Education, income, gender, and capacity in sustainable urban development: The case of Surabaya, Indonesia

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Abstract
To promote gender equality and empower women is the goal number 3 in the Millennium Development Goals (MDG). Gender equality in having access to education in Indonesia has been improved but the related challenges such as opportunities of women to participate in labor force continues to persist in the developing region. This study aims at exploring the challenges and aspiration of urban women in a community of in a government funded-housing in urban Surabaya, Indonesia. To understand their particular characteristics, comparison to the men data and rural women data from a rural community in the Philippines is also provided. Participatory workshop style was used for the data collection. Correspondence Analysis and Multiple Correspondence Analysis method was applied to socioeconomics attributes such as education level, income level, household size and number of children to see the correlation of the sample attributes to their prioritized challenges. Result showed that, the urban women sample shows more concern in water quality and food safety, better education completion rate, less number of children and stronger desire to contribute financially to the family than their rural counterpart. However, both the rural and urban woman in the case studies put importance in children education and entrepreneurship that is believed to be a way to earn financially without leaving the house.

Keywords: Urban, Women, Surabaya, Sustainable Development, Participatory Workshop

1. Introduction

With more people living in the urban area, the need to develop the region sustainably is getting more important than ever before. According to World Bank data, in 2012, the percentage of world population who lives in the urban area already exceed those who live in the rural area. In the high-income countries, 80% of people are already living in the urban area (The World Bank, 2014). In the less developed region, the growth of population is in a much faster rate that by the mid of this century, the world urban population will likely be the same size as the world's total population was in 2002 (United Nations, 2011).

In cities, women have more opportunity to participate in the labor force. The literacy rate of women is also better in cities than in the rural villages (UNESCO Institute for Statistics, 2011). In Indonesia, the percentage of women who are illiterate in the urban area is less than half of those in the rural area (Statistics Bureau Indonesia, 2013). Women in cities also have better indicators of general health and wellbeing (Cohen, 2006). Women, as the one who spend more time with their newborn babies have a very important role in early childhood development. Early childhood is found to be the most crucial period in investment in human capital because it has the highest rate of economic return (Heckman, Cunha, Lochner, & Masterov, 2006) (Doyle, Harmon, Heckman, & Tremblay, 2009).

Despite of the positive progresses in gender equality programs in access to education, the challenges arise responding to the changes still require a lot of work. For example, the number of boys and girls enrolled in primary education institution has reach an equal level in Indonesia (Statistics Bureau Indonesia, 2013), but the number of women who have become schools headmasters are significantly low. This is more apparent in the higher education level. As an instance, the percentage of primary school headmasters who are women is 35%. The number drastically decreases to 16% in junior high school and to 12% in the high school level in Indonesia. Similarly, among entrepreneurs and employees in Indonesia, only 35% of them are women. At the same time, women dominate with 73% in sectors of unpaid labors such as being labors in the family (Statistics Bureau Indonesia, 2013). This shows that the gender specific challenges and aspiration might have not been addressed close enough.

To understand what are the specific challenges and aspirations of the urban women, the present paper presents a close look to a women community in an urban setting of Surabaya City, Indonesia. Surabaya is the second largest city in Indonesia and the largest city with a woman mayor in Indonesia. The population of Surabaya is 2.8 million and the density is 8,300/km^2 (Surabaya City Statistics Bureau, 2013). The targeted community was examined by employing the participatory workshop method to see what kind of challenges they have been facing and what kind of aspiration they have for the post 2015 period.

Through intensive group discussions and applying the Correspondence Analysis (CA) and Multiple Correspondence Analysis (MCA) on the collected data, this study found that participants put high importance in child education, food safety, opportunity to entrepreneurship and sanitation in their neighborhood.

2. Methodology

2.1. Data collection method

The targeted community is located in a government funded housing for people evicted from slums in riverbanks and Surabaya city area. The evicted people were rural – urban migrants from Madura Island, an island connected by a bridge to Surabaya. This particular community is selected because they have history of urbanization, located in densely populated neighborhood, and considered to be in the lower economic level. The women who joined the workshop for this study are the first and second generation of the evicted people. Sixteen women were involved in the workshop. They were intentionally separated from the 16 men participants who joined through the same activities on different days. This separation was done to ensure that the voices of the women could be captured separately in a condition where they are not constrained in expressing their opinion in the presence of the men from the community.

