



APPLIED POLICY PROJECT

Improving Rural People's Access to Loans Fintech as a Potential Solution

Xinyang Liu
University of Virginia
Master of Public Policy Candidate
May 2020

ACKNOWLEDGMENTS

I would like to thank Professor Friedberg and Professor Player for supporting me in completing this project. I appreciate that they have been willing to meet me outside of class to discuss my thoughts and give me a great deal of feedback and many suggestions for carrying on this project. I would also like to thank my friends in the Applied Policy Project class for coming up with comprehensive thoughts to guide this project through discussion. Special thanks to Jeanine Braithwaite and Syaru Shirley Lin. Thank them for their important and useful feedback for this project.

Finally, thank you to everyone at Alderman Library's Scholars Lab; you may not know me, but without your efforts, I would be a lesser student.

DISCLAIMER

The author conducted this study as part of the program of professional education at the Frank Batten School of Leadership and Public Policy, University of Virginia. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgments and conclusions are solely those of the author, and are not necessarily endorsed by the Batten School, by the University of Virginia, or by any other agency.



ACRONYMS

CGAP	Consultative Group to Assist the Poor
WBG	World Bank Group
RCC	Rural Credit Cooperative
RCB	Rural Commercial Bank
VTB	Village and Township Bank
PSBC	Postal Savings Bank of China
SMEs	Small and Medium-sized Enterprises
P2P	Person-to-Person or Peer-to-Peer
ATM	Automatic Teller Machines
UNCDF	United Nations Capital Development Fund
B2P	Business-to-Person
MNO	Mobile Network Operators
GDP	Gross Domestic Product
MM	Mobile Money

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	5
PROBLEM STATEMENT	6
BACKGROUND	7
<i>Current Situation in China</i>	7
<i>Formal Financial Sector</i>	9
<i>Informal Financial Sector (social network)</i>	11
<i>Fintech</i>	11
EVALUATION CRITERIA.....	17
<i>Implementation Cost</i>	17
<i>Effectiveness</i>	17
<i>Political Feasibility</i>	17
<i>Sustainability</i>	18
ALTERNATIVES.....	19
<i>Summary of Alternatives</i>	19
<i>Analysis of Alternatives</i>	25
OUTCOME MATRIX	36
RECONMMENDATION (Trade-off)	37
IMPLEMENTATION	38
REFERENCES.....	41
APENDIX A: Map of China.....	49

EXECUTIVE SUMMARY

Poor people in China are concentrated in the Western rural areas. Rural individuals in Western China lack access to forms of credit and bank accounts, which makes it nearly impossible to receive loans and run their own businesses. This is problematic, because these poor rural communities need ways to make money. Fintech (technology used to support or enable banking and financial services) is regarded as a potential method to address the problem. There is a rapid development of Fintech in China, especially in urban areas. However, people in rural areas still prefer using traditional financial services in their daily lives, even though some of them may be excluded.

In this report, I make a comparison between Western China to cases in Eastern China and other countries. In order to help rural people have full access to loans and other financial services, I propose the following alternatives:

1. Keep the status quo
2. Implement digital bulk payments in agricultural value chains
3. Combine digital payment with utility bills
4. Lend money to subsidize farmers running their own businesses based on e-commerce

I evaluate the above alternatives using four criteria: implementation costs, effectiveness, political feasibility, and sustainability. I did a sensitive analysis based on the criteria, and I recommend the digital bulk payments in agricultural value chains should be implemented in the Western rural China. (Alternative 2).

PROBLEM STATEMENT

By the end of 2017, approximately 576 million people lived in rural China, nearly 40 percent of China's total population (Statista, n.d.). According to data released by the World Bank Group (World Bank, n.d.), at the end of 2017, there were 30.5 million people living below the national poverty line. Even though that comprises only 3.1 percent of the population, the Chinese government set a goal to alleviate all poverty by 2020 (Statista, n.d.). The main income source for rural people is agriculture, which, compared to urban lifestyles, is unstable. Rural people often cannot find stable buyers for their products (China Agricultural News Network, 2017). Recent government policy encourages farmers to run their own businesses. Thus, self-employment, which means farmers run their own business, has been regarded as a potential method to reduce poverty in China. A significant amount of capital is required before farmers can start their own businesses. However, the traditional financial institutions have not met the growing credit demand in rural areas. Certain farmers have even borrowed money through their social networks, such as from friends and relatives. Internet finance is an emerging technology to provide loans; however, the data shows that the utilization rate of online payment¹ in rural areas is only 15 percent, while that of urban areas is 48 percent (Yongjian Li & Wang, 2017).

Additionally, the poor people in China are concentrated in its western rural areas (*UNDP-CH-PR-Publications*, n.d.). These regions have the largest number of sites labeled “poverty-stricken counties” by the Chinese government based on their per capita income (CEWEEKLY.CN, 2015). These areas need the most assistance to alleviate poverty for rural individuals. **Rural individuals in Western China, lack access to forms of credit and bank accounts, which makes it nearly impossible to acquire loans and run their own businesses.** This is clearly problematic, because these poor rural communities need ways to make money; the data shows that in poverty-stricken areas, the employment of one person can be solved with the injection of production funds of approximately 30,000 RMB (Yongjian Li & Wang, 2017).

¹ The most widely used Internet Finance

BACKGROUND

Current Situation in China

Rural/ Urban current situation

Driven by economic growth, China faces a population shift from rural to urban areas. In 2008, 53 percent of the population lived in rural China. However, that number fell to 41 percent at the end of 2017 (Statista, n.d.). Many people moved from rural areas to urban areas with the process of urbanization. When people moved to the cities, they often leave other family members behind, especially elders and children. This is mainly due to the Chinese household registration system (*hukou*). *Hukou* was adopted in the late 1950s, used to divide urban and rural people, and forbid migration from rural to urban areas. After the reforms of 1978, such migration was allowed, to meet the burgeoning labor demands. Yet people without registered urban households still could not fully access benefits or social welfare, such as health and education (Chan, 2010). Thus, elders and children lacked access to public service. For example, they could not have full access to any urban health insurance, and the children could not attend the public school. Yet if the entire family migrated to the city, their cost of living would be pretty high. Therefore, many people chose to work in the city, and sent their earned pay to their hometown. However, people left in the rural areas could not receive these money efficiently, because they did not own bank accounts, or lived far from the physical financial institutions (PEOPLE.CN, 2015).

Poverty Trap

There is a special word used in China when talking about issues related to rural development: *sannong*, including *nong ye* (agriculture), *nong cun* (rural areas), and *nong min* (farmers). The Chinese government has already provided preferential policies and facilitation measures for rural people, and encouraging them to become self-employed or run their own businesses was one such policy. Money was needed for this process. They needed to borrow from banks where generally, collateral or credit records were required. In terms of collateral, the biggest fixed asset which farmers possess is land, but unlike most countries, Chinese farmers did not have typical land ownership (PPM_Rural-Entrepreneurship, 2017). For the credit records, people left in rural areas did not have a normal bank account and transaction records, which were the basic requirement of credit record (Duflos & Klapper, 2015). Thus, farmers in remote areas were excluded by the

normal credit market, and they were not able to receive loans to start their businesses or invest in agriculture, which is a potential way for them to go out of poverty. Farmers in rural areas were stuck in a poverty cycle.

Formal Financial Sector

Introduction

In order to alleviate the issue of rural development, the Chinese government continued to try to establish a suitable rural financial system. In China, state-owned banks occupy the majority of the credit market outside cities (Ong, 2013). Even though the government is trying to narrow the credit gap, the credit in the Western rural China is still inadequate.

Rural Credit Cooperatives

Generally, banks were needed for loans. However, in rural areas, due to the underdeveloped financial industry, there are few commercial banks, and credit cooperatives are more common. The Rural Credit Cooperatives (RCCs) is the biggest financial institution outside of cities; its primary site is located in the township (*xiang*), and is regulated by the People's Bank of China (PBC) (Xie, 2003). Unlike banks, RCCs are community-based local financial institutions. These RCCs mainly provide micro- credit to support local farmers' agricultural production, and provide targeted services to “*sannong*” and rural small- and medium-sized enterprises (SMEs) and self-employed households (ZHIHU, 2018).

