



Sustainable Development Verified Impact Standard

MUYUAN WJZ AWMS GHG MITIGATION PROJECT IN HENAN PROVINCE



Document Prepared by Profit Carbon Environmental Energy Technology
(Shanghai) Co., Ltd.

Project Title	Muyuan WJZ AWMS GHG Mitigation Project in Henan Province
Version	04
Date of Issue	24-July-2024
Project Location	Henan Province, P.R. China
Project Proponent(s)	Muyuan Foods Co., Ltd. Lu Chang Longsheng Industrial Park, Wolong District, Nanyang City, Henan Province, P.R China +86 199 6296 0254 hnsinglo@sohu.com
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Project Lifetime	15-July-2020 to 14-July-2035; 15-year lifetime
History of SD VSta Status	validation and first verification
Other Certification Programs	Verified Carbon Standard with project ID 2876
Expected Future Assessment Schedule	The initial SD VSta verification is happening concurrently with the validation. It is estimated that the Project will verify every year subsequently

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1 SUMMARY OF SDG CONTRIBUTIONS

Table 1: Summary of Project SDG Contributions

Row number	Estimated Project Contribution by the End of Project Lifetime	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Section Reference	Claim, Asset or Label
1)	Prior to the implementation of the project, the animal manure waste was left to decay in uncovered open lagoon at the livestock farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility. The project installs 7 sets of animal waste management system (AWMSs) to treat the swine manure in the 7 existing swine farms and the biogas generated during the treatment process is captured for heat generation. Total $3,287.1575 \times 10^4$ m ³ of biogas will be captured annually for heat generation.	7.0	Ensure access to affordable, reliable, sustainable and modern energy for local residents	Increase	3.2 #3,4	Claim
2)	14 permanent jobs (including 7 females and 7 males) for the local residents will be created during crediting period of the project.	8.0	Provide decent work for local residents	Increase	3.2 #1,2,3	Claim
3)	77,693tons of organic fertilizers will be produced annually.	12.0	Reduce waste generation through resource utilization	Increase	4.2 #2	Claim
4)	The project installs 7 sets of animal waste management system (AWMSs) to avoid methane emissions generated in the previous manure treatment process of uncovered anaerobic lagoons, which is the baseline scenario of the project. It is estimated that the annually emission reductions of the project will be 321,663 tCO ₂ e.	13.0	Tones of greenhouse gas emissions avoided	Increase	4.2 #1, VCS PD and validation report	SD VISta-labeled VCU

2 PROJECT DESIGN

2.1 Project Objectives, Context and Long-term Viability

2.1.1 Summary of Project Sustainable Development Objective(s)

Before the project, the animal waste generated by the swine farms were usually treated in the uncovered anaerobic lagoons at the project site. It is a kind of harmless treatment process for manure and permitted by laws and regulations of China¹. However, the methane generated in the anaerobic lagoons is emitted to the atmosphere directly without any recovery or reuse facilities. Besides, it is not mandatory by the local policy to take resourceful treatment technology for the animal manure. Therefore, uncovered anaerobic lagoon is still the most economic, viable and reasonable measures to treat the animal manure.

The project activity installs 7 new sets of animal waste management systems (AWMSs) to replace the previous uncovered anaerobic lagoons for the manure treatment. All the manure and wastewater of the 7 existing swine farms are collected into the collection tanks and then be separated firstly by solid and liquid separators. The solid is treated in aerobic composting system and the organic fertilizers can be produced, part of the fertilizer is distributed to local farmers for free and the others would be sold on the domestic market. The liquid is treated through anaerobic digestion and the biogas generated during the treatment process is captured for heat generation. If there is surplus biogas, then the biogas would be flared through the flaring system. After anaerobic digestion, the sludge produced from anaerobic digestion is treated through aerobic composting together with the separated solid, the effluent is used for agricultural irrigation. Sustainable development objectives of the project can be summarized as follows,

SDG 7 Affordable and Clean Energy

The biogas generated during the treatment process is captured for heat generation, the heat generated are all used by the operation of AWMSs and the 7 swine farms, which was provided by the coal-fired boiler without the project. Prior to the implementation of the project, all manure waste produced from the existing 7 swine farms was left to decay in 7 uncovered anaerobic lagoons at the livestock farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility. The project activity reduces of GHG and provides clean energy. $3,287.1575 \times 10^4 \text{m}^3$ of biogas are expected to produce annually. Compared with coal, biogas is a kind of clean and renewable energy. The project provides useful reference for the resourceful treatment technology of animal manure.

¹ <https://oss.baigongbao.com/2020/12/14/MRyhTKOcWC.pdf>

SDG 8 Decent Work and Economic Growth

It plans to create 14 permanent jobs for the local residents during operation period of the project. The job opportunities will be provided to the local residents fairly regardless of gender, age, education and other possible aspects of discrimination. The project will provide welfare and salary higher than the average level of local farmers. Equal salary will be paid for work of equal value.

SDG 12 Responsible Consumption and Production

The project activity is designed to install new AWMSs to treat the manure. After liquid-solid separation, the solid will be treated in aerobic composting system and the organic fertilizers will be produced, which partly will be supplied to the farmers living around free and partly will be sold as fertilizer. In the baseline uncovered anaerobic lagoons, no organic fertilizers can be generated. It *is estimated* that 77,693 tons of organic fertilizers will be produced annually.

SDG 13 Climate Action

The project installs 7 sets of animal waste management system (AWMSs) to avoid methane emissions generated in the previous manure treatment process of uncovered anaerobic lagoons, which is the baseline scenario of the project. It is estimated that the annually emission reductions of the project will be 321,663 tCO₂e. Besides, it will help to raise the awareness of climate change and GHG emissions for the local villagers.

2.1.2 Description of the Project Activity

The project activity installs 7 new sets of animal waste management systems (AWMSs) to replace the previous uncovered anaerobic lagoons for the manure treatment. The project activity will reduce of GHG in the atmosphere through avoiding methane emissions from controlled aerobic methane emissions generated in the previous manure treatment process of uncovered anaerobic lagoons.

Biogas is captured for heat production

The biogas generated during the treatment process is captured for heat generation, the heat generated are all used by the operation of AWMSs and the 7 swine farms, which was provided by the coal-fired boiler without the project. Prior to the implementation of the project, all manure waste produced from the existing 7 swine farms was left to decay in 7 uncovered anaerobic lagoons at the livestock farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility. The project activity reduces of GHG and provides clean energy.

Provide employment opportunity

Muyuan WJZ AWMS GHG Mitigation Project in Henan Province Project currently employs 14 full time staff members. This includes 7 female staff and 7 male staff responsible for daily managing, data recording and operation maintaining when necessary. The project activity contributes to

SDG 8 – Decent Work and Economic Growth, by aiming to increase well-paying employment opportunities by hiring residents in the area.

Furthermore, the project is implementing an Anti-Discrimination Recruitment Policy ensuring that the hiring and recruitment process does not discriminate based on gender and makes sure that an adequate number of women and members of other underrepresented groups are encouraged and have the opportunity to apply.

Organic fertilizer production

The project installs 7 sets of animal waste management system (AWMSs) to treat the manure which product the bio-organic fertilizers. The reuse of swine manure reduces the methane emissions from uncovered anaerobic lagoons in the project scenario. After liquid-solid separation, the solid will be treated in aerobic composting system and the organic fertilizers will be produced, which partly will be supplied to the farmers living around free and partly will be sold as fertilizer. The project activity would help ease their pressures in the economy.

