POLICY BRIEF

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POLICY POINTS

Standardize training materials for all CAC extension workers to improve the quality of skills being passed down to contact farmers

CAC should invest in future Farmer Field Schools so regional and assistant managers can continue to improve their knowledge bae and disseminate best practices to route managers, buyers, and contact farmers.

CAC should offer more enticing benefits to buyers in order to compete with more established firms for talented and dedicated buyers.

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The Impact of Chinese Investment on Skill Development and Technology Transfer in Zambia and Malawi's Cotton Sector

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COTTON PLAYS AN IMPORTANT ROLE IN BOTH THE LOCAL economy and export industry for a number of African countries. Meanwhile, although China is a valuable cotton producer it also imports large quantities of African cotton. Focusing on one of the first companies to enter the African cotton market, this study analyzes China-Africa Cotton's (CAC) operations in Zambia to investigate the impact on the technological development of the local cotton sector. As a new player in the arena, CAC has business models and a management style that differ from those of previous foreign investors in the region. In addition to detailed and in-depth analysis of CAC's unique qualities, the study also uses Cargill's operations in Zambia as a comparison. How does the new Chinese firm, CAC, compare to previous investors in training its employees and farmers? Does the Chinese approach work effectively in an African context? Has Chinese investment had an impact on skills development and technology transfer in Africa's cotton sector?

CAC & THE ZAMBIAN COTTON MARKET

THE OLDEST AND LARGEST CHINESE PLAYER IN AFRICA'S cotton sector, active since 2003, CAC has now expanded to Malawi, Mali, Mozambique, and Zimbabwe. As of 2016 CAC's operations have covered every thing from seed processing to ginning and oil extraction, providing work for thousands of local workers, and contracting with over 100,000 farmers throughout Southern Africa.[1] CAC's business model is not yet fixed. Within six years they have grown from a sole ginnery with outreaching agents into a firm with tens of thousands of contracted outgrowers, and is now a comprehensive multinational business with an integrated value chain.

In terms of operations, the Zambian cotton market manages production through contract farming outgrower schemes in which the firm contracts farmers by giving them seeds and inputs (inputs include pesticide, fertilizer, herbicide, tools, etc.) throughout the entire farming process. Farmers then sell cotton to the firm after the harvest and deduct the costs of seeds and inputs from the income obtained.[2] The outgrower scheme appears to be derived from historical production operations, because farmers' relatively low position in the cotton value-added chain has remained unchanged. Since farmers cannot afford production costs, they have to depend on private companies for necessary means of production and financial support.

CAC has made three significant variations to the extension system, giving it distinct "Chinese characteristics". First, CAC does not pay buyers a high salary. At Cargill buyers earn an attractive and consistent salary, reportedly 1800-2200 ZMK (USD 180-220) or two times more than the average wage in the region, but are in charge of many more farmers, usually three times more than a CAC buyer within a similar sized area, and buy other commodities in addition to cotton. CAC originally paid a monthly wage ranging from 120-560 ZMK/US$12-56 to its buyers, but stopped in 2015. In 2016, CAC renewed their payment program, but at only 100 ZMK per month. Consequently, CAC buyers are not as motivated when compared to Cargill's buyers. The main business reason behind lower payments is cost. Cargill is able to pay its buyers because it purchases maize, soybean, and sunflower seeds in addition to cotton while CAC is only a cotton business whose revenue cannot sustain a buyer's full-time salary.

The second major difference is that CAC does not use independent cashiers. Instead, buyers carry cash to pay farmers directly. Although this increases the risk of embezzlement by the buyers, it does reduce costs by circumventing paying independent cashiers' wages. This approach gives CAC another advantage: farmers like to receive cash immediately. CAC was the first company in Zambia to pay in cash. While Cargill usually requires the farmers to collect money from a certain location one week after the transaction, CAC's policy of paying cash at the moment of trade has gained widespread popularity.

The last variance is that CAC does not operate a contracted farmers database. Instead, buyers record the farmers' information, inputs, and purchases. Data controllers audit the figures from time to time, but do not have detailed information about individual farmers. This leaves the possibility for ghost farmers, namely falsely reported farmers, and increases the risk of embezzlement as well. Construction of a database remains a low priority as a database is used primarily to regulate electronic payments and Chinese management is hesitant to make changes to the current cash payment modality.

