

# **Participatory Monitoring and Evaluation of Biogas Project**

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The biogas project in Chaoshan village is one project of Energy Sources Office of Agriculture Bureau of Changshun County. Energy Sources Office mainly implemented biogas project in south of Changshun County and did not intend to implement biogas project in north of Changshun County before 2002. The Community-based Natural Resource Management project team of Guizhou Academy of Agricultural Sciences (GAAS) thought biogas project was good for natural resource protection, so they made the efforts to get a biogas project for Chaoshan village from Energy Sources Office. The CBNRM project team facilitated farmers to monitor and evaluate the biogas project.

## **Chaoshan village**

Chaoshan village is one of the eleven natural villages in the administration village. It has 63 households and 280 people. Most of the villagers are farmers, relying on agriculture for their life, Chaoshan village has 480 Chinese mu of paddy field and 180 Chinese mu of upland.

Local farmers cook food and prepare pig food by firing coal and firewood, they should input some labors to collect firewood and firing. Every household would collect 5 ton firewood from forest. And every household should input 4 hours to cook food and pig food.

The villagers visited some outside villages of Changshun County and found out that it is very convenient to cook food by biogas. So they decided to apply for biogas project.

## **Biogas Project**

Energy Sources Office mainly implemented biogas project in south of Changshun County. So the farmers in north of Changshun were difficult to apply for biogas project. In early 2002, the farmers wanted to apply for biogas project from the small grant project committee of CBNRM project. The CBNRM project team thought that biogas project was good to natural resource management, so project team and leaders of Kaizuo government went to Agriculture Bureau of Changshun County and negotiated with leaders of agriculture bureau. Finally, agriculture bureau agreed to implement biogas project in Chaoshan village, agriculture bureau would provide 800 Yuan worthy of material for each household to build biogas pool, pig sty and washroom. But the agriculture Bureau could only supported 16 households. In fact, farmers should input more than one thousand Yuan additionally to build biogas pool, pigsty and washroom. And the farmers should raise at least two pigs to support biogas pool so that biogas pool could produce enough biogas for cooking. Considering this reason, the CBNRM project team and Kaizuo government decided to support 300 Yuan from CBNRM small grant to each households that would implement biogas project.

## Whose project?

In the negotiation with agriculture bureau leaders, the CBNRM project team and Kaizuo government advocated that agriculture bureau could try participatory methods in biogas project. That implied that Chaoshan village would participate in the decision-making, design, implementation, monitoring and evaluation of biogas project, because they were the beneficiaries and hence the ones who had to shoulder the responsibility of using and maintaining the facility. The township leader and the GAAS project leader held a fruitful discussion at the county agriculture bureau with the bureau leader who was one of the officials was not interested in trying CBNRM approach in their projects. He said that county agriculture bureau applied for biogas project from prefecture agriculture bureau. That was to say, prefecture distributed task to county agriculture bureau. Prefecture agriculture bureau and province agriculture department had their own principle to implement biogas project. County energy office was in charge of decision-making, design, implementation, monitoring and evaluation. In the implementation process, county energy office provided technicians to guide farmers to build biogas pool. And farmers should input labors.

After Kaizuo Township government applied for biogas project, they went to Chaoshan village again and mobilized villagers. Because there were only 16 households that could be supported, Kaizuo Township government selected 16 households that were active in biogas project. Each household that would like to build biogas pool should give 100 Yuan to Kaizuo Township government as deposit and transportation expenses.

In Chaoshan village biogas project, villagers did not participate in decision-making, design process. It was a usual way to implement the government-funded projects. Villagers just input labor and money. Because 16 households could benefit from biogas project, they should pay more attention to quality of biogas project. GAAS researchers mentioned that farmers should participate in implementation, monitoring and evaluation. One of the important aims was to enhance capacity of farmers and ensure quality of the biogas pools instead of not to support Construction Company to make money. The farmers and the township officials accepted this suggestion. In March 2003, Mr. Yang Zhengquan, vice leader of CBNRM in Kaizuo township gave a camera to Chaoshan village leader from small grant, and taught him how to use it. So he could take picture when he found some problems in the process of biogas project, and then told Kaizuo township government and CBNRM project team. After a few days, CBNRM researchers realized that Kaizuo township government gave a camera to Chaoshan village leader and commanded him to monitor the biogas project was not good ways. Every beneficiary should know participatory monitoring ways and would like to contribute their responsibilities. So CBNRM researchers consulted with township leader if we should held a meeting in Chaoshan village to discuss participatory monitoring ways. But Kaizuo township leaders said that they agreed to this idea. But they were very busy in that season; they could not participate in that meeting.