The project activity has identified that it supports SDG 12 (Responsible Consumption and Production). This is because the swine manure can be reused and recycled to produce organic fertilizers. The activity also contributes to SDG 13 -Climate Action as the composting process avoid potential GHG emissions that would have been generated if the manure treated in uncovered anaerobic lagoons.

2.1.3 Implementation Schedule

Date	Milestone(s) in the Project's Development and Implementation
November -2018	Accomplished environmental impact assessment registration form
22-March-2019	Completion of project evaluation report
30-May-2019	Obtained official approval for the environmental impact assessment registration form
24-October-2019	Signed the general construction contract
10- November -2019	Start date of the first swine farm (Wolong 2 nd farm) to construct the AWMS
15-November-2019	Signed the purchase contract of boiler
08-Decemer-2019	Start date of the last swine farm (Zhengyang 13 th farm) to construct the AWMS
19-Decemer-2019	Signed the purchase agreement of solid-liquid separator
06-January-2020 to 10-January-2020	The time period of the local stakeholder consultation

01-April-2020	Signing Employee Contacts
12-June-2020	Training for the employees before commissioning date of the AWMSs.
17-June-2020	Commissioning date of the AWMS for the first swine farm (Zhengyang 13 th farm)
25-June-2020	Commissioning date of the AWMS for the last swine farm (Wolong 2 nd farm)
15-July-2020	Project start date which activities that lead to the generation of sustainable development benefits are implemented.
23-July -2021	Training for the employees in 2021
08-July-2022	VCS Project Validation and Verification complete
12-August-2022 to 11-September-2022	Public comment period of SD VISTA project description and monitoring report
12-January-2023~14-January-2023	SD VISTA On-site Validation and Verification

2.1.4 Project Proponent

Organization Name	Muyuan Foods Co., Ltd.
Role in the Project	Project Owner
Contact Person	Lu Chang
Title	Project Manager
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2.1.5 Other Entities Involved in the Project

Organization Name	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.
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Role in the Project	Consultation
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Title	Project Director
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2.1.6 Project Type

The project follows the framework of energy industries (renewable -/ non-renewable sources, sectoral scope 01), waste handling and disposal (sectoral scope 13), and livestock and manure management (sectoral scope 15). The project is not a grouped project.

2.1.7 Project Location

The project is located in Henan Province, China. The location of the seven swine farms is shown in Table 2 and Figure 2.

Table 2 The location of swine farms involved in the project

Swine farm	Location	North latitude	East longitude
Wolong 2 nd farm	Shaozhuang Village, Luying township, Wolong District, Nanyang City	32° 52'9.05"	112°27'15.77"
Junzhang 26 th farm	Junzhang Village, Wangdian Township, Neixiang County, Nanyang City	33° 7'55.24"	111°54'37.62"
Zhengyang 1 st farm	Laodian Village, Pengqiao Township, Zhengyang County, Zhumadian City	32° 26'42.00"	114°23'13.20"
Zhengyang 4 th farm	Liwa Village, Lanqing Township, Zhengyang County, Zhumadian City	32° 28'25.36"	114°13'14.56"
Zhengyang 6 th farm	Liwa Village, Lanqing Township, Zhengyang County, Zhumadian City	32° 29'19.54"	114°18'12.82"
Zhengyang 9 th farm	Lanqing Village, Lanqing Township, Zhengyang County, Zhumadian City	32° 23'54.43"	114° 36'10.94"
Zhengyang 13 th farm	Xiemiao Village, Dougou Township, Zhengyang County, Zhumadian City	32° 26'37.43"	114°18'20.30"

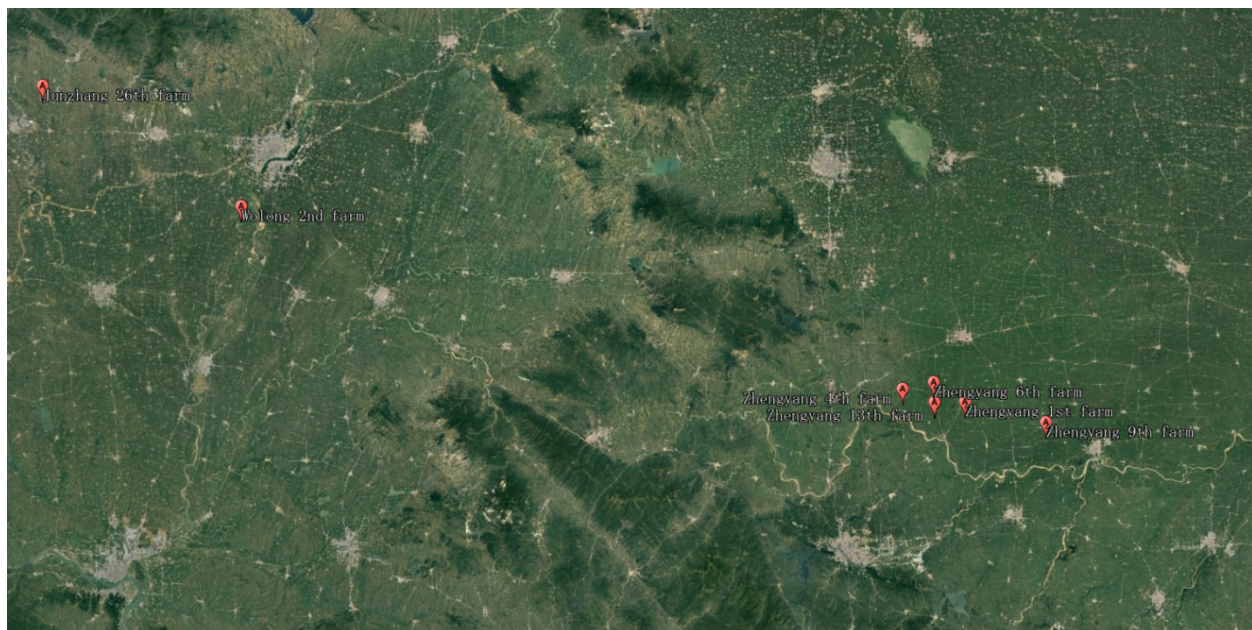


Figure 2 The geographic location of swine farms involved in the project

2.1.8 Baseline Scenario

In China, the GHG emissions on agriculture, forestry and other land use account for 18.4% of the total carbon emissions. Methane emissions in animal husbandry with a 31.5% share for GHG emissions on agriculture, forestry and other land use². In absence of the project, all swine manure waste from the swine farm was left to decay in uncovered anaerobic lagoons, which is the most economic, viable and reasonable for swine farm owners. The methane will be generated during the anaerobic process of the swine manure and the methane was emitted to the atmosphere directly without any recovery or reuse facilities. Besides, methane is one of the main greenhouse gases. So, the traditional manure treatment process through uncovered anaerobic lagoons and natural anaerobic decay in unmanaged swine farm increases the effect on global climate change.

Regarding the social, economic and environmental baselines of Muyuan WJZ AWMS GHG Mitigation Project in Henan Province Project (the baselines being the context before the implementation of the project), all three have already been considered.