Rural Commercial Bank

The Rural Commercial Bank (RCB) system developed from RCCs. The main difference between RCBs and RCCs is that RCBs are more market-oriented and commercialized (profit is the main means of evaluation) (FINANCIAL NEWS, 2018). It is all built at the village level. By the end of 2016, approximately 49,000 RCBs existed in Mainland China. However, the nation contains approximately 600,000 villages. Besides the lack of RCBs, most of them are mainly responsible for drawing deposits, but rarely lend to farmers (Tianfeng Securities, 2018).

Village and Township Banks

Village and Township Banks (VTBs) were established in 2008. In May of that year, the People's Bank of China and Banking Regulatory Commission jointly issued guidance on a pilot program of small loan companies, which proposed that qualified small loan companies should be

transformed into Village and Township Banks, in accordance with the regulations. By the end of 2016, 1,519 VTBs were established in rural China, covering 1,213 counties in 32 provinces. The total loans of farmers and small- and medium-sized enterprises (SMEs) are 652.6 billion yuan, of which 92.98 percent are used for loans to meet the financial needs of SMEs. These VTBs are playing a greater role in supporting agriculture (CBRC, 2019; *Literature review of rural banking industry in China*, 2018).

However, problems exist in VTBs. Compared with other commercial banks, VTBs' entry threshold was low, and their supervision was not as strict as that of commercial banks. Therefore, their reputation among depositors was low. This led to a shortage in the capital chain, and insufficient providers for loans, so VTBs were far from meeting the credit demands of farmers (*The Shortcomings and Improvement of Rural Finance*, 2019).

Postal Savings Bank of China

The Postal Savings Bank of China (PSBC) was recognized as the fifth biggest commercial bank in China, established to bridge the financial gap for farmers in rural areas (M. Zhang & Liu, 2014). Since 2007, 39,707 outlets have been built by PSBC and 70% of them locate in rural areas in China. With its expansion branch network and dominant role in such areas, PSBCs "serve approximately 2.2 million micro-credit clients with an average outstanding loan size of RMB 54,000, and the main products offered by PSBCs are agricultural loans, women's loans, re-employment loans, and loans with informal collateral" (Riecke, 2014).

Issues

Compared with commercial banks, the thresholds of rural financial institutions are lower, and procedures simpler, but people also need to meet their conditions, such as collateral (a house or car). These conditions were still very difficult for extremely poor people to meet (ZHIHU, 2018). What is more, certain financial institutions merely received deposits in rural areas, and then lent to urban residents. Clearly, this did not solve the problem of rural funding (Yongjian Li & Wang, 2017).

Informal Financial Sector (social network)

Getting loans through social networks is extremely prevalent in rural China (Yuan & Xu, 2015). People excluded by the formal credit market could borrow money directly from their relatives or friends, and identification documents, like collateral, were not required in this process. “The private lending assisted Chinese farmers to improve their economic behavior, including consumption, production and management” (Li & Li, 2004). However, Yan Yuan and Lihe Xu estimated that extremely poor people also experiences constraints in accessing the informal credit market. They stated that “the poor have no financial means for investment in social capital, which largely prevents them from borrowing in the informal sector” (Yuan & Xu, 2015)

Fintech

Introduction

Fintech, which is a new word means financial technology. The World Economic Forum stated that Fintech is a “new entrants that promised to rapidly reshape how financial products were structured, provisioned and consumed.” (WEF, 2017). As a new kind of technology, it has challenged the traditional financial services model. It combines data and innovative technological methods to provide customers with new financial products, services and experiences (CGAP, 2019a). With its high efficiency, low cost, and flexibility (Zavolokina et al., 2016), it has a natural advantage in market penetration of financial services. Thus, CGAP stated that Fintech has “a potential to provide a range of affordable, convenient and securing banking services to poor people in developing countries.” (IFC, 2017).

Main agricultural Fintech lending platforms in China

1. Ant Financial

Introduction

Ant Financial is an internet finance company dedicated to financial inclusion. It started in Alipay, which was established in 2004, and was formally founded in October 2014 (*Group Profile - Ant Financial*, 2020). There are four branches under Ant Financial: Alipay, Ant Fortune, MYbank, and ZHIMA CREDIT.

Alipay was born in 2004, and was originally established as a third-party secured transaction service, which resolved the trust problem between buyers and sellers in the early days of China's ecommerce. Currently, Alipay operates more like a payment tool. Customers can use it to pay for a taxi, book a hotel, buy a movie ticket, pay for water, electricity and gas or buy a financial product. Users can do these things on their mobile phones.

Ant Fortune is a wealth management platform, and it mainly provides financial management and investment services, which has no business related to farmers' loans (Ant Financial, n.d.).

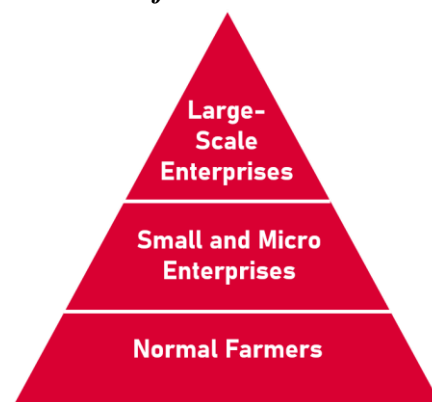
MYbank, also called Zhejiang Online Commercial Bank, is one of the first private banks in China. It operates purely on the internet and officially opened on June 25, 2015. MYbank's mission is to serve micro-and small enterprises, support the real economy, and implement inclusive finance.

ZHIMA CREDIT is a credit technology enterprise aiming at building a simple, equal and inclusive business environment. ZHIMA CREDIT uses leading technologies such as cloud computing and machine learning to objectively present the business credit status of individuals and enterprises (Ant Financial, 2020).

Based on this pre-existing ecosystem, Ant Financial established three business models serving the “*sannong*” development. Ant Financial found that, in rural areas, distinct demands for financial services are distributed in a pyramid structure, and present three different levels.

The first is the data-based financial platform model, which is at the bottom of the pyramid (normal farmers). Ant Financial provides comprehensive financial services to the nationwide agricultural users, including payment, insurance and credit through the internet. Consumer credit service is mainly provided in this service, and the credit line is less that of urban residents.

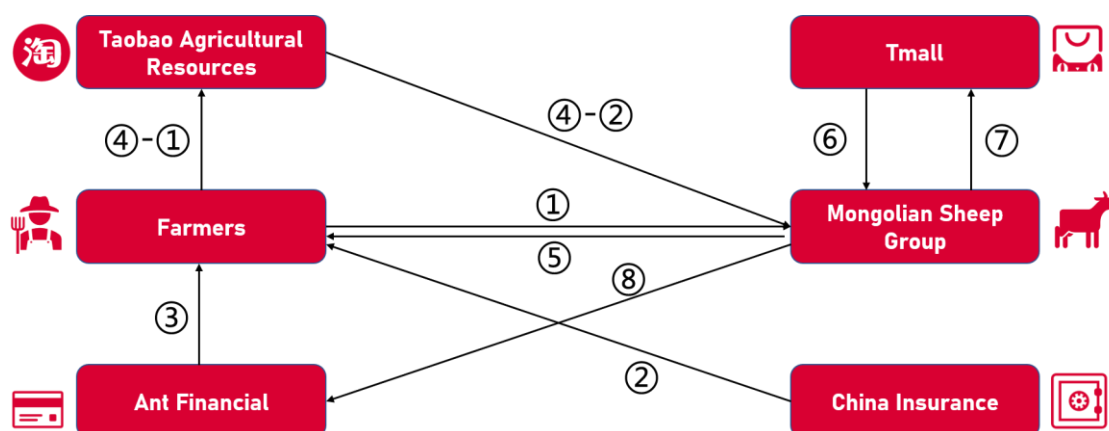
Figure 1: Pyramid structure of demands



The second is the “Online+Offline” credit model for the middle layer of the pyramid, who are small and micro enterprises in rural areas. The credit line provided by the pure online channel has not been able to meet its requirements, and the online data information provided by them is not enough to make credit judgment. Thus, Ant Financial services combines Fintech and informal lending together during the loan evaluation.

The third is the supply chain financial model for large-scale agricultural leading enterprises at the top of the pyramid. The supply chain finance means that all members of the supply chain (suppliers, manufactures, distributors, retailers and end users) are regarded as a whole, and provide the systematic financial services in the mode of “Internet credit+ insurance+ leading enterprise+ e-commerce” for members in the supply chain. For example, in Inner Mongolia, ant financial services and China Property & Casualty Insurance Co., Ltd. jointly provide supply chain financial services from loans to sales for large breeding groups such as Mengyang group (*Ant Financial*, 2020; Tianfeng Securities, 2018).