Participatory workshop method was used in 2 consecutive days to collect the data. In the first day, participants were asked to vote the most important topics in their life, and then analyze the diversity of the topics they voted, followed by discussions about the cycle of water, waste and energy from the cradle to grave/cradle by making a map of the community, and then they were asked to address the existing challenges in their urban life. On the second day, participants discussed together with the facilitators about what kind of future goals they aspire for. Afterwards, participants wrote down their ideas on the capacities required to reach those goals and listed down the possible barriers that could prevent them from achieving their aspirations. Figure 1 displays the steps of participatory workshop activities. Each of the activity was conducted by using physical tools such as large papers, color-coding markers and coded seals. This approach was used to minimize error that could be resulted from literacy or education level diversity. Participatory workshop is a practical method to get the actual voices from real stakeholders enabling evidence-based researches (Mindell, Sheridan, Joffee, Samson-Barry, & Atkinson, 2004). The advantages of Participatory workshop include enabling people to do their own appraisal and analysis (Chambers, 2002). The participatory workshop tool used in this study was modified from the UNICEF publication (Gawler, 2005).

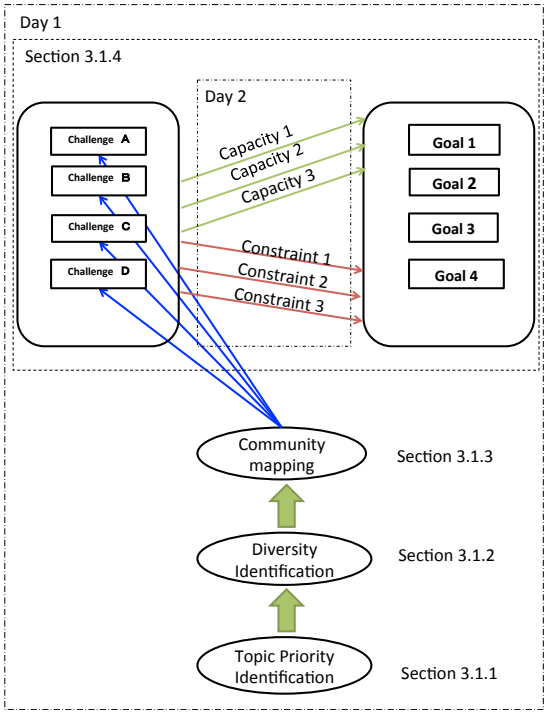

Figure 1 Scheme of Participatory Workshop

2.2 Data Analysis Method

The process of summarizing output from individual comments and group discussion was done together with the participants and 5 female facilitators from the University of Surabaya. To complement this, MCA methodology was applied to the collected quantitative data.

2.2.3 Correspondence Analysis and Multiple Correspondence Analysis Method

To understand the characteristics of the participants and the kind of challenges faced by the particular characteristics, CA and MCA was conducted. MCA is part of a family of descriptive methods such as Principal Components Analysis (PCA) and also the extension of Correspondence Analysis (CA). It is used to detect and reveal the main structure or pattern of complex data sets. MCA is able to map both variables and individuals and show the patterns geometrically by locating each variable of analysis as a point in a low-dimensional space (Savage, 2007) (Greenacre & Blasius, 1994) (Nenadic & Greenacre, 2005).

The MCA computation in this study was conducted by using the R programming and plotted with ggplot2 package. The analysis in this study looked into the correlations between participants' attributes such as the number of child they have, education and job with their topic priorities with their answers during the participatory workshop.

In attempt to increase the quality of interaction with and among participants, the number of participants had to be compensated. With the limited number of participants, the output of the MCA analysis only best reflects the situation of this particular community. However, this approach at the same time provides a valuable local insight and might better reflect the regional situation. "One-size-fits-all" failure

has been the very point that MDGs has been criticized (Sumner, 2009) (Shepherd, 2008).