Social capital conditions

Before the implementation of the project, the local government issued a series of policies to promote the livestock and poultry farming, with a substantial increase in output. However, the number of livestock and poultry manure also increased rapidly. Such a large amount of swine manure didn't match the technology of resource utilization, The utilization rate of waste resources was still in the initial stage. Otherwise, the communities surrounding the project area at the start of the project were significantly lack the awareness of acting to climate change, little did they know about the huge amounts of methane produced by animal waste which have adverse impact on climate change.

The low utilization rate of waste resources has caused a series of social and environmental problems the is bound to cause more serious ecological environment and social problems, such as the air, water and land pollution, and seriously affecting human and animal health. Through the project activities, the environmental problems caused by livestock and poultry manure have been effectively alleviated, and the process of local waste recycling has been promoted. At the same time, the employment created by the project activities has also increased the local employment rate.

Economic capital conditions

For the economic baseline scenario, it can be assumed that without the project there would be less employment opportunities within the project's operating area. There are additional lost economic opportunities for the local residents.

Furthermore, the swine manure will be treated in aerobic composting system and the organic fertilizers will be produced, which partly will be supplied to the farmers living around free and partly will be sold as fertilizer, under the baseline economic scenario, the local farmers would

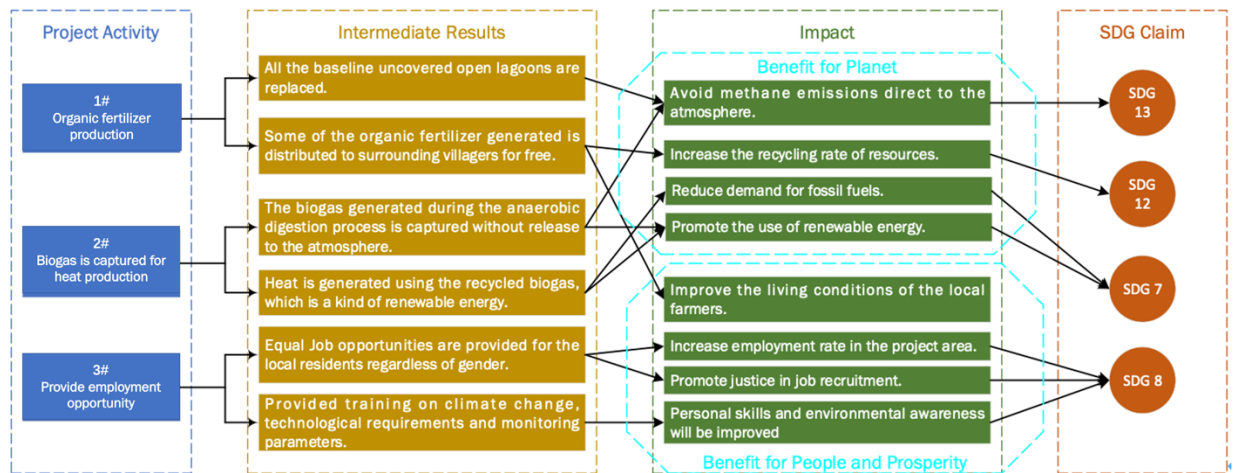
² https://pdf.dfcfw.com/pdf/H3_AP202204131558974893_1.pdf?1649845991000.pdf

spend more money on buying fertilizer. Therefore, the local farmers make an economic saving through the project that would not be available to them were the project not to exist.

Natural capital conditions

The project installs 7 new set of animal waste management systems (AWMSs) to replace the previous uncovered anaerobic lagoons for the manure treatment. The project activity will reduce of GHG in the atmosphere through avoiding methane emissions from controlled aerobic methane emissions generated in the previous manure treatment process of uncovered anaerobic lagoons.

2.1.9 Causal Chain(s)



2.1.10 Threats to the Project

Type of Risk	Main Threats	Solution
Natural	Classical swine fever virus (CSF) which will result the swine production declines and further reduce the swine manure supply.	- All the project swine farms have established adequate biosecurity measures, which includes but not limit to regular disinfection, health monitoring, disease recognition and etc. - In order to restrict strictly the transfer of live pigs and their products across regions, only those that meet related epidemic prevention policy can be circulated in the market.

		To avoid kitchen waste feeding. If food waste is contaminated by CSF, the healthy pigs can be infected.
	COVID-19	The COVID-19 pandemic might impact the feedback and monitoring process of project. All the epidemic prevention policy related to COVID-19 are followed by the project owner. For the employees of swine farms carrying out project monitoring, epidemic prevention and control measures are taken, which include strict disinfection, wearing masks and other protective gear, regular nucleic acid testing, controlling the social safety distance, and providing dormitories for employees on the farm, etc. to ensure that the infection and spread of new crowns are controlled at source. If it is necessary, the feedback process will be conducted online. Invitations and related information will be sent to the local stakeholders through email, telephone or We Chat.
Human-induced	Fire or explosion caused by leakage of biogas.	All the related employees are trained on safety operation of the AWMS. All employees must strictly implement the safety procedures during the operation period of AMWSs, which are set by the company. Portable gas detection alarm is equipped in each swine farm to detect gas concentrations in different locations, audible and visual alarm will be issued if it exceeds the normal range.
	Leakage of manure waste into ground water that will cause the water pollution.	The project obtained the EIA approval from local governmental authorities. The project activity is compliance with environmental laws and regulations.

		Fully Geo-membrane enclosed anaerobic tanks applied in the project is sealed by HDPE geomembrane, which is impermeable and leak-proof, and laying HDPE impermeable membranes inside the excavated soil pit. Therefore, the anaerobic tanks are impermeable and will not cause leakage of manure waste into ground water. During construction period of the project, sedimentation tanks are built and the wastewater generated can be reused. Digested effluent generated during the operation period of the AWMS will be irrigated to the surrounding crops after treatment.
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2.1.11 Benefit Permanence

To maintain and enhance the climate, community and biodiversity benefits beyond the project lifetime, the project proponent has taken a series of actions.

1) Project adopts the advanced technology and equipment to reuse the animal manure, which is in line with the current policies and local development plans. Thus, even if the project is ceased, the project will serve as a reference for the local government to further develop similar projects and improve the local ability in waste recycling.

2) The project activity reduces of GHG in the atmosphere through avoiding methane emissions from anaerobic treatment of swine manure and waste water. Capture of methane will significantly reduce the odor nuisance in the vicinity of the facility. As a kind of renewable energy, the biogas generated will be used for heat generation, which will help to lessen the reliance on fossil fuels.

3) As the project runs, local residents will feel the benefits of carbon reduction project, such as the project activities reduce odors from animal waste, get the fertilizers for free, etc. At the same time, during the annual training, the project proponent has also repeatedly emphasized the importance of carbon reduction and carbon neutrality and popularized related knowledge. Therefore, local residents have a deeper understanding of the significance of environmental protection and carbon reduction. Beyond the lifetime of this project, local residents can continue to improve themselves in this area because they already have the knowledge base.

2.2 Stakeholder Engagement

2.2.1 Stakeholder Identification

To identify the project's key stakeholders, the identification process determined there were two main groups of stakeholders, those with a direct impact on the project or those with an indirect impact on the project. In this project, the process of stakeholder identification consists of three steps: communication and discussion, analysis of rights, questionnaire survey and on-site interview.

