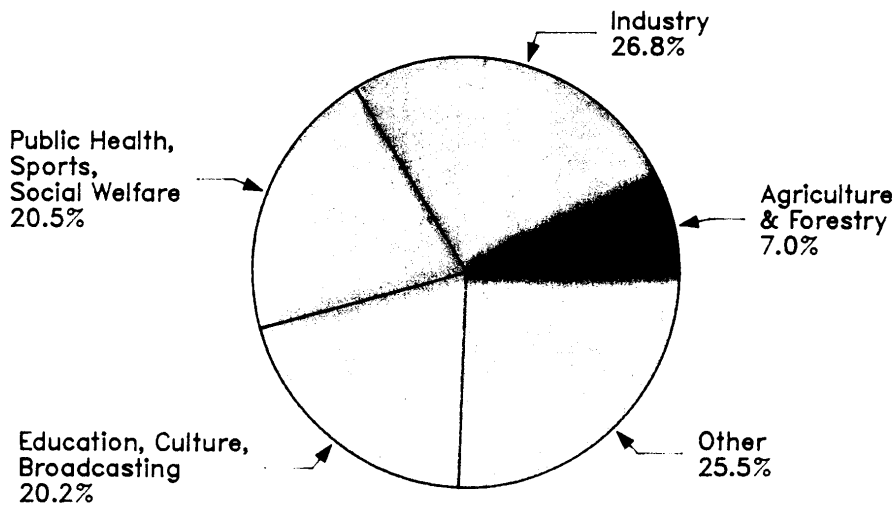
Spark entails several risks for Beijing. Officials have called for widespread involvement, and published press articles designed to stir up enthusiasm for the program. Yet we believe such popularization measures may be stimulating low-level activities that waste resources, duplicate ongoing activities, and generate little return on investment. The appearance of press commentaries that specifically warn against "mass run" activities such as the disastrous Great Leap Forward reinforces this impression.

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Technical Personnel in Agriculture

Few...

...and With Limited Training



Number of Technical Personnel	
Senior Level	800
Secondary Level	60,600
Below Secondary Level	389,300

Total: 7.816 million S&T personnel, 1985



[Redacted]

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Beijing, however, has only poor control over the choice of projects and training at the local level, and lacks qualified personnel to supervise Spark projects. Similarly, the lack of supervision over the plan at the local level and the exhortations to fund Spark program activities could encourage local officials to use the plan as a cover to fund the type of out-of-plan construction that Beijing wants to control. [Redacted]

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The Spark Plan also may be raising expectations that will be difficult to meet quickly. Even training most of the rural labor force of over 400 million in one or two skills, as Spark promises, is an enormous task. Moreover, the Spark Plan may only perpetuate the disparities in regional development. Although almost all provinces have announced Spark projects, there apparently is very little activity in some of the interior provinces. [Redacted]

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Beijing's commitment to the state industrial sector means that rural industries will suffer in the allocation of scarce resources. Also, officials will decide policies relating to grain production and price controls, which will influence the extent to which Spark projects can improve rural output and efficiency. Emphasis on the Spark program may cause limited local S&T funds to be diverted to quick-return, low-level projects to the detriment of other important research and development activities. [Redacted]

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Nonetheless, we anticipate the Spark Plan will continue to produce small-scale benefits for many localities, including improvements in output, per capita income, and rural exports. Measures introduced by Beijing alleviate some of the shortcomings of the program, and, to the extent they are implemented, the benefits will grow. For example, China announced policies and financial incentives to lure intellectuals from urban areas to the countryside. In addition, to improve the availability of funds and the types of projects funded, Beijing is encouraging banks to provide money to projects prescreened for profitability and export potential. Policies to experiment with shareholding in rural enterprises and to seek foreign assistance should also help provide funds. [Redacted]

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The call for foreign assistance and technology increases the opportunities for US and other foreign firms to expand technology sales to rural industries. China has expressed interest in equipment for food processing, storage, and transport. If rural enterprises were to significantly increase exports of goods such as textiles, however, tensions in Sino-US trade could intensify. [Redacted]

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