We discussed the purpose of that meeting with Chaoshan village leader first, he agreed and

promised to organize that meeting. In a night of March, CBNRM researchers went to Chaoshan village and held a meeting. 18 farmers attended that meeting including village leader and 8 women. CBNRM researchers explained the purpose of the meeting. It was nice that CBNRM researchers mentioned that they came for the farmers' ideas and decision. Then Chaoshan village leader explained the purpose again. CBNRM researchers invited Chaoshan village leader facilitate that meeting. Firstly, CBNRM researchers and villagers discussed how to monitor the biogas project. Villagers could evaluate the biogas project by their own criteria. Secondly, CBNRM researchers and villagers discussed how to select a villager to take charge monitoring. The criteria that villagers discussed as following: (1) having responsibility; (2) be active; (3) having capacity; (4) having time. Thirdly, villagers began to select villager according to the criteria that they made. One villager suggested an old man to monitor biogas project. But the old man did not attend that meeting, and some village said that that old man was selfish. Some village suggested the village leader, but the village leader refused because he had no enough time. Some villagers suggested a woman to monitor the biogas project, but that woman said she dared not to do because she considered she had no capacity. Villagers discussed hotly. Finally, CBNRM researchers facilitated the meeting, according to villagers' idea, they suggested the village leader to take charge main task, and the other villagers should help the village leader when they were available. Villagers should discuss the biogas project together often and share experience. All villagers agreed. On that meeting, the village leader took two pictures, he looked very proud.

Afterward, CBNRM researchers often went to Chaoshan village and met the village leader. And help the village leader to monitor the biogas project.

### **Construction process of biogas project**

When each household gave 100 Yuan to Kaizuo township government, the biogas project started. Energy sources office supported each households with a ton of cement, 30 kilogram of steel, some pipe, biogas stove and biogas lamp. Villagers should input the other things such as stone, brick, and sand etc. The energy sources office send two technicians to Chaoshan to facilitate the biogas project; they mainly take charge of the technology of building biogas pool and fixing biogas system. Villagers should take charge of the other things such as building of biogas pool. Technicians and villagers worked together. Sometimes, villagers found some mistake of the technicians, and quarreled with the technicians. For example, after the biogas pool was mould, the technicians only paste lining once. But villagers were afraid that it would leak gas. They decided to paste the lining twice. Some villagers visited the other village and learned that the quality of biogas pool would be better if some special materials pasted the lining of biogas pool. But they did not know the name of the special materials and had no samples. They asked technicians if they know. But the technicians did not know it, and they said the quality of biogas pool made by them were no problem. Villagers asked for help to CBNRM project team and Kaizuo township government. But it is hard to found that special material that the villagers said.

There were only two technicians in Kaizuo Township, while there was 100-biogas pools in

Kaizuo Township. So the technicians were very busy, villagers should wait for the technicians even if they had prepared everything. Some villagers said it was very easy to pour biogas pool by themselves, because they went out to do some construction work. But they could not pour the biogas pool by themselves. Some households were lack of money, so they should go out to work to make money. So some households could not finish biogas pool in a short time. And the technicians said that they would fix biogas system when most of households finished biogas pool, because it was convenient to them. So some households had to wait for a long time even if they already finished biogas pool. The two technicians were also farmers; they had to go back home and planted corn and rice in planting season. The biogas project started November 2002, but the technicians fixed biogas system in June 2003. Villagers benefited from biogas project in July 2003. By July 2003, there also were 2 households that could not benefit from biogas project because construction was not completed since they were lack of money to cover the cost.

After the biogas pool and biogas system was finished, the two technicians left. They did not teach villagers how to use and manage biogas system and how to maintain biogas system. There was a handbook accompanied with biogas stove, so villagers could learn how to use and manage biogas system.

In August 2003, one biogas pool leaked biogas from the cover of biogas pool. At beginning, villagers did not know how to repair it. And the technician did not come Chaoshan village very often. They ask for help to Kaizuo township government, staff of Kaizuo Township did not know how to repair it also. So Kaizuo township leader called for energy sources office. The technician came and suggested that villager could use mud to block up biogas. But biogas still leaked out because mud was so soft. The technician did not solve the problem and left. So the villager could not use biogas for several weeks. One day, a villager suggested that they could use cement and mud together to block up the leak, it was not so soft and not so hard, and it was convenient to uncover the cover. It was a good idea; the villagers solved the problem by themselves.

## **Evaluation**

After the villagers used biogas for several weeks, CBNRM researcher had facilitated farmers to evaluate the biogas project, aiming to reflect experiences with the farmers and find rooms for improvements. The evaluation included 5 aspects: (1) input of biogas system, (2) quality of biogas system, (3) benefit of biogas project, (4) post-construction management and service, and (5) villagers' capacity. Small group discussions and stakeholders interviewing were conducted. CBNRM researchers interviewed all households that participated in the biogas project and collected villagers' opinion about the biogas project. They worked with villagers and respected villagers' opinion. The results of the evaluations are summarized as follows:

### **(1) Input of biogas system**

Energy sources office supported 800 Yuan of materials to each household to implement biogas project, and commanded villagers to build biogas system, pigsty and washroom together. In fact, 800 Yuan was not enough. Villagers should input additional money to buy stone, brick, sand, steel, and cement. According to villagers' calculation, it would cost villagers 1800 Yuan to build biogas system, pigsty and washroom together. So villagers should input 1000 Yuan additionally. Some households could not afford to pay it. So there were two households that could not finished biogas project and could not benefit from biogas project yet.