Communication and discussion

Before the implementation of the project, Muyuan Foods Co., Ltd. and consulting company held a communication and discussion meeting, to discuss the stakeholder in the project. The local government staff, decision makers from the PP and raw material suppliers attended. During this workshop, discussion focused on the impact of project activities on the community, a comprehensive list of the categories of people expected to be affected by the project were identified. This provided valuable background information for subsequent investigations and research.

Analysis of rights

An analysis of user rights helped provide a straightforward insight into which communities, community groups and stakeholders are present in the area. This process aided in identifying communities and stakeholders.

Questionnaire survey and on-site interview

After the discussion meeting, PP organized a team of people to interview the village representatives, relevant government officials and distribute the questionnaires to gather local residents' opinions. The questionnaire is aimed at the residents involved in the project. The results of the questionnaires show that all farmers have no objection to the project and they are all willing to participate.

As a result, the direct stakeholders were deemed to local government, local residents around the project site, raw material suppliers (7 swine farms). The indirect stakeholders were identified as equipment providers.

2.2.2 Stakeholder Description

Stakeholder Category	Direct/Indirect Affected	Relevance to the Project Activity
swine farm	Direct	The original uncovered anaerobic lagoons are removed and new sets of AWMSs are installed at 7 existing swine farms.

Local residents around the project site	Direct	New job opportunities and free organic fertilizer may be provided for them.
Local government	Direct	(1) To make relevant standard and guideline for manure management. (2) Approval for construction and operation of the AWMSs. (3) Daily supervision of normal operation of the swine farms.
Equipment providers	Indirect	Provide regular equipment repair and maintenance services.

2.2.3 Stakeholder Consultation

The project maintains regular communication with five main stakeholders. These stakeholders are the local government, residents near the project site, raw material suppliers and equipment providers. Each group has required a different consultation process which will be described in detail below:

Firstly, the local government had to be consulted regularly for the project to be granted permission to operate in their areas of jurisdiction. This consultation included meetings to describe the basic information of project. Furthermore, some materials (such as project evaluation report, project key information and the environmental impact assessment registration form etc.) were made to demonstrate the project satisfies the regulations of the nation. Due to the important role the local government play in granting permission for the project to operate, regular communication and consultation is maintained between the project and local government. The project proponent provides or updates regular yearly to the government such as company qualification information, financial auditing and environmental monitoring reports etc. This information is communicated via government affair platform. Also, the government regularly holds business service seminars to provide assistance for business problems.

Local stakeholder consultation was conducted by project owner before the construction of the project and during the monitoring period through the means of meeting and questionnaire.

In order to solicit the opinions and attitudes of various stakeholders on the construction of this project, the project owner issued a stakeholder survey opinion form at each project site from 06-January-2020 to 10-January-2020 investigate the opinions of local residents on the construction of this project. A total of 105 questionnaires were issued for this project, 15 copies for each project site, and 105 copies were collected. The basic information about the survey respondents is listed in Table 3.

Table 3 Structure of stakeholder survey

Items		Amount
Gender	Male	57
	female	48
Age	<25	11
	25-55	80
	>55	14
Education	Junior high school or below	10
	Senior high school	78
	College or above	17
Occupation	Worker	21
	Farmer	54
	Management personnel	17
	Civil servant	13

The survey results are as follows:

1. 97% of the respondents understand this project, 3% don't know much about this project.
2. 100% of the respondents believe that the implementation of this project has reduced environmental pollution and is an environmental protection project.
3. 100% of the respondents believe that the implementation of the project will bring economic benefits to their lives, because they get free organic fertilizer.
4. 97% of the respondents believe that the implementation of the project is in harmony with the local ecosystem; 3% of the respondents are not sure whether it is in harmony.
5. 100% of the respondents believe that the implementation of the project has a good impact on the social economy.
6. 100% of the respondents believe that the construction of this project can promote energy conservation and emission reduction, improve environmental quality and investment environment, and promote the sustainable development of the local economy.
7. 94% of the respondents believe that the implementation of this project can promote employment growth; 6% of the respondents believe that it has no impact on local employment.
8. 100% of respondents believe that AWMS technology can be vigorously promoted.
9. 100% of respondents support this project.

The project owner carefully listened to and accepted the suggestions and opinions of stakeholders and stated that it would implement environmental protection facilities (AWMS) in strict accordance with the requirements in the environmental impact report form and the approval opinions of the local environmental protection bureau. Protect the environment and promote local sustainable development. There is no suggestion about the project design.

During operation period of the project, project proponent will make questionnaire survey was conducted for stakeholder consultation. The project proponent will put up public announcements at the villages near the project site, and contacted the local authorities (mainly the ecology and environment bureau, agriculture and rural affairs bureau) by phone. The general information about the introduction of project, as well as the project proponent's phone number and email address were clearly conveyed via these public announcements and phone calls.

2.2.4 Continued Consultation and Adaptive Management

In order to set up the mechanism for on-going communication with local stakeholders, a grievance book was put at the entrance of each swine farm. All stakeholders are allowed to record their grievances or comments in the book at any time. And staff has checked the book daily, if any comments received, staff will provide responses back to stakeholders immediately. And Secondly, By Posting notices in public places with the project implementation information, stakeholders farmers affected by the project can receive timely notifications of the project and make comments on the project through the contact method of staff including phone or WeChat provided in the postings and if any comments received, staff will provide responses back to stakeholders immediately throughout its life. The notices posted during the operation of the project will be updated regularly, and the contact information and relevant information and policies that may affect the project will be updated in a timely manner. In addition, an additional questionnaire for SDG Contributions during Stakeholder Consultation is conducted annually to monitor stakeholder feedback on an ongoing basis which enables stakeholders to effectively invest in projects throughout their life cycle in response to real-time policy or project changes and adjust management accordingly. So far, no complaints about the project have been received. Its effectiveness and accessibility can be fully guaranteed.

Due to the impact of COVID-19, consultation also can be conducted online, such as email, telephone, We Chat or video conference. Although COVID-19 has some restrictions, but local stakeholders in the project area can still go out to check the postings and provide comments in the Grievance Expression Process Book which has been confirmed by site interviewed with local stakeholders.

2.2.5 Anti-Discrimination

The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis. The project respects all the rights to the women conferred to them by the *Constitution of the People's Republic of China, the Labour Law of the People's Republic of China, Special provisions on labour protection of female employees* and other related regulation and policies. The project will not directly or indirectly reinforce gender-based discrimination and shall not lead to/contribute to adverse impacts. Gender

equality will be attained by ensuring that both men and women will have equal opportunities to jobs created and trainings. The project will further ensure equal pay for equal value of work.

2.2.6 Worker Training

Capacity building and training for the employees is necessary for normal operation of the AWMSs. Trainings will be accessible to all the employees, with emphasis on those recruited from local residents. All the staff working in the swine farms will be informed of risks and trained on measures to avoid it. Generally, the training will cover the following topics,

- Background of carbon emission reductions and climate change.
- Basic requirements of Verra for issuance of carbon credits.
- Safety operation process of the AWMSs, especially for avoidance of fire and leakage of biogas.
- Parameters monitored and methodology.

