

FINAL RESULTS REPORT: WOMEN'S TIME SAVINGS FROM INDONESIA DOMESTIC BIOGAS PROGRAMME BIOGAS (IDBP)

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Summary:

The W+ standard is a unique certification label developed by WOCAN that endorses projects that create increased social and economic benefits for women participating in economic development or environment projects, including those that provide renewable energy technologies, time and labor saving devices, forest and agriculture activities, and employment opportunities.

The W+ measures women's empowerment in six domains: Time, Income & Assets, Health, Leadership, Education & Knowledge and Food Security. It produces quantified women-benefit

units that contribute towards post 2015 Sustainability Goals (SDGs), Climate Financing or Corporate Social Responsibility (CSR) targets.

HIVOS commissioned the WOCAN W+ team to apply the W+ Standard in collaboration with BIRU in two provinces of Indonesia: West Nusa Tenggara and East Java between October 2014 to April 2015.

Method and criteria used: the W+ Time method was based on the following anticipated results:

- Increased discretionary time for women
- Reduced drudgery
- Increased sharing of household work– men take on work that is normally considered that of women
- Increased perception of well being among women

The following Do No Harm indicator (s) was applied:

- Not less than 97% of both women and men report that the project has not caused any unwelcome and non-remunerated increase of time spent on either productive or reproductive activities (on daily activities excluding leisure time)

The application of the W+ Time method in two project areas of West Nusa Tenggara and East Java show that there is a net time savings of 61 minutes or 1.1 hours a day for women biogas users. When applied to the total number of project beneficiaries that have installed biogas for two years and less, the total time savings generated over that period is 16,041,962 hours. To translate the amount of hours saved for the project beneficiaries into W+ units, the total is divided by eight, which is the average number of working hours in a day. The total number of W+ Time Units generated is **2, 005, 245**.

While social asymmetries associated with existing gender division of roles and responsibilities remain largely unchanged and unaffected by biogas interventions alone, the economic activities associated with bio slurry production hold huge potential for improving the social and economic position of women and men. Additional interventions to enhance income and asset potential as well as mechanisms to improve equitable access by women to biogas services such as trainings for maintenance and masonry would complement and contribute significantly to the Time benefits that have been generated by the installation of biogas.

Table 6: Time Saved in NTB and East Java

Provinces	Total biogas installed	Total Biogas of less than 2 years	Total Biogas of greater than 2 years	Average total operation days (<2 years)	Total time saved (<2 years) 16,041,962 hours
East Java and NTB	9860	4452	5408	508.5	<u>2,005,245</u> Time units

1. INTRODUCTION

1.1 Objective

Purpose:

The main purpose of the project is to apply the W+ Time Method on an existing biogas project in villages across two Provinces in Indonesia, enabling women to release time previously spent collecting fuelwood, cooking and other activities.

1.2 Scope and Criteria of Method

The W+ Time Method measured employed the following indicators to measure time savings for women biogas users:

Table 1: Indicators of W+ Time Method

RESULTS CHAIN	INDICATORS
Immediate Outcome	Increased discretionary time ¹
Intermediate Outcomes	Reduced drudgery Increased sharing of household work– men take on work that is normally considered that of women
End Outcomes	Increased perception of well- being by women

A do no harm indicator was also employed for the Time method, followed by corresponding questions included in the survey questionnaire.

Table 2: Do No Harm in Time Domain

Indicators for Time Domain	Not less than 97% of both women and men report that the project has not caused any unwelcome and non-remunerated increase of time spent on either productive or reproductive activities (on daily activities excluding leisure time) (check for risks of increased labour for children)
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1.3 The Time Formula

The following time formula was used to determine the total amount of time saved by women through the adoption and use of biogas technology.

$$TS(S) = W_{c,p} * P_{pref\ c,f} * [\sum (TS_{coll\ c,p} + TS_{cc\ c,p} + TS_{subs\ c,p}) - \sum (Tl_{wc\ c,p} + Tl_{dca\ c,p})]$$

Where:

¹ The aim of the Time Method is to measure the immediate outcome of increased discretionary time for women as a result of biogas. To measure higher level outcomes that are outlined above will require additional project interventions beyond provision of biogas alone, and measurement of such outcomes will require the use of one or another W+ Domain such as Income and Assets etc.