3. Results and Discussion

The women who participated in the workshop are selected based on their age (between 30 to 50 years old) because the output of this study is intended to contribute to goal setting of the post 2015 Sustainable Development Goals (Kanie, 2014). Although they are living in the same community, the level of education attainment is quite diverse. Nevertheless, majority of them is a housewife. A small number of women work at home by opening a small shop selling daily needs, such as shampoo, soap, cigarettes, and toothpaste or home made tofu. Two outliers are: a woman who is working as parking attendant because her husband has passed away and one lady who managed to completed a college education, so that she is able to earn a job in a private company. Figure 2 and 3 shows the level of income and education that the overall participants have (including men). There seems to be a tendency that those who have higher education level are able to earn more significant amount of income. This finding is encouraging because it reflect the general consensus that although there would be uncertainties of investing in education, it is still a profitable practice (Mohapatra & Luckert, 2012) (Kingdon & Theopold, 2008)

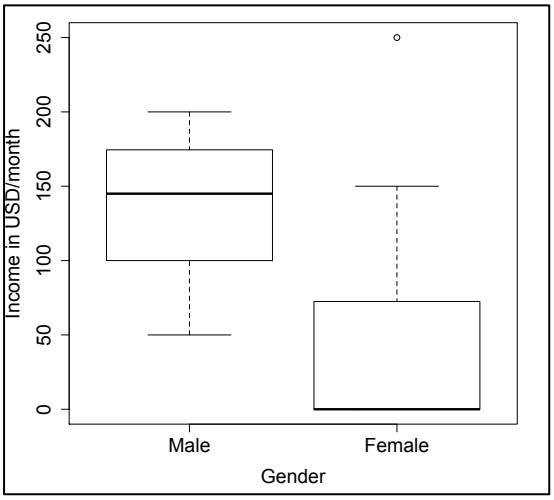

Figure 2 Gender and income gap

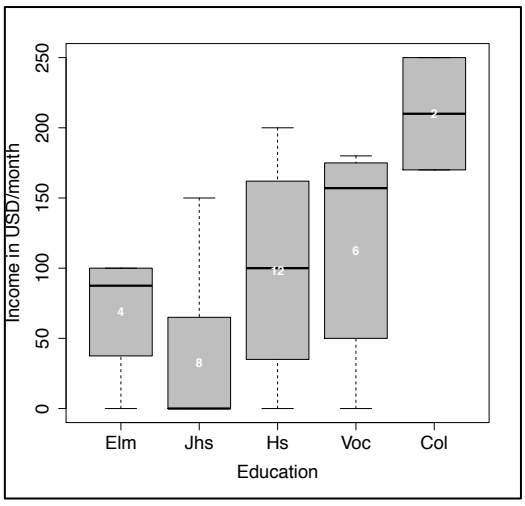

Figure 3 Years of education and income (both genders)

By applying CA to the number of children a woman in the Surabaya sample has and the level of education she has attained, there seems to be no direct correlation that could be described. However, the number of children is significantly lower than the number of children from the rural sample. According to the observation made during the workshop, larger families live in one household. This might enable women to receive extra hand in child bearing, so that female feels more comfortable having more children. This study do not deny that there could be another explanation to this, including the exposure of family planning programs, accessibility of food and nutrition, fertility, religious values, or cultural influences. When the male data of Surabaya workshop participants are plotted (Figure 5), one can see that number of children is more clearly correlated with the level of education. (e.g. the higher the

level of education is, the lower the number of children he has). Note that figure 4 and 5 are asymmetric graphs, with point shading correspond to the absolute contribution.

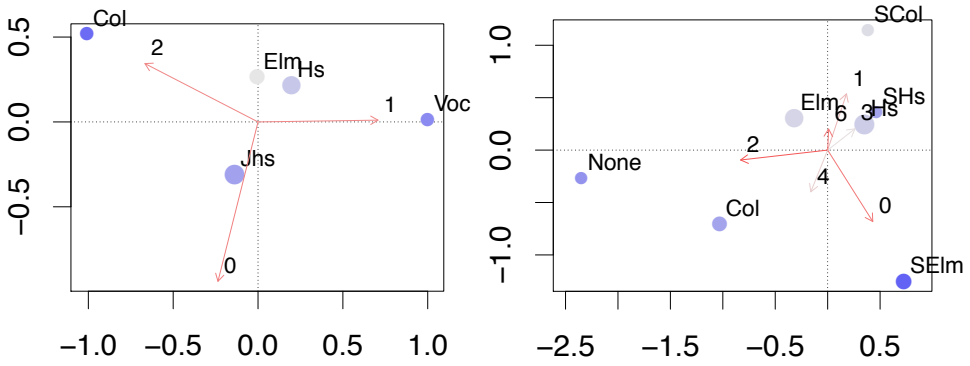

Figure 4 Correspondence Analysis result of urban female (left) and rural female (right) education and number of children