2.2.7 Equal Work Opportunities

The project provides equal job opportunities for local residents regardless of gender, race, religion, sexual orientation or any other basis. Prior to the project started, by posting the labor law propaganda materials, broadcasting in the village, the local residents are aware of their right to participate in the work, more residents could participate in the recruitment. All the project policy on human resource, including but not limit to recruitment, salary and benefits, takes into account the labour laws of China to build an inclusive workplace and culture. And 14 permanent jobs (including 7 females and 7 males) for the local residents will be created during crediting period of the project.

Furthermore, the project shall in the future apply mutual assistance rules and has a strong commitment to similar training opportunities for its staff.

2.2.8 Workers' Rights

This project abides by all relevant China's workers' rights, laws, and regulations. The project ensures that any project employment is in conformance of the Core Labor Conventions of the International Labor Organization (ILO).

The following conventions of the ILO have been ratified by the Government of China and are judged to be "In Force" in China by the ILO.

- 1) C029–Forced Labour Convention, 1930 (No. 29)
- 2) C100–Equal Remuneration Convention, 1951 (No.100)
- 3) C105–Abolition of Forced Labour Convention, 1957 (No. 105)

4) C111–Discrimination (Employment and Occupation) Convention, C1958 (No.111)

5) C138–Minimum Age Convention, 1937 (No.138)

6) C182–Worst Forms of Child Labor Convention, 1999 (No.182)

Contract will be signed with each employee to state specific rights, obligations and benefits of the job. Forced labour and child labour are forbidden by the project. Everyone is free to join or the leave the project. The project owner abides labour laws and local requirements of China to provide a safe and fair work environment for the employees. There can be regular new-employee training provided to workers before they started the job, which clearly indicates their rights and mechanism for grievance appeal, including the regulation about rest and vacation, promotion, security, welfare, etc, and the workers' rights are guaranteed in the labour contracts for each worker.

2.2.9 Occupational Safety Assessment

The project owner has referenced Labor Law of the People's Republic of China and adapted them to meet the local conditions to ensure workers' health and safety. The workers' health and safety policy, including items covering the health insurance scheme for workplace accidents and evacuation plans is made available for workers. Adequate training will be provided to the employees constantly, which covers the safety instructions. Besides, necessary safety instruments such as portable gas detection alarm are equipped in each swine farm to detect gas concentrations in different locations, audible and visual alarm will be issued if it exceeds the normal range. Fire and leakage of biogas will be prevented effectively.

2.2.10 Feedback and Grievance Redress Procedure

In order to document the project's feedback and grievance redress procedure, the project set up the mechanism for on-going communication with local stakeholders, a grievance book is put at the entrance of each swine farm. All stakeholders are allowed to record their grievances or comments in the book at any time. And staff has checked the book daily, if any comments received, staff will provide responses back to stakeholders immediately. And Secondly, By Posting notices in public places with the project implementation information, stakeholders farmers affected by the project can receive timely notifications of the project and make comments on the project through the contact method of staff including phone or WeChat provided in the postings and if any comments received, staff will provide responses back to stakeholders immediately throughout project life. So far, no complaints about the project have been received. Its effectiveness and accessibility can be fully guaranteed.

Due to the effect of COVID-19, the input and grievance expression process could be reflected via telephone, email or We Chat. All the contact information is announced to the stakeholders during

the local stakeholder consultation process. The project owner will take necessary action on the issue raised by the stakeholder within 48 hours.

2.2.11 Feedback and Grievance Redress Procedure Accessibility

The contact details of the grievance redressal information, including contact person, telephone, email, We Chat and address of each swine farm are announced to all stakeholders during the stakeholder consultation process. The grievance book is available at each swine farm.

2.2.12 Stakeholder Access to Project Documentation

Key project information was sent to the stakeholders before the stakeholder consultation process. The project documentation has been uploaded on website of Verra and the related link <https://registry.verra.org/app/projectDetail/VCS/2876> has also been informed to the stakeholders. On the request of stakeholders, the project document, monitoring reports and other relevant documents will be provided as requested in a timely manner. All the stakeholders can contact the project owner via telephone, email or We Chat.

2.2.13 Information to Stakeholders on Assessment Process

The detailed process for registration of carbon reduction project under Verra has been explained to the stakeholders during local stakeholder consultation. The stakeholders were informed of the SD Vista assessment process via email, telephone or We Chat as requested. All the periodical achievement of the assessment were communicated with the stakeholders, such as the start date of 30 days public comment period, ways to submit comments on the project, as well as on-site results of validation and verification of the VVB.

The validation and verification site visit were held on 12-January-2023, PP have informed all stakeholders to attend this meeting on 01- January-2023, to ensure that assessor would be able to independently ask questions of all stakeholders regarding project consultations.

2.3 Project Management

2.3.1 Avoidance of Corruption

China has strict laws to prevent corruption. The proponent of the project also established relevant code of conduct and business ethics to avoid corruption of the management and employees. These policies are in line with all legal requirements and are held to the highest standards of operation. As per public information listed in National Enterprise Credit Information Publicity System³, neither of the project proponent were involved in nor complicit in any form of corruption such as bribery, embezzlement, fraud, favouritism, cronyism, nepotism, extortion, and collusion.

2.3.2 Statutory and Customary Rights

According to the Constitution of the People's Republic of China and the Law of the Peoples Republic of China on Land Administration, the land is state-owned land. The project owner have obtained the construction right to use the land authorized by Henan province Natural Resources and Planning Bureau, and paying annually land tax to the government, the process has been completed before the implementation of project.

2.3.3 Recognition of Property Rights

All the AWMSs were invested by the project owner, who has the legal right to control and operate the project activity. The business license, approval of Environmental Impact Assessment (EIA) and the equipment (boiler) purchasing contracts are evidence for the ownership of the project and credits or label issued. All property rights are recognized, respected and supported.

2.3.4 Free, Prior and Informed Consent

The project does not require any change to property or land tenure arrangements. The project owner holds the land title for all swine farms covered in the project activity. All the relevant arrangements are agreed with free, prior and informed consent of the stakeholders. In order to solicit the opinions and attitudes of various stakeholders on the construction of this project, the project owner issued a stakeholder survey questionnaire on 06-January-2020 to 10-January-2020 to investigate the opinions of local stakeholders on the construction of this project. Local stakeholders included relevant personnel of the livestock farms, local villagers and government officials. The survey questionnaire was designed to assess the project impacts on the local environment and social economic development. Totally, 105 questionnaires were sent, and 105 responses were collected. On the other hand, the project is carried out under the supervision of the government, and the filing certificate has been obtained before the project starts; And signed the agreement with the raw material supplier.

³ <http://bt.gsxt.gov.cn/index.html>

2.3.5 Restitution and/or Compensation for Affected Resources

Before the construction of the project, the project land belongs to the state-owned land. PP had granted permission to operate in their areas of jurisdiction and paid land use tax in accordance with *The Law of Land Administration of the People's Republic of China*. So, there are no negative effects on the land or resources due to the project activity, and allocation of restitution or compensation to any parties is not required.

2.3.6 Property Rights Removal/Relocation of Property Rights Holders

Before the construction of the project, the land here was vacant near swine farms and didn't have any negative effects on Indigenous people livelihood and culture. Therefore, the project activity does not lead to removal or relocation of property rights holders from their lands or territories, and do not force rights holders to relocate activities important to their culture or livelihood.