TS(S) =	Time saved by women during project operation, that will be used for additional activities for women.
Wc,n,p =	Number of women user/beneficiaries within a cluster of “like” projects within a verification period
Pperf,c,p =	Project performance
TScoll,c,p =	Time saving as a result of reduced fuel collection times when project is operating as designed. Established by comparing time-use survey results of users vs. non-users within the same community and calibrated on a per-person basis.
TScc,c,p =	Time saving as a result of reduction in cooking time and post-cooking clean-up times when project is operating as designed. Established by comparing time-use survey results of users vs. non-users within the same community and calibrated on a per-person basis.
TSsub,c,p =	Time saving as a result of substitution activities, such as activity shifting from women to men or time spend on project maintenance/technology application/training as result of project implementation and when project is operating as designed. Established by comparing Time User Survey results of Users Vs Non Users (note: if there is no shift of work then TS Sub can be taken as 0)
Tl wc c,p =	Time increased in collection of water after biogas installation, when the project is operating as designed. Established by comparing Time User Survey results of Users Vs Non-Users.
Tldca c,p =	Time increased in collection of dung and application of manure after biogas installation, when the project in operating as designed. Established by comparing Time User Survey results of Users Vs Non-Users

Calculation of Pperf:

*Pperf = % of biogas plant in operation * % of biogas usage per day*

% of biogas plant in operation = Number of days biogas plant is in operation /365

% of biogas usage per day = Number of hours biogas is used for cooking/(total number hours for cooking cumulative of all stoves; biogas + Mud stove + Improved cookstove).

1.3 Level of Assurance

Sample Size and Method

Survey participants were selected only from users who had used biogas under two years and less to ensure sufficient memory recall. First year users selected for the survey was based on them having used the technology for more than 0.5 years, while second year users were selected from those who had used the technology for at least 1.5 years. The sample size for each group was 30 users.

The BIRU project was initiated in 2009 and covers 9 provinces in Indonesia: West Java, Central Java, East Java, Yogyakarta, Bali, West Nusa Tenggara, East Nusa Tenggara, South Sulawesi and Lampung. Two provinces were selected for this study: East Java and West Nusa Tenggara Province. As shown in the table below, there are a 1,831 first year users and 2,621 second year users making a total of 4,452 users in the two selected Provinces.

Table 3: Total Biogas Users for First and Second Year in East Java and West Nusa Tenggara

	Province	Year 1	Year 2	TOTAL
1	East Java	873	1,579	2,452
2	West Nusa Tenggara	958	1,042	2,000
	TOTAL	1,831	2,621	4,452

Sampling Method

Purposive sampling was used to determine the sample size of 61 user respondents, with an equal number of non-users selected for the control group. The total number of respondents represents the population with an 11% sampling error and 90% level of confidence.

The selection of primary sampling units (or villages) was conducted through the following process:

1. From each selected province, two districts were selected on the basis of the presence of highest number of first and second year biogas users;
2. From each selected district, a sub district with the highest number of first and second year biogas users was selected;
3. From each of the selected sub districts, 3 villages with the highest number of first and second year biogas users was selected;
4. From each of the selected villages, 10 biogas users (first and second year) and 10 non-users were selected.

Table 4: Total Number of Sample

Province	District	Total number of sub district	Total number of villages	Sample Size		
				BioGas User < 2 years	Non User	TOTAL
East Java	Malang	1	3	14	15	29
	Pasuruan	1	3	16	16	32
West Nusa Tenggara	Central Lombok	1	3	16	15	31
	North Lombok	1	3	15	15	30
TOTAL		4	12	61	61	122
Sampling error				+/- 11%	+/- 11%	
Confidence level				90%	90%	

Data collection/ Survey tools

Data was collected using a structured interview with biogas users and non-users. To triangulate the data, in-depth interviews were also conducted with several respondents.