## (2) Quality of biogas system

There was 16-biogas system in Chaoshan village. Now, 14-biogas system can work well. The other two-biogas systems are not yet finished. Villagers reflected that quality of biogas system is good. It does not leak biogas.

## (3) Benefit of biogas project

Most farmers said that biogas could work well and provide enough biogas so that they can use biogas to cook. So they did not need to collect more firewood or buy more coal than before, and it is very convenient, save 30% labors time. Farmers can save some electricity after using biogas lamp. For example, a farmer said that it cost him 8 Yuan RMB before using biogas lamp, now it only cost him 4 Yuan RMB. The villagers found that village environment become better, because all manure of human and livestock be put into biogas pool and be fermented, fly and mosquito that transmit illness became less. Fermented fluid is good fertilizer to crops; crops that were applied with fermented fluid grew faster and tasted better than that were applied with chemical fertilizer. Women can save some labor to develop agriculture production, such as planting strawberry. So women can earn more money, it is useful to improve position of women. But biogas system cannot provide enough biogas to cook pig food. Most of villagers said the biogas pool designed by energy office was a little small.

## (4) Post-construction management and service

Energy sources office said that they would take charge post-construction management and service. But Chaoshan village is far away from county site. In fact, technician of energy sources office did not come Chaoshan village very often. So villagers manage biogas system by themselves. Some households burned their biogas lamp, while they did not know where they could buy. CBNRM researchers visited the technicians who take charge biogas project in Chaoshan village. The technicians said that they selected a villager working with them in another villager that implement 60 biogas system. And the technicians taught the villager how to build biogas pool, how to fix biogas system, how to repair biogas system. And energy sources office prepares to provide some affix to the villager to sell in that villager. Because in Chaoshan village, there were only 16 households participated in biogas project. So they did not intend to train a villager as technician. But maybe they would select one villager to sell affix such as biogas lamp for energy sources office.

## (5) Villagers' capacity

Villagers participated in implementation, monitoring and evaluation of biogas project; most villagers said that they learned some skills to repair biogas system. They can share their

experience to other villagers who would like to build biogas system.

## Issues raised

- Policy-making of biogas project

The objective of government is to solve the issues about firewood and to improve environment. Only energy sources office of agriculture bureau can apply for biogas project for farmers from government. Government can give 800yuan, 800yuan, and 1000yuan according to different specs as expiation. But government required that farmer have to build biogas pool, washroom and sty together, it will cost more than 1800yuan, so farmers have input some fund to build biogas pool, washroom and sty. That is to say that only rich household can afford to build biogas pool, washroom and sty, and benefit from biogas project. So biogas project did not pay attention to poor household, rural community develop overbalance.

Usually, government pay more attention to scale of biogas, for example, agriculture bureau of Changshun County required that there should have more than 70% household agreeing to biogas project in a village. So in depressed area, only few villages can meet with this criterion, it is unfair. CBNRM researchers suggested that government should add flexibility of biogas project when they make policy.

- Design of biogas project

Government designed biogas project, usually they did not ask farmer's need. For example, government designed 8 stere of biogas pool, but most farmers said that it could not supply enough biogas to cook for family and livestock. So they must collect some firewood or buy some coal additional, it is not too good to improve local environment. Or some farmers said that government scaling up some new breeding technology in place of traditional breeding ways, so farmers do not need to collect firewood again.

- Implementation of biogas project

Biogas project is a new thing to farmers, but government ignored introduction. So most farmers did not learn about biogas project, and did not willing to risk first. For example, government just told farmers to undertake biogas project in Chaoshan villager which has 63 households, farmers did not know benefit of biogas project, so only 15 household that are rich undertook biogas project. While in Jichang village which has 74 households, because a few households already benefited from biogas project in 2002, so 64 households undertook biogas project actively.

Energy sources office of agriculture bureau is in charge of biogas project, energy sources monopolize implementation of biogas project for their own department benefit, so there are no companies to compete with it. But energy sources office has no enough staff to implement biogas project; for example, there were only two technicians to implement 100-biogas pool in

Kaizuo Township in 2003. So the service was not good. However, some farmers said that they could implement biogas project by themselves if energy sources office train them.

Usually, government ignored roles of indigenous person with ability and indigenous knowledge. But indigenous knowledge has important role in biogas project. For example, government technicians always said farmers should raise more two pig if they undertake biogas, so some households did not undertook biogas project, because they were afraid that they could not afford to raise more than two pigs. But farmers found that cattle manure also could produce biogas, and there were enough cattle manure in their village. Another example, some biogas pool leaked, the technician said that mud could block biogas out, but not working. While farmers solved this problem by using mud and cement together.

- Management of biogas project

Government technicians left village after they finished biogas project, there is no person to manage biogas and provide services. Farmers did not know how to use biogas correctly and maintain biogas system. For example, biogas lamp of several households was burned, but they did not know where they could buy a new one. So some farmers suggested that government should train one or two farmers to maintain biogas system.