Figure 2: Supply chain financial model



1. Sign the purchase order of fattening sheep
2. Provide credit guarantee insurance
3. Issuance of “Wangnong” loan
- 4.1 Purchase of feed
- 4.2 Feed information synchronization to the enterprise
5. Purchase of fattening sheep

6. Sale of processed food
7. Refund
8. Repay the principal and interest of ant financial service loan, and pay the remaining purchase money to the farmers

Issues

With the above strategies, Ant Finance have achieved great accomplishment in rural areas. Take MYbank as an example, according to its annual report, by the end of 2017, MYbank had served 750000 rural users, and the balance of agricultural related loans was 26.45 billion RMB, six times that of 2016 (*MYBANK Annual Report*, 2018). However, the existing modes could not cover all of rural people in the nation. Strategies provided by Ant Finance are all based on the *Taobao*², and based on the report published by Alibaba research center, the top 20 of *Taobao village* are in the east of China. This means that people in Western China could not benefit from such strategies because of the less development of e-commerce (AliResearch, 2019). What is more, rural people who stay under the extremely poverty line are not targeted, and most of them are distributed in the Western China.

² The biggest on-line e-commerce platform in China

2. eLoancn

Introduction

Eloancn is an internet financial firm established in 2007. And it was a special peer-to-peer or person-to-person (P2P) platform. What is more, it was also the first internet financial platform which focused on “*sannong*”. It provides point-to-point and individual to individual loan services under the internet environment.

The platform is just the information service provider, matchmaker and risk controller. It provides the public with a new financing and investment channel with low threshold, accessibility, low cost, high efficiency, safety and reliability, to meet the capital needs of loan users, and to help investment (eLoan, 2020).

Figure 3: eLoan P2P platform



Based on the characteristics of small amount of loans and “acquaintance society³”, it provided loans smaller than 90000 RMB and a mode of “Offline risk prevention and control + online information matching” (Offline+ Online). “Offline” means that using the advantages of “acquaintance society” in rural areas, Eloancn learns about the reputation, family situation and business situation of farmers’ borrowers, and carries out risk control and post loan management. “Online” means that Eloancn provides the information they collect and match lenders and borrowers online (Yongjian Li & Wang, 2017).

Issues

As the end of January 2017, Eloancn has set up operation centers in nearly 200 cities across the country, covering more than 1200 districts and counties (*xian*), more than 10000 towns and townships (*xiang*), and has accumulated more than 25 billion yuan of loans to the “*sannong*” related areas.

³ in the 20th century, Fei Xiaotong put forward the concept in local China. He thought that the countryside "is a familiar society, without strangers". Villagers know each other and become an acquaintance society.

However, problems also exist in this mode. Firstly, the mode based on “acquaintance society”, it did provide convenience for farmers to receive loans. However, this mode also excludes extreme poor people, as they generally have low reputation and undeveloped social network. Secondly, the policies are tighter on P2P, not only did this caused a decline of agricultural P2P platforms, but also will cause a decrease in the amount of loans (Tianyan Research, 2018).

EVALUATION CRITERIA

The project will address rural people's access gap to the loan market by using the Fintech. And this Applied Policy Project will evaluate each of four alternatives by using costs, effectiveness, political feasibility and sustainability. In the following section, I will explain each criterion in more detail.

Implementation Cost

The main costs considered in evaluating each policy are its implementation costs. The implement costs borne by the government, CGAP, and third parties, such as internet financial companies, will all be taken into consideration. The cost estimates are directly based on how much stakeholders will spend on the program. As each program reveals different sorts of implementation costs, these costs will be detailed based on actual conditions. Each alternative will be evaluated through a score of "High," "Medium," or "Low." The score will be projected by doing a sensitive analysis, based on similar programs in China or other nations.

Effectiveness

The most important criterion for success is whether the alternative is effective in improving rural people's access to loans. Separate alternatives will have different ways to measure their effectiveness. The primary purpose in improving rural people's access to loans is to strengthen their access to financial services. The evaluation will be divided into two processes: intermediate outcome and long-run effectiveness. Each policy option will be given a distinct intermediate outcome, which will also be projected by doing a sensitive analysis relying on similar programs. Subsequently, the long-run effectiveness will be calculated upon the result of intermediate outcome, and will allotted a score of "High," "Medium," or "Low".

Political Feasibility

Policy alternatives will be given a basic score for political feasibility, as well: "High," "Medium," or "Low". Alternatives supported by multiple regulators and partners will be considered to possess a high level of political feasibility. With the support of limited regulators or partners, alternatives

will be scored as of moderate political feasibility. Those that lack the support of any group will be considered of low political feasibility.

The support of regulators will be measured by searching for whether the government has forbidden similar activities in the past. If it has, the program will be projected to have no support from the regulator. The support of partners will be divided into three categories: support from targeted farmers, the CGAP, and third parties (such as mobile payment companies). I will consider two dimensions to the project if a given alternative will be supported by partners: first, if partners will receive benefits in this process, and second, if the alternative fits their mission. If the program receives more than two supporters among partners, it will be regarded as receiving support from partners.

Sustainability

The sustainability of alternatives will be evaluated by if the program can be maintained in the future. This is based on whether or not money will need to be continually invested, and whether or not the program has positive effects on alleviating poverty for the long-term. Policy alternatives will be applied with the score of “High”, “Medium”, or “Low”, with "High" meaning it is easily sustainable and "Low" meaning it is not easily sustainable.

ALTERNATIVES

Summary of Alternatives

Alternative One: Keep to the status quo

In China, the central government has already implemented related policies to enhance the development of the credit market in rural areas. For example, the government has tried to increase access to Automatic Teller Machines (ATM) and the use of card payments in remote areas. This measure would encourage rural individuals to open bank accounts. With bank accounts, they would have a record of transactions and credit scores, which are essential for applying for loans through the normal financial institutions. These methods have been somewhat successful. A report published by the People's Bank of China indicated that by the end of 2018, the coverage rate of bank cards service in rural administrative areas reached 98.23 percent (People's Bank of China, 2018). Even though the percentage of the population with access to bank-card does not match the percentage with access to loans, having a bank card (or bank account) is a prerequisite for obtaining a loan. In addition, the government has already issued a policy whereby farmers can receive a reduction in loan interest rates, which reduces the risk of financial institutions lending money to them.

Aside from the government, private companies such as Alibaba and eLoancn have implemented related programs in order to improve rural people's access to loans, such as the data-based financial platform model, Offline + Online P2P platform. However, these programs were developed in Eastern China, and western localities have not received their full benefit.

While these policies and programs were mainly launched in 2017, their effects are not yet clear in Western China, perhaps due to the small amount of time during which they have been available. Therefore, keeping the status quo may be a suitable alternative. We also need more time to determine whether the relevant strategies are effective. If their effect is insignificant, we can correct or supplement them.

Alternative Two: Implement digital bulk payments in agricultural value chains

Mobile payment is popular in urban China, and many organizations predict that people will go cashless in the future (Meng B., 2017). However, those in rural areas still prefer using cash in their daily lives. There are two major reasons. First, most rural people still do not have bank accounts. Before using mobile payment, they must register and link to their bank accounts through mobile payment apps. If rural people lack bank accounts, they cannot use mobile payment. Additionally, these people lack literacy in mobile payment. Compared with cash, mobile payment is invisible. Farmers do not trust this process; they believe it is unsafe to deposit money in an invisible account.