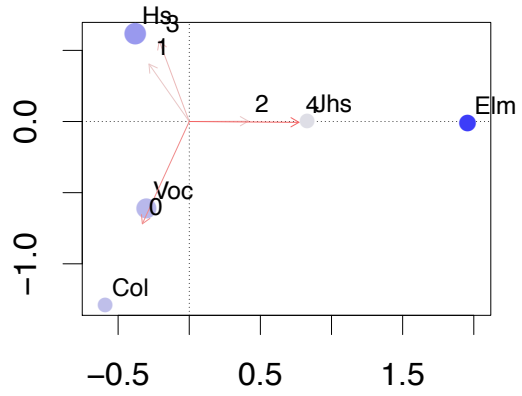

Figure 5 Correspondence Analysis result of urban male education and number of children

Legend	
None	No formal education
SElm	Some Elementary school
Elm	Elementary school
Jhs	Junior High School
Hs	High School
Voc	Vocational School
Col	College
Numeric	Number of children
Note that the old Philippines education system consist of 6 years Elm and 4 years of Hs, whereas the Indonesian one is 6 years Elm, 3 years Jhs and 3 years of Hs	

3.1 Participatory workshop outcome

3.1.1 Priority identification

The 16 female participants were grouped into 4. And then individually, they were asked to vote with a numbered color seal by sticking it on to a prepared poster paper about the top three of their most prioritized topics (figure 6). There were five topics presented: water, energy, waste management, employment, and food. A blank space for additional topic was provided in case there is anyone who would like to vote something outside the predetermined selections. The weighted output from this priority identification session is shown by figure 7. Three points is given to the first priority, two points for the second priority, and one point for the third voted priority. The most voted topic is water, followed by employment and food. Participants argued that human could not survive without water, and in order to pay for utilities, one

needs employment. Lastly, food is also required for human survival. This finding is similar in the male participants voting result as well as the women participants of the rural sample in the Philippines. It is likely to be the answers from many communities in the developing regions and across gender.

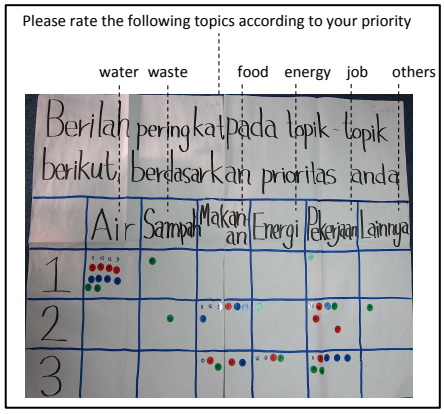

Figure 6 Priority voting poster

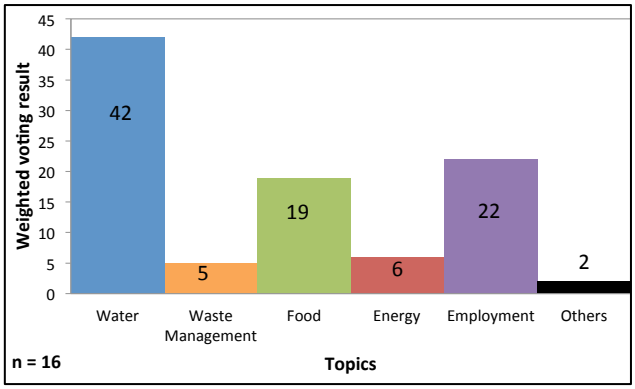

Figure 7 Weighted results of priority voting

3.1.2 Diversity Identification

Because water, employment and food were selected as the most prioritized topics in the previous session, participants were asked to elaborate the diversity within these three topics. The results showed that water is mainly for drinking, cooking, shower, toilet and washing. Job includes their own job, the husband's job, their children's job in the future, and their children's job right now. It is interesting to see that they put their job as equally important with their husband's job although many are housewives. It seems that they understood that although there is no direct financial incentive from being a housewives, but it significantly contributes to the functioning of the family as a whole. This finding is similar to that of a community in Nicaragua, where women acknowledge their housework as contribution to the family, whereas men only identify payable work as contribution (Bradshaw, 2013). According to Bradshaw, financial income would lead to power in decision-making such as deciding the number of children a family would like to have. As shown by figure 4 and 5, this study is also in good agreement with Bradshaw's argument. In food diversity, there are rice, vegetable, fruits, fish, milk, tofu and tempeh. The food categories might have been influenced by a from a government campaign back in the 1950 about the "Healthy Four Perfect Five" that has become popularly used in nutrition education and nationally known. The Ministry of Health had introduced the new nutrition guidelines in 1995 responding to the persisting under nutrition and emergence of over nutrition (Soekirman, 2011).