2.3.7 Identification of Illegal Activities

There are no illegal activities identified and associated that could affect the project's impacts, and measures needed and designed to reduce these activities are not required.

2.3.8 Ongoing Conflicts or Disputes

There are no ongoing or unresolved conflicts or disputes over rights to lands, territories and resources that will impact the operation and outcomes of the project during the last twenty years.

2.3.9 National and Local Laws and Regulations

As per approval of Environmental Impact Assessment (EIA) of the project, the project complies with all relevant laws and regulations of China, mainly includes,

1. Environmental Protection Law of the People's Republic of China.
2. Administrative Licensing Law of the People's Republic of China.
3. Law of the People's Republic of China on Environmental Impact Assessment.
4. Regulations on Environmental Protection Management of Construction Projects.

The project obtained the EIA approval from local governmental authorities. The approvals well demonstrate that local government permits the construction of the project activity. Consequently, the project is compliance with laws, status and other regulatory frameworks.

2.3.10 Project Ownership

The project activity is constructed and operated in the swine farms owned by the project owner. All the AWMSs were invested by the project owner, who has the legal right to control and operate

the project activity. The business license, approval of Environmental Impact Assessment (EIA) and the equipment (boiler) purchasing contracts are evidence for the ownership of the project and credits or label issued.

2.3.11 Grouped Projects

The project is not a grouped project.

3 BENEFITS FOR PEOPLE AND PROSPERITY

3.1 Condition of Stakeholders at Project Start

As previously described in section 2.2.2, there are several important stakeholders to the project, both direct and indirect. The main group of direct stakeholders included the local government, residents around the project site, raw material suppliers and equipment suppliers. For each stakeholder, there are several factors which make up their baseline scenario.

Conditions at Project Start

For the local government, prior to the implementation of the project, local government has effectively implemented the suggestions on promoting the development of live pig production and stabilizing market supply⁴ Cluster Since 2007, and the local farming mode has transferred from individual farming to large-scale, intensive and standardized farming, with a substantial increase in output. Such a large amount of swine manure is bound to cause more serious ecological environment and social problems, such as the air, water and land pollution, and seriously affecting human and animal health.

For the local residents, under the baseline scenario, the per capita disposable income of rural residents in Henan Province was 17,533 RMB⁵ in 2021, which was lower than that of national residents⁶. The situation is worse in rural and remote area.

For the swine farms, before the project activities, all swine manure waste produced was left to decay in uncovered anaerobic lagoons, the energy consumption fee increased the financial burden of the swine farm.

Diversity between/within the stakeholders

Prior to the implementation of the project, local government has effectively implemented the 2011-2015 Animal Husbandry Planning of Henan Province⁷ Since 2011, and the local farming mode has transferred from individual farming to large-scale, intensive and standardized farming, the local residents' working priorities had also shifted from farming to working in the livestock farm.

Interactions between/within the stakeholders

⁴ <http://henan.kjzch.com/hn/2007-09-05/128211.html>

⁵ <https://www.henan.gov.cn/2022/03-12/2413033.html>

⁶ http://www.stats.gov.cn/tjsj/zxfb/202201/t20220117_1826403.html

⁷ https://wenku.baidu.com/view/f93b99e99dc3d5bbfd0a79563c1ec5da50e2d63c.html?_wkts_=1670391825135&bdQuery=河南畜牧发展规划

In recent years, China has been continuously promoting the comprehensive utilization of manure of livestock, the local government also supports relevant enterprises including the swine farm and regularly holds business service seminars to provide assistance for technical and business problems. Before the implementation of the project, all manure waste produced from the existing swine farms was left to decay in uncovered anaerobic lagoons at the swine farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility.

Significant Changes in the Past

In the past, the local economic was underdeveloped and the government didn't have enough experience to develop policies and strategies, to optimize rural economic reform and promote economic development. Due to the low economic growth in the past years, the local residents were mainly lived by farming and seeking to go outside of their villages for living, and most of the female have to stay at home with no income.

3.2 Expected Impacts on Stakeholders

Impact #1	Provide decent work for local residents
Type of Impact	New job opportunities will be provided to the local residents, it is positive without cost or a risk to the local residents. The impact is an actual impact which is a direct consequence of the project activity.
Affected Stakeholder Group(s)	Local residents around the project site, and the local government.
Resulting Change in Well-being	The job opportunities are available to all the local residents around the project site equally. For the local government, the local unemployment rate will be reduced, and the living conditions of the local residents will be improved. To a certain extent, it will help to promote local prosperity and stability.

Impact #2	Promote justice in job recruitment
Type of Impact	Equal job opportunities will be provided for the local residents regardless of gender. The impact is an actual impact which is a direct consequence of the project activity.
Affected Stakeholder Group(s)	Local residents around the project site.

Resulting Change in Well-being	The project will help to promote the employment of women. Decent job opportunities are available to them equally.
Impact #3	Personal skills and environmental awareness will be improved
Type of Impact	Adequate training will be provided to the employees of the swine farms as needed. The impact is an actual impact which is a direct consequence of the project activity.
Affected Stakeholder Group(s)	Local residents around the project site, and original staff of the swine farm
Resulting Change in Well-being	Trainings will be accessible to all the employees, with emphasis on those recruited from local residents. All the staff working in the swine farms will be informed of risks and trained on measures to avoid it. Personal skills of the employees will be improved to adapt to sustainable development better.
Impact #4	Improved economic conditions
Type of Impact	The raw material for the project to produce organic manure is swine manure, which are from swine farms, the project has created employment opportunities for local residents, and the employed employees obtained the salaries from the project owners, thus bringing economic benefits to the local residents. The organic fertilizer produced by the project is distributed to nearby farmers for free, which relieves the economic pressure of farmers to purchase organic fertilizer. And the others would be sold on the domestic market. The operation of the project has brought economic benefits and created tax revenue for the local government. These impacts are actual impact which is a direct consequence of the project activity.
Affected Stakeholder Group(s)	Local residents around the project site, the swine farms and local government
Resulting Change in Well-being	The project has brought economic benefits to local residents and swine farms. For the local government, the improvement of the economy of residents and enterprises contributes to the prosperity of the local economy to some extent.

3.3 Stakeholder Monitoring Plan

This section explains the monitoring approach that will be undertaken by the PP to monitor the impacts of the designed project activities observed on the key stakeholders associated with the project activity. The impact mapping for every stakeholder has been conducted with respect to the potential SDG claimable for that stakeholder category.

The following tables describes the mapping of project activity with impacts on stakeholder classes and the monitoring parameter that will be used to assess the intended and unintended impacts of the project activities:

The project will provide equal and decent job opportunities and free fertilizers to the local residents around the project site. The parameters of *Number of jobs for local people created by gender* and *the amount of the organic fertilizers generated* will be monitored by the project. The stakeholder monitoring plan for the variables linked to the identified project impacts and the claims are described as follows:

SDG Claim	SDG 8.0 Provide decent work for local residents
Impact No.	<i>Impact #1: Provide decent work for local residents</i> <i>Impact #2: Promote justice in job recruitment.</i> <i>Impact #3: Personal skills and environmental awareness will be improved.</i>
Description of relevancy	<i>Impact #1: New job opportunities will be provided to the local residents; The impact is an actual impact which is a direct consequence of the project activity.</i> <i>Impact #2: Equal job opportunities will be provided for the local residents regardless of gender. The impact is an actual impact which is a direct consequence of the project activity.</i> <i>Impact #3: Adequate training will be provided to the employees of the swine farms as needed. The impact is an actual impact which is a direct consequence of the project activity.</i>
Parameter monitored	<i>Number of jobs for local people created by gender and the number of times all staff working in swine farms have been trained on risk avoidance measures</i>
Affected stakeholder group	Local residents around the project site, swine farm and the local government. All the monitoring work will be monitored by the project proponent.