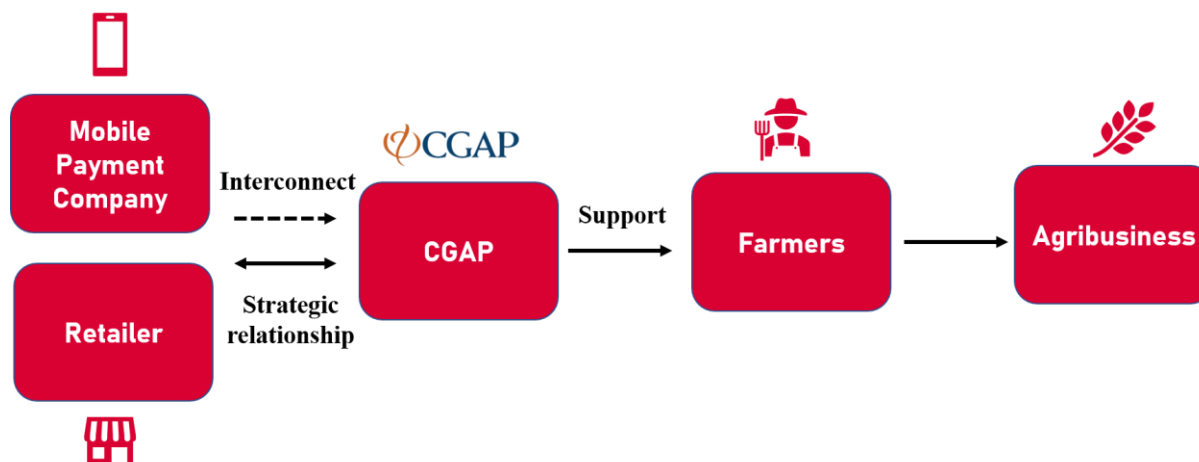
The idea of “implementing digital bulk payments in agricultural value chains” comes from programs in Uganda founded by the United Nations Capital Development Fund (UNCDF). This type of program combines mobile payment and Business-to-Person (B2P) to initiate a new agricultural value chain. By doing this rural people will have a mobile payment account and can buy goods and easily conduct business through that account. They will then have bank records to more easily apply for loans later. At the same time, the value chain will assist them in building connections with agricultural enterprises. Then farmers can opt to pre-finance via loans (GSMA, 2017).

The UNCDF established a pilot for different value chains, including coffee, tea, maize, seed oil, and dairy (UNCDF, 2018). These programs are divided into two categories: a third-party led model (also called “aggregator”) and a money-provider led model. The third-party combines different types of mobile network operators (MNO) and provides an agricultural value chain. The money provider led model is provided by the MNO. The pilot program in Uganda achieved great success. For example, the coffee value chain programs in the Mount Elgon region involved 2.8 million smallholder farmers. After three years, approximately 27,749 registers and 3,614 farmers paid using mobile payments. Because of that change, coffee sales increased by 30 percent (UNCDF, 2018).

The main agricultural product in China is maize (NBS, 2018), so there needs to be an agricultural value chain for it. There are too many sorts of mobile payment companies in China such as Alipay and WeChat Pay, and it is challenging to determine the dominant one. Thus, the above alternative will

implement a third-party led, digital bulk payment system in the maize value chain. The figure below illustrated this program's steps.

Figure 4: Procedure of the alternative two



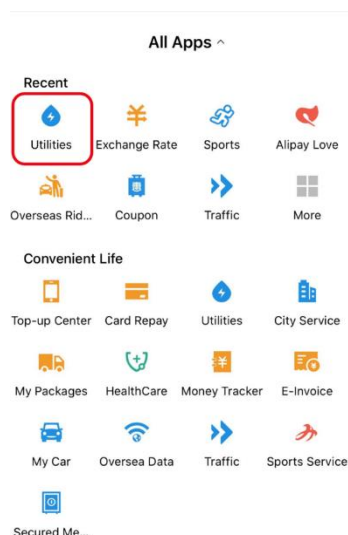
Alternative Three: Combine digital payment with utility bills

As the rural population is aging, fewer people are interested in learning about new technologies. This is a problem because of this caused low digital literacy among rural areas. Digital payment is a type of new payment technology, people need to learn how to use it such as signing up accounts, linking the account to bank account and so on.

Alipay, WeChat pay and other Internet financial enterprises can provide short-term loans, and the threshold for borrowing is low, but is not popular in rural areas because the low digital literacy of these people. Because of this, people do not have a sufficient transaction record which is necessary for registering the Huabei⁴. According to Financial Ant's report, the group that is most likely to use the Huabei is the post-90s generation in Beijing, Shanghai and Zhejiang; all of these are urban and developed areas (1991t Internet Data Center, 2015).

⁴ "Huabei" is a consumer credit product initiated by the Financial Ant, after application for opening, the consumer will obtain loans from 500 to 50,000 RMB.

Figure 5: Alipay with utility bills



CGAP can encourage rural individuals to use digital payments the digital payments through the government by combining the digital payment with utility bills. Everyone needs to pay utility bills in some way, so making it digital would require people to use digital means. Financial Ant has already provided such service to its customers. By the end of 2017, families in more than 90 percent of 28 provinces and 370 cities can pay for utilities by Alipay⁵ (Yang, 2017). However, this service is not available in the rural areas in Western China. Thus, CGAP can cooperate with the government and help fund Financial Ant to popularize the service. Also, as the low digital literacy in rural areas, CGAP needs to set up an education campaign to persuade farmers to use the service. Once farmers begin to use it, they will have transaction records. Not only will they have the access to “Huabei”, but also, they will have the access to formal bank loans.

⁵ Product of Financial Ant

Alternative Four: Lend money to subsidize farmers to run their own businesses based on e-commerce.

In the Shaanxi province, most farmers are living on wheat. They can sell the wheat product through e-commerce. Second, farmers in Shaanxi do not have their own on-line stores and have no experience in operating them. Thus, CGAP needs to loan them start-up funds and provide corresponding consulting services. In this way, farmers will have their bank account, have full access to the mobile payment by operating the online shop, and also will have the transaction scores for applying other loans.

This could be a beneficial policy based on the example in Shuyang. Shuyang is a typical “Taobao county”⁶ located in Jiangsu Province. Since 2011, Shuyang’s average annual growth of GDP has been 15.7 percent. In 2015, the regional Gross Domestic Product (GDP) has been achieved 63 billion RMB (Juhui Data, 2017). The national poverty line in China is 2,300 RMB (J. Meng, 2015). In 2015, the per capita disposable income of rural residents reached 13,011RMB which is significantly more than the national poverty line (CNKI, n.d.). The huge improvement in rural people’s income results from the development of the e-commerce.

Local farmers in Shuyang combined their advantages in agriculture with e-commerce, and sell their flowers, a major industry in the county, through e-commerce platforms such as Taobao.

The data shows that the e-commerce has positively influenced (or benefitted) in Shuyang, increasing the number of online stores from about 101 online stores in 2011 to 359 online stores in 2015. Additionally, in this same time frame, the e-commerce transaction volume increased from 7.62 million RMB to 55.421 million RMB.

Similarly, the development of e-commerce also needs start-up funds. The rapid development of e-commerce in Shuyang is inseparable from relevant loan benefits. In Shuyang, it first developed the e-commerce-oriented credit product “Taodai”, which is a loan specifically for e-commerce. The people operating their businesses through e-commerce can enjoy a mortgage free credit line

⁶ With the development of e-commerce in China, a number of professional Taobao villages or counties have emerged in Zhejiang, Guangdong, Jiangsu, and other rural areas. Taobao village refers to the villages where the number of active online stores reaches more than 10 percent of local households and the annual transaction volume of e-commerce reaches more than 10 million RMB.

of 10 percentage of annual sales. This means that if an online store operator wants to lend money, he can get a loan of 10 percent of last year's turnover of his store without fixed assets to mortgage. Additionally, there are also non-governmental organizations provide loans to the e-commerce operators, like the E-commerce Association in Shuyang. These are huge benefits, as these reduced the capital pressure of online stores.(*Shuyang mode "Internet +Sannong" model*, 2016)

Shuyang's model is worth learning, but we need to change some objectives. There may be some differences between Shuyang and counties in Shaanxi province. The most significant is the wealth differences: the average household income in Zhejiang province is more than it in Shaanxi province. Thus, the direct subsidies would be better in the early stage.

Analysis of Alternatives

Overview

Four criteria were considered to measure the alternatives: *cost*, *effectiveness*, *political feasibility* and *sustainability*.

Evaluating alternative one: Keep to the status quo

Implementation Cost

This alternative presents **no direct implementation costs** to regulators or partners, as it contains no change from the status quo.

Effectiveness

The effectiveness of this alternative is **low**. Taking no action to study any potential policy interventions will not alter the current trajectory.

Political Feasibility

The political feasibility of this alternative is **medium**. There are two main providers of loans in the market, formal financial institutions, and fintech. For the formal financial institutions, most of them are national owned, and regulators will support them. However, most of fintech companies are private owned, and regulators may not be satisfied with letting present trends continue. Fintech is a new area; it is unclear what regulatory policies will be released in the future.