3.1.3 System Mapping

In system mapping activities, participants worked in group to draw on a large piece of paper about their living place, where and how water, waste and energy are coming from, how they use it on the daily activities and how and where the went to in the environment. Figure 11 shows an example of the drawing. Each of the group had to present to explain their drawing. The aim of this activity is to get everyone

familiarized with the system and to enable sharing of knowledge and information about their surrounding area and how they work.

Water in the community is supplied twice daily by the water utility company to the community and stored in the communal water storage. The water is pumped electrically to the smaller container located at the top of each building. There are six building in the community, and each has 4 floors. Water is then distributed by gravity through pipes to households. After usage, wastewater comes out to the gutters and wastewater treatment ponds where water lilies and other waste treating water plants are nurtured and fish is kept. For septic tanks, the treatment company handles it separately.

The government electricity provider supplies electricity to the community. Energy for cooking used to be kerosene, but after the national conversion program, all households converted into using the Liquefied Petroleum Gas (LPG) that is subsidized by the government. Foods are purchased from the nearby traditional market, cooked at home, and waste is disposed in the temporary disposal site until the scavengers collect it to be brought to the final disposal site.

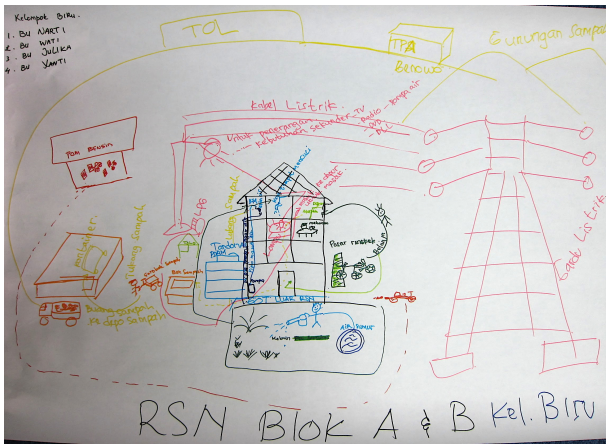

Figure 11 Drawing result of a female group

3.1.4 Identification of challenges, goals, necessary capacities, and constraints

The last sets of activities were conducted in two separate days. This is to give participants time to think overnight about their identified challenges and goals and come up with the necessary capacities and constraints on the next day. Ideas were written individually on small pieces of papers, read out loud, discussed in groups, summarized by the groups and then written by a facilitators. When there are points where consensus by the participants could not be achieved, voting was conducted as the last means of summarizing. Figure 12 shows the photo of the analysis poster and Table 1 presents the summary of this session's outcome.

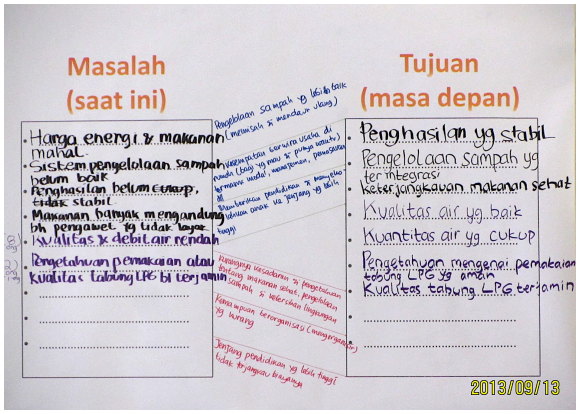

Figure 12 challenges, goals, necessary capacities, and constraints discussion result

Table 1 Summary of challenges, goals, necessary capacities, and constraints as identified by the participants.