Measurement methods and procedures	The total number of jobs created will be calculated based on the record keeping books, which includes name, gender, date of joining and other basic information of the employees. The results will also be cross checked with labour contracts and training records of the employees. The number of training sessions is calculated from the records of each type of employee training and is cross-checked with the training notices and sign-in sheets for each session.
Monitoring frequency	Once for each monitoring period. After the first verification, only changes in employees will be reported. The total number of training sessions was counted at the end of each monitoring period.

SDG Claim	SDG 12.0 Reduce waste generation through resource utilization
Impact No.	Impact #4 : <i>Improved economic conditions</i>
Description of relevancy	The raw material for the project to produce organic manure is swine manure, which are from swine farms, the project has created employment opportunities for local residents, and the employed employees obtained the salaries from the project owners, thus bringing economic benefits to the local residents. The organic fertilizer produced by the project is distributed to nearby farmers for free, which relieves the economic pressure of farmers to purchase organic fertilizer. And the others would be sold on the domestic market. The operation of the project has brought economic benefits and created tax revenue for the local government. These impacts are actual impact which is a direct consequence of the project activity.
Parameter monitored	<i>The amount of the organic fertilizers generated</i>
Affected stakeholder group	Local residents around the project site, the local government, swine farm and equipment providers.
Measurement methods and procedures	This parameter can reflect the recycling of swine manure. The amount of the organic fertilizers generated is measured by belt scale. Calibration and frequency of calibration is according to manufacturer's specifications.

Frequency of monitoring/recording	Continuously measure, aggregated by month, reported by monitoring period.
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1. Monitoring framework

The project owner will be responsible for the entire monitoring work and arrange special personnel to collect and record the above monitoring data on Impact1, 2, 3 and 4. All final data will be cross-checked by the project developer and the actual number of people and relevant training documents before data storage.

2. Monitoring target

The number of staff actually involved in the monitoring period and the proportion of different genders; The number of different types of training actually conducted during the monitoring period.

3. Principle of Monitoring

Related personnel training and staff system shall be carried out in accordance with industry requirements and shall be verified regularly as required.

If monitoring instruments is changed or added during the crediting period, this should be documented transparently in the monitoring reports, and the procedure for post registration changes shall be followed.

4. Quality control and quality assurance procedures

A quality management system will be established, which ensures the quality and accuracy of the measured data.

Training

For all members involved in the project, necessary trainings will be provided by the project owner. Besides, the project owner should ensure that only skilled employees are allowed to undertake the monitoring work.

Data management

All data collected as part of monitoring plan should be saved with at least 1 backup copy until the end of the crediting period.

After the crediting period ends, the data should be archived electronically on hard disks and be kept at least 2 years after the end of the last crediting period.

Corrective actions

The quality control and quality assurance procedures include the handling and correction of nonconformities in the implementation of the project or the monitoring plan. In case such nonconformities are observed:

- An analysis of the nonconformity and its causes will be carried out immediately by the project owner.

- A corrective action plan should then be developed to eliminate the non-conformity and its causes to prevent its recurrence.

- Relative information will be included in the monitoring report and reported to VVB during the verification.

If the data record is missing or damaged during the monitoring periods, the following makeup process will be conducted:

- The general principle is that Conservative value will be used for the missing or damaged data. This is most conservative approach. The monitoring personnel will be trained before the starting of the project operation to ensure that each team member is fully aware of and able to strictly follow this conservative principle. During the monitoring process, the monitoring personnel will be required to strictly abide by the above conservative principle in data recording, i.e., use Conservative value for all the missing or damaged data.

- If this is due to the working error of the monitoring personnel, further train the person until he or she can perform the job properly.

3.4 Net Positive Stakeholder Well-being Impacts

Impact	Affected Stakeholder Group	Baseline Scenario	Project Scenario	Net Impact
Provide decent work for local residents	Local residents around the project site, and the local government.	No related job positions are available in the project site	14 permanent jobs (including 7 females and 7 males) for the local residents will be created during operation period of the project, which will	Positive

			contribute to reducing unemployment rate.	
Promote justice in job recruitment.	Local residents around the project site.	Some job opportunities are not available to women.	Equal job opportunities will be provided for the local residents regardless of gender.	Positive
Personal skills and environmental awareness will be improved.	Local residents around the project site, and original staff of the swine farm.	Lack of training on resource reuse on biogas generated from animal waste.	Training on the following aspects will be provided to the employees as needed, • Background of carbon emission reductions and climate change. • Basic requirements of Verra for issuance of carbon credits. • Safety operation process of the AWMSs, especially for avoidance of fire and leakage of biogas. • Parameters monitored and methodology.	Positive
Improve the economic conditions	Local residents around the project, swine farm and local government	Local residents buy fertilizers at market prices, putting economic pressure on their lives. swine farm bears the operating costs for anaerobic disposal of swine manure and biomass waste residue.	(i) <i>The raw material for the project to produce organic manure is swine manure, which are from swine farms, the project has created employment opportunities for local residents</i> (ii) The employed employees obtained the salaries from the project owners, thus bringing economic	Positive

			benefits to the local residents. (iii) The operation of the project has brought economic benefits and created tax revenue for the local government.	
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4 BENEFITS FOR THE PLANET

4.1 Condition of Natural Capital and Ecosystem Services at Project Start

The state of natural capital and ecosystem services at the start of the project

Before the project starts, the common practice for animal waste management is building uncovered anaerobic lagoons/ponds at related swine farms, the swine manure was left to decay in the uncovered lagoon at the swine farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility. Also, in China, uncovered anaerobic lagoons are a manure treatment method recognized by the state. In addition, since there is no legal regulation to mandate to implement anaerobic digestion, aerobic or other biological treatment techniques to treat the swine manure and no legal regulation to mandate to capture and/or utilize methane generated at the common treatment method, therefore the continue of those common practice to treatment the manure i.e., uncovered anaerobic lagoons and the natural stacking are the most economic, viable and reasonable.

The uncovered anaerobic lagoons and anaerobic decay in an unmanaged treatment technology belong to anaerobic treatment technology that can produce methane, and the methane is usually released into the atmosphere and poses a threat to the climate change because there are no laws and regulations requiring the recycling of methane.

Before the project start, the swine manure is disposed of in uncovered anaerobic ponds built in swine farm and the site selection of swine farms will not be located in areas with high conservation value. It will not affect the local rare plants, animals, landscape, topography and regional hydrology. Therefore, before the implementation of the project, the impact of anaerobic treat of swine manures only relevant to climate change.

At the start of the project, condition of the climate in the project area are: Southwest Henan Province has four distinct seasons, mild climate, large annual temperature difference, moderate rainfall, sufficient sunshine, long frost-free period, and many easterly winds, belonging to the subtropical monsoon climate. The annual average temperature is 15.0 °C. The annual average precipitation is 800 mm.