Training of Enumerators

A two - day (s) training was organized for the enumerators in each province by the WOCAN W+ team. The training included ensuring that each member of the enumerator team was sufficiently familiar with the survey and the key gender concepts and sensitivities that are required to ensure appropriate responses from the respondents. Additionally, the W+ team members accompanied the enumerators to each of their sites while conducting in-depth individual interviews to triangulate the trends that appeared from the previous day on interviews.

1.4 Summary Description of the Project

WOCAN was commissioned by HIVOS to implement that W+ project in the Indonesia Domestic Biogas Program (IDBP). The W+ project was implemented with 4452 women in East Java and Nusa Tenggara Barat who have been using biogas digesters distributed through the IDBP.

The IDBP is implemented by HIVOS, in collaboration with the Indonesian Ministry of Energy and Mineral Resources, and the Netherlands Development Organization (SNV). The project aims to disseminate domestic biogas digesters as a local and sustainable source of energy. The project began implementation in 2009 and is currently in its second phase that will run till 2015. In the period between its inception in 2009 and October 2014, an estimated 13,035 digesters have been constructed in nine provinces of Indonesia. These include Lampung, West Java, Central Java, Yogyakarta, East Java, Bali, Nusa Tenggara Barat, Sumba and South Sulawesi.

The main objective of the W+ project was as follows:

- To quantify the time saved by women through the use of biogas using the W+ Time Method and understand how women have used the time saved
- To generate W+ Time units that can be sold
- To identify mechanisms for revenue sharing with women beneficiaries

Process Description

The implementation of the W+ Time method was conducted between February and May 2015 and the activities were follows:

- Adaptation of existing survey questionnaire on Time Domain to local context
- Selection of sample survey size for users and non-users in consultation with BIRU
- Training of enumerators
- Implementation of survey
- Supervision of enumerators in the field
- Compilation of raw data
- Analysis of data
- Registration of project with WOCAN
- Preparation of report
- Arrangement of W+ verification by independent auditor

2 PROJECT RESULTS

2.1 Results Summary

The application of the W+ Time Method in two project areas of West Nusa Tenggara and East Java show that there is a net time savings of 61 minutes or 1.1 hours a day for women biogas users. When applied to the total number of project beneficiaries that have installed biogas for two years and less, the total time savings generated over that period is **16,041,962** hours. To translate the amount of hours saved for the project beneficiaries into W+ units, the total is divided by eight, which is the average number of working hours in a day. The total number of W+ Time Units generated is **2,005,245**.

While there is no denying the overall benefits that have been generated through the installation of biogas, there is also an underlying cautionary 'gender' tale that needs to be acknowledged. For one, the increase in discretionary time for women users does not easily translate into activities that may lead to increased incomes and decision making for women. Instead, women reallocate the saved time into performing or completing household tasks that are traditionally viewed as women's roles (reproductive activities) and productive activities with little income generating potential. Secondly, with the introduction of biogas, the ease of cooking and cleaning cooking utensils has not necessarily translated into men assuming these tasks and freeing up substantial time for women to engage in other economically productive activities.

While social asymmetries associated with existing gender division of roles and responsibilities remain largely unchanged and unaffected by biogas interventions alone, the economic activities associated with bio slurry production hold huge potential for improving the social and economic position of women and men. Additional interventions to enhance income and asset potential as well as mechanisms to improve equitable access by women to biogas services such as trainings for maintenance and masonry would complement and contribute significantly to the Time benefits that have been generated by the installation of biogas.