CAC's outgrower system is divided into four levels: company management, regional managers, route managers, and buyers and contact farmers. The department that deals directly with cotton planting is the agriculture department, lead by its manager Robert Bwalya, former regional manager for Cargill. It was Bwalya who persuaded several former colleagues from Cargill to join CAC, in addition to recruiting several other experienced managers to regional and assistant manager positions. It was these Zambian managers that set up the extension system, as it exists today, in large part due to their experiences in Cargill. Each region employs route managers, who visit and supervise depots along their respective routes. Each depot is run by a buyer, usually a farmer in the village, who is commissioned to distribute cotton seeds, pesticides, and tools, assist the farmers to grow cotton, and purchase cotton after harvest. Each buyer covers a radius of approximately 10 kilometers containing anywhere from 30 to 150 farmers. Two or three contact farmers are assigned to each buyer to spread messages to farmers, provide advice for cotton growing, and send farmers' feedback to CAC. Besides the General Manager and the Country Manager, all players in CAC's extension system are Zambians.

A main problem of the outgrower scheme is that farmers often cannot repay their loans after investing in technologies. To address this problem, Cargill has recently begun to promote the Farmer Business School. Emmanuel Mbewe, Cargill's Project and Public Relations manager, explained how, "The school helps farmers look into business, help them think at the beginning of the season... By pursuing profit, they can think about how to achieve high productivity. They can analyze the profit/loss, think why to use herbicide, hybrid maize. Before, they just try their luck and calculate from rear view perspective." By contrast, CAC addresses loan repayment problems in a more limited way, by de-incentivizing the use of and reducing access to expensive inputs such as weed killers and fertilizers.

TECHNOLOGY TRANSFER

THREE THINGS MATTER IN COTTON GROWING: seed, inputs, and field management. For CAC, the key is to nurture good seeds. CAC has greatly contributed to seed development in Zambia and Malawi through the creation of the cottonseed delinting workshop. As the only firm producing acid-delinted seeds, CAC sells to other firms in Zambia and Malawi and has even been able to break up a monopoly in the Malawian seed market, offering lower prices for a better product to help the whole sector prosper.[3] At first, the acid-delinted seeds were distributed to contracted CAC farmers only. The seeds became popular among local farmers because of its high germination rate and other cotton firms started bringing their own seeds to CAC for delinting, in exchange for fee payment.

Another form of technology transfer has been in the investment, creation, construction, and operation of the

Chinese government funded Agri-tech Demonstration Center in Malawi. It is currently operated by CAC, and as of April 2016 headed by a Ph.D. in Agronomy. Currently, the Zambia Cotton Development Trust (CDT) only has three varieties of seeds with no ability to develop more. CAC leadership thinks Agri-tech can help address this limitation by studying and developing new varieties. Seed development is planned as an important function of the center, not only to support CAC business, but also to help Agri-tech achieve long run financial sustainability. Agri-tech operates a seed-delinting processor (owned by CAC) and is pursuing research on cottonseed varieties together with the local cotton research station in addition to the training it plans to offer to local farmers and technicians. However, at the time of field research in 2016, the center had not fully implemented these training and research activities.

SKILLS DEVELOPMENT

CAC PARTICIPATED IN A FARMER FIELD SCHOOL (FFS) implemented by the CDT and funded by the FAO. Starting in 2014, this FFS program trained five CAC facilitators, including three assistant managers and two route managers. Over the course of almost a year, they attended two-week training sessions every two months with most of the time spent in the field. Classroom courses were also offered. A Zimbabwean master trainer taught seed planting, post-harvest seeding, integrated production and pest management (IPPM), and methods to teach and engage farmers. Every trained facilitator then went on to conduct one to two FFS experimental projects back in their villages during the training year.

In May 2006, as one of the world's largest and most experienced cotton trading companies, Cargill Cotton entered the Zambian market. Throughout Zambia, Cargill operates hundreds of permanent stations staffed by fulltime buyers for seed and input distribution as well as for purchasing cotton and other crops. While Cargill provides its buyers with a weeklong seeding, planting, and pest management training at the beginning of the season and a shorter training on harvesting further into the season, CAC only provides a one-day training for buyers on planting and seeding and another one-day training on harvesting and loan recovery. Cargill trains their managers in-house so they can learn the use of chemicals and agricultural practices in detail to then teach to farmers. While at CAC, technical issues are only briefly mentioned during the one-day trainings and lack follow-up. In addition, regional and assistant managers are responsible for collecting their own training materials, some using training manuals acquired while working at Cargill, others using books acquired from previous trainings, and yet others using materials collected online.