Potential Threats

At the beginning of the project, the use of anaerobic treatment technology (uncovered anaerobic lagoon for swine manure) to treat swine manure will not only produce methane emissions, but also cannot effectively exert the fertility of biomass. Henan province aims to accelerate the development of agriculture, so there is a growing demand for high-quality organic fertilizers. In addition, methane is one of the important gases affecting global climate change, therefore, the disposal of swine manure by anaerobic treatment methods poses a threat to natural capital and ecosystem services.

4.2 Expected Impacts on Natural Capital and Ecosystem Services

After the implementation of the project, the disposal method of swine manure has changed from anaerobic state to aerobic composting, thus avoiding the production and release into atmosphere of methane in anaerobic state. It is estimated that 321,663 tCO₂e emission reductions will be generated annually. In addition, although the technical life of the main equipment (turnover machine) of this project is 15 years, the project seeks the credits of 10 years. Therefore, during the 10 years' fixing crediting period, the project will avoid 3,216,630 tCO₂e released into the atmosphere,

Impact #1	Avoid methane emissions direct release into the atmosphere
Type of Impact	All the 7 original uncovered anaerobic lagoons are removed by the project activity, and the methane emissions to the atmosphere will be avoided. The impact is positive, actual and direct. Furthermore, there is no cost or risk to natural capital and ecosystem services.
Affected Natural Capital and/or Ecosystem Service(s)	Carbon emissions and climate change.
Resulting Change in Condition	7 new sets of AWMSs are installed to the 7 existing swine farms to treat the manure and wastewater. Methane emissions generated in the baseline uncovered anaerobic lagoons will be avoided.

Impact #2	Reduce waste generation through resource utilization
Type of Impact	The solid is treated in aerobic composting system and the organic fertilizers can be produced, part of the fertilizer is distributed to local farmers for free. The impact is positive, actual and direct. Furthermore, there is no cost or risk to natural capital and ecosystem services.
Affected Natural Capital and/or Ecosystem Service(s)	Waste recycling and usage of renewable energy.

Resulting Change in Condition	In the baseline uncovered anaerobic lagoons, no organic fertilizers can be generated, the generation of organic fertilizer which will help to increase the recycling rate of resources.
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Impact #3	Reduce demand for fossil fuels
Type of Impact	The impact is positive, actual and direct. Furthermore, there is no cost or risk to natural capital and ecosystem services.
Affected Natural Capital and/or Ecosystem Service(s)	Usage of renewable energy.
Resulting Change in Condition	Biogas is a kind of renewable energy. The biogas that was burned or emitted directly to the atmosphere has been captured for heat generation, which was provided by the coal-fired boiler without the project. Therefore, it can help to reduce demand for fossil fuels.

Impact #4	Promote the use of renewable energy
Type of Impact	The impact is positive, actual and direct. Furthermore, there is no cost or risk to natural capital and ecosystem services.
Affected Natural Capital and/or Ecosystem Service(s)	Usage of renewable energy.
Resulting Change in Condition	Biogas is a kind of renewable energy. All the heat generated will be used by the 7 swine farms which was provided by the coal-fired boiler without the project. The project activity will help to promote the use of renewable energy.

4.3 Natural Capital and Ecosystem Services Monitoring Plan

The variable linked to the identified project impacts are the amount of avoid methane emissions direct release into the atmosphere and the increase the recycling rate of resources. However, only the amount of avoid methane emissions direct release into the atmosphere is claimed. The monitoring plan for these variables are shown below:

SDG Claim	SDG 13.0 Tonnes of greenhouse gas emissions avoided
Impact No.	Impact #1 Avoid methane emissions direct release into the atmosphere
Description of relevancy	All the 7 original uncovered anaerobic lagoons are removed by the project activity, and the methane emissions to the atmosphere will be avoided. The impact is positive, actual and direct. Furthermore, there is no cost or risk to natural capital and ecosystem services.
Parameter monitored	<i>GHG emission reductions</i>
Measurement methods and procedures	Baseline, project and leakage emissions will be calculated based on <i>ACM0010 GHG emission reductions from manure management systems</i> (Version 08.0). $GHG\ emission\ reductions = baseline\ emissions - project\ emissions - leakage\ emissions$. Please refer to VCS PD and Validation report of the project for more details.
Frequency of monitoring/recording	Calculated monthly, reported by monitoring period.

SDG Claim	SDG12.0 Reduce waste generation through resource utilization
Impact No.	Impact #2 Reduce waste generation through resource utilization
Description of relevancy	The solid is treated in aerobic composting system and the organic fertilizers can be produced; part of the fertilizer is distributed to local farmers for free. The impact is positive, actual and direct. Furthermore, there is no cost or risk to natural capital and ecosystem services.
Parameter monitored	The amount of the organic fertilizers generated
Measurement methods and procedures	This parameter can reflect the recycling of swine manure. The amount of the organic fertilizers generated is measured by belt scale. Calibration and frequency of calibration is according to manufacturer's specifications.
Frequency of monitoring/recording	Continuously measure, aggregated by month, reported by monitoring period.

SDG Claim	SDG 7.0 Ensure access to affordable, reliable, sustainable and modern energy for local residents
Impact No.	<i>Impact #3 Reduce demand for fossil fuels</i> <i>Impact #4 Promote the use of renewable energy</i>
Description of relevancy	<i>Biogas is a kind of renewable energy. The biogas that was burned or emitted directly to the atmosphere has been captured for heat generation, which was provided by the coal-fired boiler without the project. Therefore, it can help to reduce demand for fossil fuels.</i> <i>Biogas is a kind of renewable energy. All the heat generated will be used by the 7 swine farms which was provided by the coal-fired boiler without the project. The project activity will help to promote the use of renewable energy.</i>
Parameter monitored	<i>The amount of biogas recycled</i>
Measurement methods and procedures	The biogas recycled will be monitored by the flow meter installed at the inlet of boiler in each swine farm. The calibration of flow meters, including the frequency of calibration, should be done every two years in accordance with national standards or requirements. The parameter will be monitored continuously by the flow meter and reported cumulatively on monthly basis.
frequency of monitoring/recording	<i>Continuously measure, aggregated by month, reported by monitoring period.</i>

4.4 Net Positive Natural Capital and Ecosystem Services Impacts

The anticipated net impact of project activity is positive for natural capital and ecosystem services, since the project activity is mainly through introducing an aerobic composting system to treat the swine manure, thereby realizing the recycling of waste and reducing its methane emissions during the anaerobic treatment. And all the heat generated will be used by swine farms which was provided by the coal-fired boiler without the project. The project activity will help to promote the use of renewable energy.

This project is put into operation on 15-July-2020, the GHG emission reduction generated is about 3,216,630 tCO₂e from 15-July-2020 to 14-July-2030, with an average annual GHG emission reduction of 321,663 tCO₂e. It is estimated that approximately 1,637 tons of animal manure will be handled daily by the AWMS. The biogas released during the anaerobic digestion will be collected and used for heat production. The heat production is estimated to be 657,340GJ. 3,287.15*10⁴m³ of biogas are expected to be generated by the project. And 77,693tons of organic fertilizers will be produced annually.