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2.2 Analysis of Findings

Overall User Satisfaction²

Women and men cited their overall satisfaction with biogas units after installation. Almost all respondents reported having converted almost totally to biogas to meet household cooking energy needs, and retained older cook stoves and energy use (liquefied petroleum gas/LPG, kerosene and larger amounts of fuelwood) only for the occasional community cooking events such as for feasts and rituals. User satisfaction was measured in three specific areas:

- Sufficiency of gas produced from digester: a very large majority comprising of 96.7% of respondents stated that the gas produced from the bio digester was sufficient for their household needs with only 3 households (3.3 %) stating that it was insufficient for their household needs. The limited number of livestock and the small size of the bio digester unit were cited for this insufficiency
- Performance of bio digester: the majority of respondents reported being satisfied with the performance of the bio digester and ranked the reasons for this overall satisfaction in the following order
 - Savings on fuel costs
 - Savings on time
 - Convenience and cleaner cooking experience
 - Cleaner house through improved manure management
 - Reduced smoke in kitchens and improved health
 - Savings from reduced purchase of chemical fertilizers
 - Increased crop productivity through application of bio slurry
 - Subsidy plan to offset costs of biogas installation

Table 7: Respondents' Responses on Biogas Performance and Benefits

Is the gas produced from your digester sufficient for you? (N° and %)		
	N°	%
Sufficient	59	96.7%
Non sufficient	2	3.3%
Sufficient only in summer		
Don't know		
If it's not sufficient, why? (n° and %)		
Cannot collect enough water		
Animals died		
Not enough animals	1	1.6%
Plant too small	1	1.6%

² This section on overall user satisfaction is background information only and is not to be read as a comprehensive assessment of overall biogas benefits. The W+ Time Method addresses only the savings on discretionary time for women users.

Due to breakdown		
Are you satisfied with the performance of your biogas digester?		
Highly satisfied	40	65.6%
Satisfied	21	34.4%
Not satisfied at all		
If you are highly satisfied/satisfied, please list three reasons why in order of importance		
	N°	%
Cleaner house, through improved manure management	27	44.3%
More convenient, cleaner cooking	39	63.9%
Saved time	41	67.2%
Saved money spent on fuel	49	80.3%
Saved money spent on chemical fertilisers	6	9.8%
Increased crop productivity due to use of bio-slurry	5	8.2%
Reduced health risks (less smoke, dust, etc)	12	19.7%
Received subsidy to install plant	4	6.6%
Other (specify)		
If you are NOT satisfied, please list three reasons why in order of importance		
Cost of installation/maintenance		
Has created extra work		
Plant doesn't operate well/breaks down		
Other (specify)		

2.3 Individual Time Savings

Introduction

The time savings for individual women users was based on the following formula that takes the sum of time saved in fuel wood collection, cooking, and substitution activities and subtracts it from the additional time spent on water collection for biogas and the time spent on management of the bio digester as shown below:

$$[\text{Sum (TS coll, c,p + TScc c,p + TSsubs c, p)}] - [\text{Sum (TI wc c,p + Tldca c, p)}]$$

TS coll, c,p= time saved in fuelwood collection (7.05 mins)
 TScc c,p= time saved in cooking and other household chores (55.04 mins)
 TSsubs c, p= time saved through substitution activities by men performing tasks that are traditionally performed by women (19.43 mins)
 TI wc c,p= additional time spent on water collection for biogas (- 11.54 mins)

TIdca c, p= additional time spent on collection of dung and application of bio slurry on crops/fields (32.45 mins)

What follows is a narrative analysis for each of the elements in the formula accompanied by the amount of time saved and spent on each activity.

Fuelwood collection (TS coll, c,p)

The large majority of user respondents have converted to the use of biogas for cooking over other sources of fuel such as liquefied petroleum gas (LPG) and fuelwood. While many households still retain LPG stoves, they are rarely used for cooking because biogas is considered a more economically viable option. Fuelwood is used for cooking only during community events when large numbers of people need to be fed.

Fuelwood is collected largely from private and neighboring farms/lands with a small percentage of collection occurring from government forests. The collection is done by both women and men, with nonusers reporting a slightly higher rate of collection done by men. In east Java, people still use firewood as a source of heating especially during the cold months.

Firewood collection is not a daily activity but rather a spread out over a longer period of collecting time. Estimated in months, women users spend about 356.44 minutes per month collecting firewood compared to non- user women who spend 595.5 minutes a month on the same activity. Estimated into days per month, the time savings for women users can be subtracted from time spent by non-users into an amount of 7.05 minutes per day.