Sustainability

The sustainability of this alternative is **medium**. There is no need for a lot money in the future. Additionally, farmers' income will not have a huge increase without interventions. This means that it is not sustainable, because with no increase in income, poverty cannot be solved in the long-run. They have no money to run their own business and little opportunity for them to find a job in the rural areas, so there no other sources of income except agricultural product.

Evaluating alternative two: Implement digital bulk payments in agricultural value chains

The United Nations Capital Development Fund (UNCDF) has a history of carrying “Digital Bulk Payments in Agricultural Value Chains” in Uganda, for different agricultural value chains⁷, including coffee, tea, maize, seed oil, and dairy. Five similar programs have already been implemented in different areas in Uganda. When evaluating this alternative against the criteria, I will do a sensitivity analysis based on the case studies that have already been done by the UNCDF.

Implementation Cost

The main implementation costs in this alternative are labor costs and network expansion costs.

1. Labor costs: The main labor cost for this alternative is the wage pay for people to work for communication and technology support. I interviewed a person worked for the customer service in the Bank of China, she told me that about one person support 1,000 households in the urban areas. Thus, for this calculation, I use the assumption that every 1,000 households will need one communication support and one technology support. The program aims to target 10 percent of the households in the target area as a whole. Thus, the labor costs are equal to the target household number⁸ divided by 1000, and multiplied by the average wage of two such laborers.
2. Network expansion costs include mobile phone set-up costs and internet fees. Mobile phone costs will be measured by the average costs of buying a smartphone, multiplied by the target household number in Luonan (target area). The internet fees will be measured by the average internet fees per household per year nationwide⁹. Thus, the total internet fees for the project will be calculated by multiplying the average internet fees by the target household number.

⁷ As it mentioned before, Digital Bulk Payments in Agricultural Value Chains is a type of program combines mobile payment and B2P to initiate a new agricultural value chain.

⁸ The household number in rural Shaanxi is calculated in the following way: rural population divided by the average number of people living in one house hold in Shaanxi.

⁹ This project will ensure that every household has at least one smartphone, so the average internet fees per household per year is equal to the internet fees per person per year.

The following table demonstrates the possible cost calculations based on the data sources (CHINAXIAOKANG, 2019; C.Textor, 2020a; Shaanxi Provincial Department of human resources and social security / Bureau of Statistic, 2019; Xinhua, 2019; X. Zhang, 2007) :

Labor Costs	Communication support wage	67603
	Technology support wage	135541
Network Expansion Costs	Mobile phone set-up costs	21834279.06
	Internet fees	8671402.148
Total Costs	32.3 million RMB	

Table 1: Alternative two implementation costs analysis

Effectiveness

UNCDF identified the four factors that had the greatest influence on the success of their projects: education or literacy; rural expansion; talent in technical support; and the number of Mobile Money (MM) agents (UNCDF, 2018). The effectiveness of the alternatives here will be measured in the following way.

In order to understand the effectiveness of the program, I will make a comparison between target rural areas in Uganda and China. As the most popular product in rural China is maize, I would choose the program “Digitizing the maize value chain with AgroWays and Mobipay” for analysis (UNCDF, 2018).

Education or literacy have a positive effect on the outcome of the project. Thus, I compared the literacy rates between the pilot area and project area. The literacy rates adopted for the effectiveness calculation of this alternative is from the Statista (C.Textor, 2019) and Knoema (KNOEMA, n.d.). If they are equal, I will apply a score of 0; if the project area is higher than the pilot area, I will score it as 1; if the project area is lower than the pilot area, it will gain a score of -1 (See Table 2).

Rural expansion¹⁰ has a negative effect on the outcome of the project. As it is difficult to find the date reveal the rural expansion, I use the “urbanization” to measure the rural expansion, and the data I adopt here is also from the Statista (C.Textor, 2020b). I compared the urbanization between two areas, and applied the score for the next step calculation (See Table 2).

For talent in technical support and number of MM agents, I will apply the score of 1 for these two measurements. This is mainly because China is facing a digital payment revolution, whether its technical support or the number of mobile payment agents, they are at the leading level in the world (CGAP, 2019b).

The following table illustrates the calculations, and then I added the applied scores together to reach an intermediate effectiveness measure.

	Percentage of education or literacy	Urbanization Rate	Talent in technical support	Mobile Money agents
Pilot Area	76.50%	23.77%	N/A	N/A
Project Area	89.12%	58.13%	N/A	N/A
Applied Score	1	1	1	1

Table 2: Alternative two effectiveness analysis

The intermediate outcome, the percentage of farmers paid digitally, will be projected by the data received from the pilot areas. I assume that each score has a 10 percent effect. In this case, the accumulated score is 4, so I will add 40 percent to the pilot outcome. According to the data published by the UNCDF, the percentage of farmers paid digitally in pilot areas is equal to 13.85% (UNCDF, 2018). Thus, the 53.85 percent of farmers will be paid digitally with this alternative.

¹⁰ Rural expansion means that the increase number of rural areas or rural people.

Then, the long-run effectiveness will be calculated by the percentage of farmers who have access to a loan with a bank account, multiplied by the intermediate outcome. According to the annual report published by the People's Bank of China, around 75% people with a bank account have access to loans (People's Bank of China, 2018). Thus, the long-run effectiveness is equal to 40.39 %.

Lastly, the percentage of farmers have bank account who have access to loans is projected based on the rural housing ownership rate and rural microfinance default rate.

Based on these calculations, I will supply a basic score of “High” (70%-100%), “Medium” (40%-69%), or “Low” (0%-39%). In conclusion, this alternative will receive a **medium** score of effectiveness.

Political Feasibility

This alternative is a market-based option, which will not generate a negative influence on the authority of the government. China's central government has released many policies to support agricultural development. Thus, this alternative will receive the support of regulators.

In this alternative, the partners will be digital payment companies, such as Alipay and WeChat Pay. Both are market-based companies, so this is an excellent opportunity for them to expand their market. Thus, they will support this program.

In conclusion, this alternative will receive a **high** score of political feasibility.

Sustainability

With the agricultural value chain, farmers will benefit in all aspects of their lives into the future. enter a virtuous circle. They will have access to the loans, and future investment is no longer needed. Additionally, farmers will sell all of their agricultural products, so their income will increase. In conclusion, the sustainability of this alternative is **high**.

Evaluating alternative three: Combine the digital payment with utility bills

Implementation Cost

Ant Financial, CGAP and the Chinese government will be included in the program to promote digital payments to rural communities to pay for their utility bills. Ant Financial has already provided such a service to its customers. Now, CGAP needs to persuade remote individuals to use it.

The main implementation costs in this alternative are those associated with network expansion and farmers.

1. The network expansion costs include mobile set-up costs, internet fees and costs of a persuasion campaign. The evaluation methods of mobile set-up costs and internet fees are the same as those in Alternative Two. In China, the persuasion campaign is different than in western countries. The most efficient way to persuade people to use the use the digital payment is to hire people to go one by one to the households and show the farmers how to use it. Thus, the main cost of persuasion campaign is the labor cost. I calculated the labor costs like I did in alternative two.

Network Expansion Costs	Mobile phone set-up costs	21,834,279.06
	Internet fees	8,671,402.15
	Costs of a persuasive campaign	1,758,027.26
Farmers' Costs	Mobile phone set-up costs	1595128.289
Total Costs	30.7million RMB	

Table 3: Alternative three implementation cost analysis

2. Farmers' costs: Utility bills will not change by changing the payment method, but farmers' costs will be reduced because they will not need to spend as much time to travel to a physical building to pay their debts. Most rural areas do not have developed transportation, so each household will spend half a day each month paying for bills (Liu, 2006). Thus, the farmers reduce their costs equal to the average income per farmer that will be received over six days per year.

The above table 3 demonstrates the possible cost calculations based on the data sources (C.Textor, 2020c; NBS, n.d.).

Effectiveness

Changshu is a county (*xian*) in the Eastern China, similar in size to the targeted area of this project. However, in Changshu (pilot area), approximately 90 percent of households use digital payment for their utility bills (Yang, 2017). There are two main constraints on the usage of digital payments for utility bills: participants' education, and age (percentage of young generation).

Like the effectiveness analysis in the Alternative Two, I will give scores of 1, 0 and -1 by comparing the above three factors between Changshu and Luonan, and add these scores together.