CONCLUSION

A MAJOR IMPACT OF CAC ON THE technical development of the cotton sector has been its vertical integration of the value chain. In the direction of upstream integration, CAC runs seed processing and plans to establish a seed company based out of the agri-tech demonstration center. In the direction of downstream integration, CAC was the first company to build oil extraction plants in both Zambia and Malawi. Moreover, CAC plans to set up textile mills in each country of operation, which will greatly elevate the industrial capacity of these countries.

CAC experimented with various possibilities to properly adapt to the local context, with the evolution of CAC's business model creating three distinct characteristics. First, CAC is open to adopting existing systems and practices and is willing to take advice from local managers. Without any similar experience in China, CAC built its own extension team by recruiting Zambian managers and buyers, with Chinese management mainly monitoring and auditing the extension system as a whole. The division of labor is broken down according to comparative advantage. The Chinese are familiar with machinery, chemicals, and the export market. Meanwhile direct engagement with local farmers is lead by Zambian managers with decades of field experience. The main challenge in this division of labor is the connection between Chinese and Zambian managers.

Second, CAC's business model is cautious in cost control and cost efficiency. Starting as a small private business, CAC did not make large investments upfront. Unlike Cargill, CAC does not pay high wages to hundreds of buyers, but prefers to award buyers post-hoc bonuses to avoid risk. When CAC saw competition increase and limited production potential in Zambia, they quickly took measures to streamline its buyer team and cut inefficient departments. CAC does not provide expensive chemicals like fertilizers to the farmers, either. They make full use of the materials they have, for instance, selling cottonseeds after extraction to farms as feed for animals. According to CAC's General Manager for all Southern Africa, CAC is in good financial condition and is one of the few profitable Chinese agricultural investments in Africa.

Finally, being "frugal" on its own investment, CAC seeks financial resources from external partners to aid business and technology transfer. The largest support comes from the

Chinese government. The agri-tech demonstration center is set to play a strategic role in developing cottonseeds and training CAC technicians from across the region. CAC has sent several groups of its own local employees as well as related African government officials to China through training programs offered by the Chinese government. Trips were as a reward for the best performing employees and a helpful tool to enhance CAC's communication with local government. With the China-Africa Development Fund as a shareholder, CAC is also able to easily access loans from the China Development Bank. Its plans to establish textile mills are also linked to the government's capacity cooperation initiatives and financial support from the Chinese EXIM Bank and the China Development Bank.

The transformation and technical development of the agricultural sector is a slow process. As a Zambian manager of CAC described teaching new tillage skills: "it takes long to change people's mind. My grandma will still continue doing things in the traditional way. Only when the children grow up, they may change. Old men change gradually." While agricultural production customs may take generations to change, skill learning in factories usually takes place more quickly. Hence, CAC's plan to set up textile mills in Southern Africa may initiate a new wave of technology transfer on a much larger scale.

POLICY RECOMMENDATIONS:

1. CAC should provide standardized training materials for all extension workers to improve the quality of skills being passed down to contact farmers .

2. CAC should invest in future Farmer Field Schools, providing for both the costs and inputs so it's regional and assistant managers can continue to improve their knowledge base and disseminate best practices to route managers, buyers, and contact farmers alike.

3. CAC should offer a more enticing benefits package to buyers in order to compete with more established firms, like Cargill, for talented and dedicated buyers. Ultimately the skill at the buyer level has a direct impact on the relationship with the contact farmers on the ground, and the amount of cotton CAC can expect to purchase. ★

ENDNOTES

1. Interview with CAC managers, Zambia and Malawi, August, 2016.
2. Irene Brambilla and Guido G. Porto, "Market structure, outgrower contracts, and farm output. Evidence from cotton reforms in Zambia," Oxford Economic Papers 63, no. 4 (Dec, 2011): 740-766.
3. Interview, Shi Jingran, August, 2016.

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THE SAIS CHINA-AFRICA RESEARCH INITIATIVE at the Johns Hopkins University School of Advanced International Studies (SAIS) in Washington, D.C. was launched in 2014. Our mission is to promote research, conduct evidence- based analysis, foster collaboration, and train future leaders to better understand the economic and political dimensions of China-Africa relations and their implications for human security and global development.

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