The measurement of time saved was established by comparing time use survey results of users vs, non-users within the same community and calibrated on a per-person basis.

Table 8: Time for Fuel-wood Collection

Activities	Biogas user		Biogas non user		Difference
	(minutes)		(minutes)		
Fuel-wood collection	Per month	Per day	Per month	Per day	Per day
	356.44	11. 52	595.5	18.58	7.05

Cooking and household chores (TSc, cp)

Cooking and household chores are reproductive activities and are generally considered to be the domain of women. While there are many reproductive activities, this survey focused on three major activities where time savings have occurred with the introduction of biogas.

Time saved on cooking

Results show that the total time used for cooking (breakfast, lunch, tea and dinner) is 100.06 and 123.50 minutes for biogas Users and Non Users respectively. This demonstrates that non bi gas users allocate **24 minutes** more than users to cooking

activities per day. The additional time required by biogas non Users is due to the preparation time for lighting the firewood and maintaining the burn temperature.

Time saved on cleaning utensils (because it is less dirty)

Considerable time savings was also reported by female biogas Users in cleaning household utensils. This was due primarily to cleaner fuel burn of the biogas unit as compared to the charring effect of firewood on cooking utensils, which subsequently require more time for cleaning. Female biogas users spent 38.54 minutes a day as compared to non-users who spent 49.46 minutes a day on cleaning utensils. This resulted in a time savings of **10.54 minutes** for biogas users

Time saved on leaning stables and collecting dung

Organic fertilizer production is an important activity in which both users and non-users are engaged. The collection of bio slurry by users and livestock dung by non-users both require depositing the waste material in a pit, which for users is connected to the digester through a pipe, while non-users deposit the waste manually. These different operations require different amounts of time. Combined with the daily cleaning of the stable, considerable time is expended by users and non-users on this series of activities. Users typically expend 30.71 minutes versus 49.48 minutes by non-users per day on these activities. This comes to a savings in time of **19.11 minutes** a day for users.

Time saved on water collection for household consumption

Water collection is normally considered a reproductive activity performed largely by women for household consumption. However, in user households, water collection is also required for the bio digester and men are seen to perform this activity, hence saving women the time. This activity and the associated time saved (**11.54 minutes** for women) is relocated to the next category below.

The results were established by comparing time-use survey results of users vs. non-users within the same community and calibrated on a per-person basis. As the table below shows, the time saved on cooking is 55.04 minutes per day.

Table 9. Time Savings on TSc c,p

Activities	Bio-Gas User	Non Bio-Gas User	Difference (in minutes)
	Time used per day (in minutes)	Time used per day (in minutes)	
Collecting water	9.54	21.06	-11.54 ³
Cleaning stable and collecting dung	30.71	49.82	-19.11
Cooking for family	100.06	123.50	-24

³ The time savings of 11.54 has been credited under the section “additional water collection after biogas installation: TI wc c,p)

Cleaning utensils	38.54	49.46	-10.54
Total			-55.04

Substitution Activities TSubs c, p;

In separate interviews many user women observed that men and boys began to cook their own food, saving the women from having to return home to prepare lunch or dinner when they needed to travel outside the village. Several women cited that an increase in their mobility due to the ease of cooking with the biogas.

A more significant increase in cross over activities by men has been in cleaning of the household and cooking utensils attributed to a cleaner cooking environment with the biogas. Women saved **19.43 minutes** a day as a result of men performing cleaning tasks that were traditionally performed by women in the past.

This number was established by comparing the time survey results of users and non-users.

Additional water collection after biogas installation (TI wc c,p)

There is usually an increased need for water collection to feed the bio digester. Traditionally, water collection for household consumption is regarded as women's work, but the survey results show that with the introduction of biogas, men perform this task more frequently as the water is also needed for the bio digester. Hence, there was a time savings of **11.54 minutes** a day for women (see table above)

The time saving is established by comparing the Time User survey results of Users with that of Non-Users. There was time savings for biogas Users of **11.54 minutes** per day.