	Percentage of education or literacy	Percentage of young generation	Smartphone use
Pilot Area	90.84%	50.65%	N/A
Project Area	89.12%	50.77%	N/A
Applied Score	-1	1	-1

Table 4: Alternative three effectiveness analysis

The intermediate outcome, the percentage of farmers using digital payment, will be projected by the data received from Changshu. I assume that one score has a five percent effect. For example, if the accumulated score is two, I will add 10 percent to the pilot outcome. According to the annual report published by the People's Bank of China, around 88% people in rural areas in Jiangsu

province use the digital payments (People's Bank of China, 2018). Thus, the intermediate outcome is equal to 83%.

Then, the long-run effectiveness is calculated by the percentage of farmers who have access to a loan using digital payment multiplied by the intermediate outcome. People who have access to the digital payment will have access to kinds of loans provided by the digital payment companies. However, only young generations are willing to try to use it. Therefore, the long-run effectiveness is equal to the intermediate outcome multiplied by the percentage of the young generation, which is equal to 42.41% (City of Population, 2019a, 2019b; C.Textor, 2019; State Information Center, 2019). Lastly, I will give a basic score of high (70%-100%), medium (40%-69%), or low (0%-39%). In conclusion, this alternative will receive a **medium** score of effectiveness.

Political Feasibility

The political feasibility of this alternative is **high**. There are partners in this alternative: CGAP, Ant Financial, and the Chinese government. As there have already been similar services provided by Ant Financial, cooperative agreements have been reached with the government. Thus, Ant Financial and the government will support the program. Additionally, there will be low costs for CGAP, so the program will receive support from CGAP.

Sustainability

The sustainability of this alternative is **medium**. When people use the digital payment to pay their utility bills, they will have access to loans; however, we are not sure how they can use the money in the future, so it is unclear if poverty can be alleviated for the long-term. People have already registered the digital payment, so money will not need to be re-invested in the future.

Evaluating alternative four: Lend money to subsidize farmers running their own businesses based on e-commerce.

Implementation Cost

The main implementation costs in this alternative are those for network expansion and fees to ship goods to customers.

1. The network expansion costs include mobile set-up costs, internet fees, and e-commerce platform registration fees. The evaluation methods of mobile set-up costs and internet fees are the same as that in Alternative Two. E-commerce platform registration fees will be projected by the average registration fees for Taobao, which is the largest e-commerce platform in China.
2. The shipping fees will be evaluated by the average fees in Shuyang, which is located in the Eastern China and is developed in e-commerce. However, as the shipping industry is more developed in the east of China, the shipping fee in target areas will be multiplied by 1.5, as it costs 1.5 times more per kilogram to deliver goods from Suzhou than from Shaanxi. According to the interview with an e-commerce operator in Shuyang, its average shipping fees per year is around ten thousand RMB.

The following table demonstrates the possible cost calculations based on the data sources (*How Much Does It Cost to Open a Taobao Store?*, n.d.).

Network Expansion Costs	Mobile phone set-up costs	21,834,279.06
	Internet fees	8,671,402.15
	E-commerce registration fees	86,540,939.60
Shipping fees	86540939.6	
Total Costs	125.7million RMB	

Table 5: Alternative four implementation cost analysis

Effectiveness

Shuyang is a county (*xian*) in Eastern China, and is similar in size to the targeted area of this project. Shuyang (pilot area) is fully developed in e-commerce. There are three main constraints on the usage of digital payments for running business through e-commerce platform: education, age (specifically the individuals 20-49 years old), and transportation.

I compared the above three factors between Shuyang and Luonan, and added these scores together. The intermediate outcome, the percentage of farmers participating in e-commerce, will be projected by the data received from Shuyang. I assume that one score has a five percent effect. For example, if the accumulated score is two, I will add 10 percent to the pilot outcome.

The following table illustrates the calculation, then I will add applied scores together (City of Population, 2019a, 2019b; C.Textor, 2019; *Shuyang mode "Internet + Sannong" model*, n.d.).

	Percentage of education or literacy	Percentage of young generation	Transportation
Pilot Area	90.84%	50.65%	N/A
Project Area	89.12%	50.77%	N/A
Applied Score	-1	1	-1

Table 6: Alternative four effectiveness analysis

The percentage of farmers participating in e-commerce in Shuyang is 38 percent. Thus, the intermediate outcome is 33%.

Then, the long-run effectiveness will be calculated by the percentage of farmers who have access to a loan and are doing business through an e-commerce platform, multiplied by the intermediate outcome. According to the annual report published by the People's Bank of China, around 90% people with bank account have access to loans (People's Bank of China, 2018). Thus, the long-run effectiveness is equal to 29.70%.

Lastly, I will supply basic scores of "High" (70%-100%), "Medium" (40%-69%), and "Low" (0%-39%). In conclusion, this alternative will receive a **low** score of effectiveness.

Political Feasibility

Three stakeholders are included in this policy option: CGAP, Alibaba, and the Chinese government. The similar programs have already been implemented in Shuyang, and both the private firm Alibaba and farmers have gained benefits from these programs. Alibaba and the government will support the similar programs implemented in other areas. However, for CGAP, it will not lend money to China. Recently, there were some debates on whether China could enjoy the loan benefit for developing countries from the World Bank. CGAP is a consulting group under the World Bank, so it is unclear if CGAP will support lending money to subsidize Chinese farmers.

In conclusion, the political feasibility of this alternative is **medium**.

Sustainability

After this program, farmers will run their own e-commerce business. They will enter be able to continue their successes which could assist them alleviate the poverty. Additionally, as businesses has already been set up, money will not be needed in the future. Thus, the sustainability of this alternative is **high**.

OUTCOME MATRIX

	Criteria				
Alternatives	Cost (20%)	Effectiveness (40%)	Political feasibility (20%)	Sustainability (20%)	Total Score
Alternative One: Status Quo	High(1)	Low (-1)	Medium (0)	Medium (0)	-0.2
Alternative Two: Implement Digital Bulk Payments in Agricultural Value Chains	Medium (0)	Medium (0)	High (1)	High (1)	0.4
Alternative Three: Combine the digital payment with Utility Bills	Medium (0)	Medium (0)	High (1)	Medium (0)	0.2
Alternative four: Suggest the CGAP lend money to subsidize farmers to run their own business based on e-commerce.	Low (-1)	Low (-1)	Medium (0)	High (1)	-0.4

Table 7: Outcome matrix

RECOMMENDATION (Trade-off)

The cost will be measured by adding up the costs of implementing the different programs. Their sustainability will be calculated by how much money the targeted farmers will earn. All amounts will be calculated in terms of RMB. I will then compare the results between alternatives 2,3, and 4 with the status quo. A higher cost is associated with a lower score.

Up to the present, all alternatives have been measured based on the criteria in the Outcomes Matrix above with a score of “High” (1), “Moderate” (0), or “Low” (-1). As Effectiveness is the most important among the criteria, I will apply a weight of 40% to it. I weight sustainability, cost, and political feasibility all at 20%. I will then calculate the results and choose the alternative with the highest score. The following table illustrates the calculation:

According to the table 7, alternative two received the highest score. Thus, I recommend that CGAP implements digital bulk payments in agricultural value chains.

IMPLEMENTATION

According to the agricultural value chain mentioned before¹¹, seven stakeholders are involved in the process of implementation: CGAP, farmers, agricultural product traders, mobile payment agents, formal banks, smartphone manufactures, and government. The responsibility for CGAP is to combine stakeholders, set up the value chain, and enable it to work efficiently.

There are four prerequisites for the successful implementation of the policy option. There needs to be a high ratio of network coverage (smartphone and internet), advanced digital literacy among the population, sufficient mobile payment agents, and enough traders of agricultural products. These prerequisites create the network necessary to implement the technology.

There are three steps to implement this technology:

Step one: Form a team to carry out the implementation

CGAP first needs to do is to set up a team to carry out the work. The team leader is a CGAP employee who has the experience in implementing similar programs and maybe better if the person is fluent in mandarin. As most farmers in the countryside cannot speak Mandarin, CGAP also needs to gather volunteers who can speak Shaanxi dialect for translation, such as college students (Y. Zhang, 2012). However, Mandarin is necessary because it is the most widely used language in China, which is convenient for labors to communicate. Also, CGAP needs to hire new people to lead the project in China and train the new employees to take on the new project. These employees need to be qualified with high communication skills especially in China, and be familiar with how to use the digital payment in China.