Female			
Current challenges	***Future goals***	***Necessary capacities***	***Constraints***
Low water quality and quantity	Better water quality	Opportunity and capacity for entrepreneurship	Low awareness and skills on healthy food, waste management, and overall neighborhood cleanliness maintenance
Unstable income	Stable income		
Unaffordable healthy food	Better affordability of healthy food	Capacity to afford for children's higher education	Unaffordable higher education
Poor waste management	Better waste management	Capacity to manage waste (separation and recycling)	Lack of organizational skills to hold common activities

The challenges identified by participants were including low water quality, unstable income, unaffordable healthy food, and poor waste management. Discussions on water quality reveals that water sometimes found yellowish with odor. This might be caused by unclean storage tank or the source itself. Surabaya as a city has two sources of water: from the uphill Malang region and the Surabaya river. The community of this case study receives water from the Surabaya River. Water quality in Surabaya has been decreasing over the year. In year 2008, laboratory test showed that about 97.5% of water taken from 249-sample area meets the minimum standard of water quality, but in 2009, it fell down to only 58.2% (Surabaya City Environmental Department, 2011). Majority of the participants are housewives, the few women who earn financially are working in the informal sector such as having small shops and being car-parking attendance. The unstable income makes their live vulnerable because when there is unexpected spending such as if someone in the family fall sick and require cost for medicine or hospital, they face a difficult situation. Despite of the unstable income, majority of women in the observed community are not seeking for employment. There was a heated argument about this topic during the workshop. One

woman mentioned that she is not allowed to work by the husband despite of the husband's vulnerable working condition and a higher number of children mainly due to his ideology. This is again, consistent with the finding by Bradshaw (2013). The government provides subsidy for the poor for access to education and healthcare in forms of programs such as social protection cards and unconditional cash transfer (TNP2K). The food that the participants found affordable often contains preservatives, unsafe coloring and packaging. Mothers were especially worried about what their children consume. Waste in the community was not segregated; plastic and metal wastes were disposed together. Some of the community members are scavengers and they earn from separating and selling the waste for recycling. Improper waste disposal and collection, together with blocked sewage gutters invites flies and mosquito. This might negatively influence health and sanitation in the community.

The improvements in the sectors of identified challenges are the goal of the participants. To be able to reach these goals, they feel that learning the required skills and knowledge would play an important role. Entrepreneurship related skills and opportunities is one capacity that participants feel most necessary. Participants believe, by having access to capital, financial management skills and skills related to production and services for a small-scale entrepreneurship would help them support the family finance in a more sustainable way. Participants also believe that by providing education to their children will one day improve the family economy. One possible way in achieving such skills and opportunities is by joining or creating a community center learning called PKBM (Pusat Kegiatan Belajar Masyarakat) that usually provides women empowerment programs and supports in capital for small-scale business. To initiate such learning center, one would need approval from the lowest government administrative unit, the neighborhood association (RT), community group (RW), technical implementation unit of regional department (UPTD), and finally the ministry of culture and education (Y. Wahid, personal communication, May 12, 2014).

Constraints in acquiring the necessary capacities and achieving goals are including the unaffordability of education despite of the government subsidy on education for the poor. They argue that subsidy is only available for the first 9 years of education and does not cover the necessary expenditures other than the tuition fee for schooling such as school uniforms and books. Constraints that have been preventing community activities on cleaning their environment or conducting more sustainable practice of waste disposal are including the lack of harmony among residents.

3. 2 Results of Multiple Correspondence Analyses

Many of the derived results from the participatory workshop conducted are qualitative and categorical data. In attempt to quantify these data, the Geometric Data Analysis (GDA) was carried out in this study. By doing so, one would understand better about the characteristics of the participants and their daily life practices. MCA is one form of GDA methods and its main objective is to display geometrically the rows and columns of the data table, where the rows represent individuals and columns the categories of the variables – in a low dimensional space, so that proximity in the space indicates similarly of categories and of individuals (Roux & Rouanet, 2010). The step-by-step conduction of MCA in this study consists of the preparation of data

table, clouds inspection, and interpretation, as guided in Multiple Correspondence Analysis: Quantitative Applications in the Social Sciences (Roux & Rouanet, 2010).

3.2.1 Preparation of the data table for MCA

In this step, active individuals and active variables are selected. Table 2 listed the sample cross-table of participant's social condition and Table 3 defines the ranges of categories. Points are clustered into subgroup for easier result interpretation (Hong & Abe, 2012).