Biogas Management (TIdca c,p)

The management of the bio digester requires the performance of several activities such as dung collection, removing the bio slurry from the bio digester to a pit, and stirring the bio digester to mix the water the dung. The total amount of time spent by women on this activity is **32.45 minutes** per day.

This result was established by comparing the time user survey results of users and non-users.

Table 10. Time for Biogas Management

Activities	Time in minutes
Putting dung into bio-digester	13.30
Putting bio-slurry/manure into pit	6.48
Stirring the bio-digester	12.54
Total	32.45

2.4 Reallocation of saved time

It is difficult to determine with any degree of precision how the time saved has been allocated to other activities by women. Many women reported that they used the extra time generated from the installation of biogas into doing the 'usual' types of activities such as cooking, caring for children and while also engaging in productive activities such as crop production, livestock rearing, income generation activities such as crafts and food preparation. A brief comparison of men's and women's roles (users) in areas of production, reproduction and community demonstrates that women spend almost half the time that men do on productive activities while also expending considerable time on reproductive and community activities (see table 11).

Some women also reported that the additional time and their husband and family's willingness to prepare their own meals with the biogas let them devote more time to economic activities. In more detailed interviews, several women cited their 'desire' to become entrepreneurs and gain some degree of economic independence.

The portrait that emerges is that women are meaningfully engaged in all three areas of work (productive, reproductive and community) and the opportunity for additional economic interventions targeted for women has great economic and social transformative potential.

Table 11: Matrix Comparison of Men's and Women's Roles

Activities	Female	Male
Productive Activities	259.06	462.45
Un-numerated community activities (e.g. groups)	22	26.58
Collection of water	9.54	53.01
Cooking for human	100.06	24.05
Cleaning stable and collecting dung	30.42	35.47
Putting dung into biodigester	13.3	13.17
Stirring the biogas-digester	6.48	11.22
Putting bio-slurry into pit	12.54	9.53
Cooking for animal	51	59.51
Cleaning in and around the house	53.06	22.13
Cleaning utensils	38.54	19.11
Caring for children	140.12	73.11
Washing clothes	38.12	17.09
Leisure (rest during days reading, watching tv, chatting)	141.54	129.00
Washing self	33.06	31.29
Fuelwood collection	11.32	15.35

2.5 Do no harm assessment

The Do No Harm assessment posed several key questions as shown in Table 13 below. There has been single incident of fire related accident with the biogas. A relatively small number of people only reported an increase in the mosquito population although they stated that this was occurred only when the digester was not cleaned after use. While one respondent reported a mosquito borne illness, the team could not follow up with further questioning to establish the claim.

An interesting finding with regard to training on biogas maintenance and operation was that 45% of respondents reported that it was not adequate for women. Follow up interviews with women users demonstrate that women are keen to have more skills in maintenance measures, with one household also reporting that their biogas was in disrepair for several months both because of a shortage of money needed for repair, and the woman's inability to repair it. Several women stated that most of the trainings were targeted to men but that they were responsible for its use in the home.

BIRU has a policy to include an equal number of women and men in all their outreach activities. In a separate interview with the BIRU team, it was learned that BIRU has a specific policy and strategy to include an equal number of women and men in all their outreach activities but masons and other service providers who have been contracted to provide the training services to local people fail to strictly adhere to BIRU guidelines. The BIRU staff are fully cognizant of this gap and are strategizing on ways to ensure their outreach is gender equitable.

Table 13: Do No Harm Key Summary

Has there been member of this family suffering from a fire

		N°	%
	Yes		
	No	31	100%

Is there an increase in the number of mosquito flying around biogas?

		N°	%
	High	2	6.5%
	Medium	9	29.0%
	Somewhat	6	19.4%
	Not at all	14	45.2%

How is the event of diseases caused by mosquito?

		N°	%
	High	1	3.2%
	Not at all	30	96.8%

Has the biogas activity prevented you to participate in training or other important training activities?

		Male		Female	
		N°	%	N°	%
	Yes	0	0%	0	0%
	No	30	100%	31	100%

What is your opinion about training on biogas operation and maintenance? is it quite adequate for male and female?