Step two: Establish the digital infrastructure and increase digital literacy

The digitization of agricultural value chains is based on the internet and mobile payments. Firstly, CGAP needs to set up mobile infrastructure, including internet infrastructure and accessibility to

¹¹ This have been mentioned in “Alternative two”

smartphones. For the internet infrastructure, Chinese government has already implemented related policies to reach the full coverage of internet in rural areas, so CGAP does not need to consider this (Guangming Daily, 2019). For smartphones, CGAP needs to fund mobile phone sales. Ideally, each household has at least one smartphone. To achieve this, CGAP can connect with the domestic mobile phone manufacturers like Huawei and OPPO to sell them directly to the rural farmers. Farmers may refuse to buy phones because of the high price, CGAP can give them a specific subsidy when farmers would like to pay for phones. This cost has been included in the implementation costs projection.

Secondly, CGAP needs to set up some consultant programs to increase the register ratio of mobile payment and improve people's digital literacy. To do this, I suggest CGAP to organize some related trainings. In training, people from CGAP or volunteers can introduce basic knowledge of mobile payment and benefits farmers can receive from it. Meanwhile, they can assist farmers in registering bank account and mobile payment accounts on the spot. As most of the physical bank in the village level are nearby the government building, CGAP can negotiate with the government to rent the venue for training.

Step three: Build the agent network

After building the digital infrastructure, CGAP needs to establish the agent network of the agricultural value chain. The agent network refers to the cooperation among three principal partners: farmers, mobile payment agents, and traders (GSMA, 2017).

Firstly, CGAP needs to connect with farmers to tell them what they can gain from the program, such as the improvement of income and full access to loans in the future, to persuade them to join the program. Employees in CGAP can walk around in the village and go to different households to work. (Most of families living in one village are not far away from each other in China.)

The second step is to persuade mobile payment agents such as Alipay, WeChat pay and Lakala to participate in the program. This may be easier, as it is a good way for them to improve their market size. CGAP can reach out specifically to Alipay and WeChat pay.

Now farmers mainly sell their agricultural products directly to scattered individuals, which will lead to unsalable agricultural products. The reason why farmers cannot sell to retailers in large quantities is that they do not have a way to collect money other than cash. CGAP's next action is to negotiate with retailers to buy the agricultural products produced by farmers, and tell them they can pay these agricultural products through digital payments. This process may not be easy, as the quantity of agricultural product is low from small farmers and are not competitive. CGAP can tell retailers that they will gather crops together before selling them. This is in line with the government's "Sannong" policy¹², which can assist them in receiving some benefit from the government. The potential traders CGAP can reach out to Shaanxi Laoniufu Flour Company and Shaanxi Fengxiangxian Flour Mill.

There are two main risks I consider in implementation. The first one is network externalities. The success of this program was decided by if there are enough farmers to be on the network, and the participation of stakeholders like mobile payment companies and agricultural products retailers. If they are willing to join the program, the implementation of the project will be more straightforward. Second, as the COVID-19, policies become uncertainty. Policies like the cancellation of flights and China's strict isolation strategy may cause the implementation of the project very difficult. If this happened, I suggest CGAP to delay the implementation of the program. This is mainly because after the virus, in order to recover the economy, investment will be welcomed in China, it will be easier to implement the program at that time.

¹² Government will provide some subsidies to the enterprise if it fit the requirement of "Sannong".

REFERENCES

- 1991t Internet Data Center. (2015, May 4). *Huabei: Report on the Consumption and Life of Chinese Young People in 2017*. <http://www.199it.com/archives/590060.html>
- AliResearch. (2019). *The list of Taobao village and Taobao town cities in 2019*. <http://www.aliresearch.com/cn/information/informationdetails?articleCode=21850&type=%E6%96%B0%E9%97%BB>
- Ant Financial. (n.d.). *Ant Family*. Retrieved April 17, 2020, from <https://www.antfin.com/family.htm>
- Ant Financial. (2020). <https://www.antfin.com/family.htm>
- Beyond Fintech -A Pragmatic Assessment of Disruptive Potential in Financial Services*. (n.d.). Retrieved April 12, 2020, from http://www3.weforum.org/docs/Beyond_Fintech_-_A_Pragmatic_Assessment_of_Disruptive_Potential_in_Financial_Services.pdf
- CBRC. (2019, September 20). *CBRC: 1631 rural banks have been set up in China*. http://www.xinhuanet.com/fortune/2019-09/20/c_1125021139.htm
- CEWEEKLY.CN. (2015, November 30). *A picture to understand the national poverty-stricken counties*. <http://www.ceweekly.cn/2015/1130/134211.shtml>
- CGAP. (2019a). *Fintechs and Financial Inclusion*. <https://www.cgap.org/research/publication/fintechs-and-financial-inclusion>
- CGAP. (2019b, September). *China: A Digital Payments Revolution*. <https://www.cgap.org/research/publication/china-digital-payments-revolution>

- Chan, K. W. (2010). The household registration system and migrant labor in China: Notes on a debate. *Population and Development Review*, 36(2), 357–364.
<https://doi.org/10.1111/j.1728-4457.2010.00333.x>
- China Agricultural News Network. (2017). *Unsalable agricultural products*.
<http://www.farmer.com.cn/zt2017/ncpzx/>
- CHINAXIAOKANG. (2019, August 14). *Luonan County, Shangluo City, Shaanxi Province*.
<http://mxy.chinaxiaokang.com/wap/xianyu/xianyuzhanshi/shanxishangluoshiluonanxian/luonanyilan/2019/0814/778063.html>
- City of Population. (2019a, July 30). *China, Jiangsu*.
<https://www.citypopulation.de/zh/china/jiangsu/admin/>
- City of Population. (2019b, July 31). *China, Shaanxi*.
<https://www.citypopulation.de/zh/china/shaanxi/admin/>
- CNKI. (n.d.). *Data of per capita income*. Retrieved April 12, 2020, from
<http://number.cnki.net/cyfd/MetaShow.aspx?areacode=xj101303&zhibiao=%E5%86%9C%E6%B0%91%E4%BA%BA%E5%9D%87%E6%94%B6%E5%85%A5&pn=%E6%B2%AD%E9%98%B3%E5%8E%BF>
- C.Textor. (2019, November 22). *China: Literacy/illiteracy rate by region*. Statista.
<https://www.statista.com/statistics/278568/illiteracy-rate-in-china-by-region/>
- C.Textor. (2020a, February 13). *China: Average household size by province 2018*. Statista.
<https://www.statista.com/statistics/1087871/china-average-household-size-by-region-province/>

C.Textor. (2020b, February 13). *China: Urbanization by province 2018*. Statista.

<https://www.statista.com/statistics/1088173/china-urbanization-rate-by-region-province/>

C.Textor. (2020c, February 24). *China: Age distribution of urban population in Jiangsu 2018*.

Statista. <https://www.statista.com/statistics/1099419/china-age-distribution-of-urban-population-in-jiangsu/>

Duflos, E., & Klapper, L. (2015, June 18). *New accounts in China drive global financial inclusion*

figures. <https://blogs.worldbank.org/eastasiapacific/new-accounts-china-drive-global-financial-inclusion-figures>

eLoan. (2020). *About us-eLoancn*. <https://www.eloancn.com/page/aboutUs.jsp>

FINANCIAL NEWS. (2018, August 9). *From rural credit cooperatives to rural commercial banks:*

Exploring the way of commercialization and restructuring.

http://www.financialnews.com.cn/ncjr/focus/201808/t20180809_143795.html

Group Profile—Ant Financial. (2020). <https://www.antfin.com/introduction.htm>

GSMA. (2017, September 12). *Opportunities in agricultural value chain digitisation: Learnings*

from Uganda. Mobile for Development.