Table 2 Sample cross-table of participant's social condition

Participant (n = 16)	**Income level**	**Education**	**Number of household members**	**Occupation**	**Electricity consumption**	**Water consumption**
1	Low (2)	Middle (1)	Middle (1)	Low (1)	Low (1)	Low (1)
2	Middle (2)	Low (2)	Low (2)	Middle (2)	Middle (1)	Middle (1)
3..16	High (2)	High (2)	High (3)	High (3)	High (2)	High (2)

*Values in the bracket indicate the rank of number of occurrence

Table 3 Participatory workshop's attributes with categorical frequencies

Attributes	**Obs**	**Categories and Frequencies**		
		Low	**Middle**	**High**
Monthly income	16	11 (USD 50)	3 (USD 50 - 100)	2 (>USD 100)
Education	16	2 (Elementary)	12 (Jhs - Hs)	2 (Voc / Col)
Household members	16	4 (<4)	9 (4)	3 (>4)
Occupation	16	11 (Housewife)	4 (Ent)	1 (Private Comp)
Electricity consumption/month	16	6 (< USD 6)	6 (USD 6 - 9)	3 (> USD 9)
Water consumption/month	16	6 (< USD 3)	6 (USD 3 – 4)	4 (> USD 4)

*Used currency conversion rate is 10,000 IDR = 1 USD

3.2.2 Clouds inspection

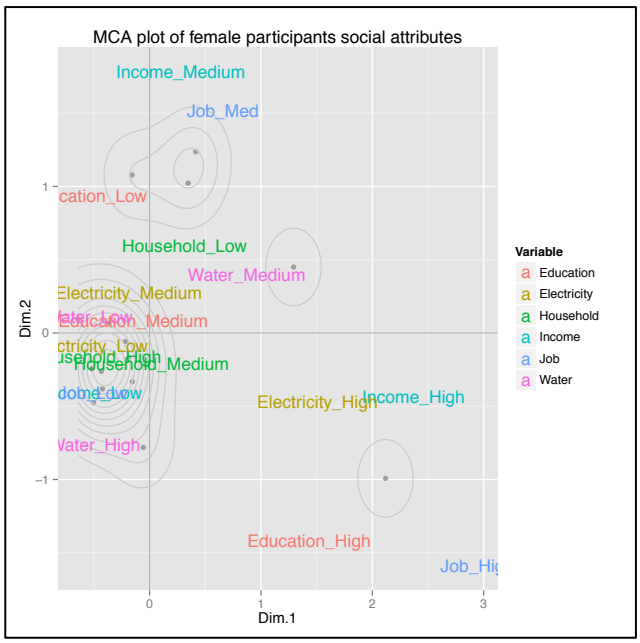

Figure 13 MCA plot of Surabaya participatory workshop participant's attributes

"Clouds" is the term used in MCA for "clusters". There are three main clouds found in the MCA result shown in Figure 13. The most crowded cloud consists of the low and medium levels of income, education, number of household members, and electricity consumption. The second most crowded cloud consists of the medium income level and low education level. The least crowded cloud consists of high income, high education, high electricity consumption, and high job.

3.2.3 Interpretation

Interpretations from the three identified clouds are as follow: 1) Higher income is only more likely to be gained by those who had higher education levels (college and vocational school). There is no significant difference of income between those who had low and medium education level (elementary, junior high, and high school). 2) Water consumption is not closely related to income, education, or job, but 3) electricity consumption is higher in individuals with higher education, job and income.

4. Conclusions

Mobilized by the third goal of MDG, countries have improved gender equality in school attendance and participation. However, women remain as minority in the work places. This might be an indicator that actual challenges and aspiration of women, especially in the urban area, have not been properly addressed. Because "one does not fit all" (Graham & Kanji, 2014), this study presented the case study of urban women community in government housing in Surabaya, Indonesia to explore the challenges faced by the urban women and their aspirations. The combination of participatory workshop, CA and MCA has enabled this study to assess participants' specific characteristics and compare them to the male counterparts and the women of the rural counterparts. It was found that women in the observed Surabaya community put high importance in child education and ability to earn. But they would prefer to contribute financially through entrepreneurship so that they do not leave home and violate the ideologies or neglect the housework.

MCA results shows that high earning is only achievable by those who acquired high education levels. Although electricity is consumed more in the case where women could give significant financial contribution, water is consumed equally in all levels of economy in the observed community. This might imply that a new mechanism or shift in ideology would be what it takes to improve women participation in the urban paid labor force. Due to its intensity, the number of participants has been limited. Future works should include larger sample from multiple communities to find out what kind of new mechanism is required and what kind of aspects would mobilize the shift in ideology.

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