		N°	%
	Adequate for male and female	9	29.0%
	Training is given equal for male and female	5	16.1%
	Training is given more for male than for female	14	45.2%
	Training is given more for female than for male	3	9.7%

		Male		Female	
		N°	%	N°	%
Have you sold your family's assets (jewelry, cattle, etc) for paying biogas installation, operation or management?					
	Yes	0	0%	0	0%
	No	30	100%	31	100%
Have you fully paid the cost of biogas installation (and repair, if any)?					
	Yes	30	100%	31	100%
	No yet, but we can pay it				
	Not, it will be difficult for us to pay it				
Did you ever put of the repair and maintenance of biogas due to fund shortage?					
	Never	28	93.3%	29	93.5%
	Yes	2	6.7%	2	6.5%
In your opinion, is biogas installation beneficial for you?					
	Yes, it is quite beneficial	30	100%	31	100%
Are biogas-related activities preventing you from actively participating in community group or organization?					

	Yes	1	3.3%	1	3.2%
	No	29	96.7%	30	96.8%
Did you spend the saved time resulting from biogas activities for participating in community group or organization?					
	A lot	21	70.0%	23	48.9%
	A little	1	3.3%	2	4.3%
	None	6	20.0%	7	14.9%
	Don't know	2	6.7%	15	31.9%

		N°	%
Besides operating biodigester in your family, do you also take roles as a MASON for BIOGAS?			
	Yes	6	19.4%
	No	25	80.6%
Besides operating biodigester in your family, do you also take role as a BIOGAS TECHNICIAN?			
	Yes	1	3.2%
	No	30	96.8%
Besides operating biodigester in your family, do you also take role as a BIOGAS PROMOTER?			
	Yes	4	12.9%
	No	27	87.1%

		Male		Female		Children	
		N°	%	N°	%	N°	%
Has the biogas usage increased the time you spent for domestic works?							
	Yes, a lot	26	86.7%	30	96.8%	3	12.5%
	Yes, a little	2	6.7%				
	No	1	3.3%				
	Don't know	1	3.3%	1	3.2%	21	87.5%
Are you dissatisfied with the increasing work burden resulting from biogas installation							
	extremely dissatisfied						
	dissatisfied						
	satisfied, because biogas brings other benefits	29	100%	31	100%	3	100%

3 CONCLUSION

The application of the W+ Time Method in two project areas of West Nusa Tenggara and East Java show that there is a net time savings of 61 minutes or 1.1 hours a day for women biogas users. When applied to the total number of project beneficiaries that have installed biogas for two years and less, the total time savings generated over that period is **16,041,962** hours. To translate the amount of hours saved for the project beneficiaries into W+ units, the total is divided by eight, which is the average number of working hours in a day. The total number of W+ Time Units generated is **2,005,245**.

While there is no denying the overall benefits that have been generated through the installation of biogas, there is also an underlying cautionary 'gender' tale that needs to be acknowledged. For one, the increase in discretionary time for women users does not easily translate into activities that may lead to increased incomes and decision making for women. Instead, women reallocate the saved time into performing or completing household tasks that are traditionally viewed as women's roles (reproductive activities) and productive activities with little income generating potential. Secondly, with the introduction of biogas, the ease of cooking and cleaning cooking utensils has not necessarily translated into men assuming these tasks and freeing up substantial time for women to engage in other economically productive activities.

While social asymmetries associated with existing gender division of roles and responsibilities remain largely unchanged and unaffected by biogas interventions alone, the economic activities associated with bio slurry production hold huge potential for improving the social and economic position of women and men. Additional interventions to enhance income and asset potential as well as mechanisms to improve equitable access by women to biogas services such as trainings for maintenance and masonry would complement and contribute significantly to the Time benefits that have been generated by the installation of biogas.

Table 14: Time saved in NTB and East Java

Provinces	Total biogas installed	Total Biogas of less than 2 years	Total Biogas of greater than 2 years	Average total operation days (<2 years)	Total time saved (<2 years) 16,041,962 hours
East Java and NTB	9860	4452	5408	508.5	2,005,245 Time units