<https://www.gsma.com/mobilefordevelopment/resources/opportunities-in-agricultural-value-chain-digitisation-learnings-from-uganda/>

Guangming Daily. (2019, October 14). *Village infrastructure construction needs to be upgraded*.

http://www.gov.cn/zhengce/2019-10/14/content_5439186.htm

How much does it cost to open a Taobao store? (n.d.). Retrieved April 12, 2020, from

https://zhidao.baidu.com/question/1517170745336576620.html?qbl=relate_question_0

IFC. (2017). *How Fintech is Reaching the Poor in Africa and Asia: A Start-Up Perspe.*

https://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Financial+Institutions/Resources/How+Fintech+is+Reaching+the+Poor+in+Africa+and+Asia+A+Start-Up+Perspective

Juhui Data. (2017). *GDP of Shuyang*. <https://m.gotohui.com/gdp-1974>

KNOEMA. (n.d.). *Uganda Adult literacy rate, 1960-2019—Knoema.com*. Knoema. Retrieved April 12, 2020, from <https://knoema.com/atlas/Uganda/topics/Education/Literacy/Adult-literacy-rate>

Li, R., & Li, N. (2004, December). *Studies on the Borrowing Behavior of Rural Households and Welfare Effects—《Economic Research Journal》2004 年 12 期*. http://en.cnki.com.cn/Article_en/CJFDTotol-JJYJ200412011.htm

Literature review of rural banking industry in China. (2018, June 22). 知乎专栏. <https://zhuanlan.zhihu.com/p/38390503>

Liu, C. (2006). *The dilemma and way out in the collection of rural water fee*. http://www.pkulaw.cn/fulltext_form.aspx?Db=qikan&gid=1510093388

Meng B. (2017, July 20). *Use cash in China? You'er out of date*. 纽约时报中文网. <https://cn.nytimes.com/china/20170718/china-cash-smartphone-payments/>

Meng, J. (2015, October 16). *WB: China's National Poverty Line Is Higher Than Its New Standard—Beijing Review*. http://www.bjreview.com/Opinion/201510/t20151016_800040481.html

MYBANK Annual Report. (2018, July 26). MyBank. <https://mybank.no/en/investor-relations/reports-and-presentations>

NBS. (n.d.). *National data*. Retrieved April 12, 2020, from <http://data.stats.gov.cn/easyquery.htm?cn=E0103>

NBS. (2018, December 14). *Announcement of National Bureau of statistics on grain production in 2018*. http://www.stats.gov.cn/tjsj/zxfb/201812/t20181214_1639544.html

Ong, L. (2013, June 19). China's rural credit problem. *East Asia Forum*. <https://www.eastasiaforum.org/2013/06/19/chinas-rural-credit-problem/>

PEOPLE.CN. (2015, June 2). *Ministry of Civil Affairs: China's rural hollowing out is becoming increasingly significant. The total number of left behind workers exceeds 150 million*. <http://politics.people.com.cn/n/2015/0602/c70731-27093835.html>

People's Bank of China. (2018). *China Rural Finance Service Report*.

PPM_Rural-Entrepreneurship. (n.d.). Retrieved April 12, 2020, from http://www.paulsoninstitute.org/wp-content/uploads/2017/02/PPM_Rural-Entrepreneurship_Peng_Turvey_Kong_Chinese.pdf

Riecke, J. (2014, September 23). *China's Microfinance Landscape: Nonprofits, Microcredit Companies, Rural Financers, and Alibaba* | Center for Financial Inclusion. <https://www.centerforfinancialinclusion.org/chinas-microfinance-landscape-nonprofits-microcredit-companies-rural-financers-and-alibaba>

Shaanxi Provincial Department of human resources and social security / Bureau of Statistic. (2019, July 22). *Average salary of Shaanxi Province in 2018.*

<http://www.gszybw.com/gs/shuju/shanxis/8347.html>

Shuyang mode "Internet + Sannong" model. (n.d.). Retrieved April 12, 2020, from

<http://report.idx365.com/%E9%98%BF%E9%87%8C%E5%B7%B4%E5%B7%B4%E3%80%8A%E6%B2%AD%E9%98%B3%E6%A8%A1%E5%BC%8F%E2%80%94%E2%80%94%E4%BA%92%E8%81%94%E7%BD%91%2B%E4%B8%89%E5%86%9C%E2%80%94%E5%85%B8%E8%8C%83%E3%80%8B.pdf>

State Information Center. (2019, October 23). *2019 China Mobile Payment Development Report.*

<http://www.100ec.cn/detail--6531229.html>

Statista. (n.d.). *China: Urban and rural population.* Statista. Retrieved April 12, 2020, from

<https://www.statista.com/statistics/278566/urban-and-rural-population-of-china/>

The shortcomings and improvement of rural finance. (2019, July 7).

<https://www.fanwen.biz/article/6793.html>

Tianfeng Securities. (2018, September). *How Fintech Changes Rural Finance.*

<https://www.hotbak.net/key/%E5%A4%A9%E9%A3%8E%E8%AF%81%E5%88%B8%E9%93%B6%E8%A1%8C%E8%A1%8C%E4%B8%9A%E6%8A%A5%E5%91%8AFi%20ntech%E5%A6%82%E4%BD%95%E5%8F%98%E9%9D%A9%E5%86%9C%E6%9D%91%E9%87%91%E8%9E%8D%E8%AF%A6%E8%A7%A3%E8%9A%82%E8%9A%81%E9%87%91%E6%9C%8D.html>

- Tianyan Research. (2018, December 20). *Report on the Internet Finance inclusive achievement of Tianyan in 2018*. <https://news.p2peye.com/article-532030-1.html>
- UNCDF. (2018, October 12). *Case Studies—Learning in the Field: Implementing Digital Bulk Payments in Agricultural Value Chains in Uganda—UN Capital Development Fund (UNCDF)*. <https://www.uncdf.org/article/3998/case-studies---learning-in-the-field-implementing-digital-bulk-payments-in-agricultural-value-chains-in-uganda>
- UNDP-CH-PR-Publications. (n.d.). Retrieved April 12, 2020, from [https://www.undp.org/content/dam/china/img/povred/UNDP-CH-PR-Publications-%20%E8%81%94%E5%90%88%E5%9B%BD%E5%BC%80%E5%8F%91%E7%BD%B2%E5%A4%A7%E6%95%B0%E6%8D%AE%E5%87%8F%E8%B4%AB%E6%8A%A5%E5%91%8A%20%E7%BB%88%E7%A8%BF-CH%20\(2\).pdf](https://www.undp.org/content/dam/china/img/povred/UNDP-CH-PR-Publications-%20%E8%81%94%E5%90%88%E5%9B%BD%E5%BC%80%E5%8F%91%E7%BD%B2%E5%A4%A7%E6%95%B0%E6%8D%AE%E5%87%8F%E8%B4%AB%E6%8A%A5%E5%91%8A%20%E7%BB%88%E7%A8%BF-CH%20(2).pdf)
- World Bank. (n.d.). *Poverty headcount ratio at national poverty lines (% of population)—China / Data*. Retrieved April 12, 2020, from <https://data.worldbank.org/indicator/SI.POV.NAHC?locations=CN>
- Xie, P. (2003). Reforms of China's rural credit cooperatives and policy options. *China Economic Review*, 14(4), 434–442. <https://doi.org/10.1016/j.chieco.2003.09.015>
- Xinhua. (2019, February 27). *China's high-end smartphone market grows rapidly—Xinhua / English.news.cn*. http://www.xinhuanet.com/english/2019-02/27/c_137855452.htm
- Yang, C. (2017, August 10). *The Coverage rate of Alipay's life payment*. <https://iask.sina.com.cn/b/CDBBKU6JLV.html>

- Yongjian Li, & Wang, N. (2017). *Annual Report on the Development of “Tri-agricultural” Internet Finance in China (2017)*.
- Yuan, Y., & Xu, L. (2015). Are poor able to access the informal credit market? Evidence from rural households in China. *China Economic Review*, 33, 232–246.
<https://doi.org/10.1016/j.chieco.2015.01.003>
- Zavolokina, L., Dolata, M., & Schwabe, G. (2016). The FinTech phenomenon: Antecedents of financial innovation perceived by the popular press. *Financial Innovation*, 2(1), 16.
<https://doi.org/10.1186/s40854-016-0036-7>
- Zhang, M., & Liu, Z. (2014, May 13). *Postal Savings Bank of China: Inclusive Finance in Rural China*. <https://www.cgap.org/blog/postal-savings-bank-china-inclusive-finance-rural-china>
- Zhang, X. (2007, May 18). *How much is too much for Internet access?*
https://www.chinadaily.com.cn/china/2007-05/18/content_875898.htm
- Zhang, Y. (2012). *On the social function of Shaanxi dialect from the perspective of Sociolinguistics*.
<http://wap.cnki.net/touch/web/Dissertation/Article/10697-1012444108.nh.html>
- ZHIHU. (2018, August 31). *2018 Rural Credit Cooperatives Loan: High demand? For whom?*
知乎专栏. <https://zhuanlan.zhihu.com/p/43428059>

APENDIX A: Map of China



Eastern China: Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan.

Middle China: Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi.

Western China: Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang.