

## Determinants of Women's Participation in Seaweed Farming in the Regency of Jeneponto, South Sulawesi, Indonesia<sup>1</sup>

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### Abstract

*Background-* Indonesia is now the world leading seaweed producer. In year 2008, Indonesia was producing 214,505.9 metric tons of dried seaweed but by 2012 it is tripled to 651,485.4 metric tons. There is an abundance of literature explaining the correlation (and causality) between exponential growths of seaweed industry in south Sulawesi and the government protection policies or the heavy subsidizations. Relationship between the availability of abundance cheap laborers consist of women, child labor (mobilization of factors endowment) and the impressive growth in seaweed farming is largely unexplored? The Objective of this paper is to identify the determinants of women's participation in seaweed farming in south Sulawesi. Data and Methodology-We spent seven days in Makassar city and travelled daily to five Kecamatan located at the coastal areas in the Regency of Jeneponto- where seaweed cultivation success were primarily driven by participation of women (by OXFAM, 2013). Various explanatory variables (introduced simultaneously) in a multivariate framework estimated their independent effect on women participation in seaweed farming. Results- the Logistic Regression Model shows that variables significance in explaining women participation in both paid (when she worked at her relative farms) and unpaid (working at her husband or brother's farm) at 10% significance level are AGE, WRKPER (number of family members in labor market) and HSYINC (Monthly Household Income including remittance).

**Keywords:** women's participation, logistic regression

### 1. Introduction

The story of Indonesia becoming world leading seaweed producer has been widely explored by the previous literature. In year 2008, Indonesia was producing 214,505.9 metric tons of dried seaweed but by 2012 it is tripled to 651,485.4 metric tons. Most previous literature says that the exponential growth in seaweed industry can be attributed to the government protection policies and heavy subsidization to seaweed industry. The relationship between the availability of abundance cheap laborers consist of women, child labor (mobilization of factors endowment) and the rapid expansion of seaweed farming in South Sulawesi is somewhat unexplored. The main objective of this paper to identify determinants of women's participation in seaweed farming in Jeneponto Regency, south Sulawesi.

This paper is divided into four sections. The first section outline Indonesia current production level. Section 2 pinpoint the determinants of women participation in seaweed farming in Indonesia have been neglected in the previous literature. Our paper contribution is also specified in the second section. Section 3 described the primary data collection in Makassar city and in five Kecamatan located at the coastal areas in Regency of Jeneponto- where seaweed cultivation success were primarily driven by participation of women (by OXFAM, 2013). This section also explained the Logistic Regression Model, the dependent variables and explanatory (independent) variables. Section 4 highlights three variables significance in explaining women participation in both paid (she worked at her relative farms) and unpaid (working at her husband or brother's farm) at 10% significance level that is AGE, WRKPER (number of family members in labor market) and HSYINC (Monthly Household Income including remittance).

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## 2. Literature Review

We sometimes wonder why the women participation or role in the expansion of seaweed farming in Indonesia have been neglected. Special literature is long overdue to women who contributed 44 per cent of the regular labor force and were more prominent than men as casual labor in seaweed farming in Indonesia (Neish, 2013a:43). We suspect it to be much higher for South Sulawesi one of the Indonesia most productive areas.

The work by Zamroni and Yamao (2011:34) mentioned in the passing that *"the wife and daughters provided support in the process of seeding...their contribution were found to be key factors in the success of seaweed farming"*. Among the latest to have observed the women active participation in seaweed farming is Neish (2013b:79). This 217 pages report has only one paragraph (7 lines) on about women and children. The author said, *"Women generally play an important role in seaweed farming. As a result, they sometimes become the main earner in the household, even if initially they had very little income."*

We visited the sites sampled by Zamroni and Yamao (2013:1709). Their study highlighted two issues; one, that middlemen occupy a crucial position in the production and marketing dynamics of the seaweed trade. Two, their respondents has two livelihood activities i.e. seaweed farming and sustenance fishing activity with seaweed farming giving bigger contributions to household income. They did not however, specify how many seaweed farmers were women, but said "fishermen" were supported by middlemen who provides capital without interest payment. When male gone fishing, who then provide the tender loving care for the cultivated seaweed? Moreover, it is quite impossible for men to alternate between seaweed farming with another labor intensive activity- fishing, unless women in the households took charge of the farm. To find out if this is case, we analyzed our primary data using logistic regression model following suggestions by Domadar Gujarati (2003) and by Hosmer and Lemeshow (2000).

## 3. Methodology

Household survey on time use (allocations) or activity schedule was conducted in Kecamatan (district?) of Jeneponto, Kalumpang and Kebok Kasih located along the coastal areas where seaweed is farmed. Face-to face interview was conducted with the help of University Hassanuddin final year (female) students who assisted us to translate (into Bahasa Makassar and Bugis) and to answer the structured questionnaires (N=170). Our unit of analysis is the women (most of them become head of household because their husbands were working away from home). We hired female enumerators to interview women (adult female) who are involved in seaweed farming, either a mother, adult daughter or adult sister from each of the 60 households representing sampling sites.

Various explanatory variables are introduced simultaneously in a multivariate framework to estimate their independent effect on women's involvement using a logistic regression model.

The explanatory variables are location of the farming in terms of proximity to town centres, age, education, family size (number of dependents), number of working family members and household income.

The Logistic Regression Model are as follows;

$$P(Y = 1) = \frac{1}{1+e^{-z_i}}$$

$$z_i = B + B_1X_{1i} + B_2X_{2i} + B_3X_{3i} + \dots + B_kX_{ki}$$

Y depend on k explanatory variables, ---, j= 1,2,3,...k. Parameters are estimated using maximum-likelihood method on SPSS LOGISTIC REGRESSION procedure.

DMYLOC is a location dummy variable D=1 if site 0-5km from - capital town /Makassar city, 0 otherwise- to test impact of accessibility of women to paid job in the capital. AGE depict relationship between age and participation decision. EDU denotes educational attainment, - EDUCNIL = 1 if women has primary education (including *madrassah*), 0 otherwise; EDUCPRIM =1 if women has primary education, 0 otherwise. EDUC is used to gauge effect of education on probability of participation in income -earning activities. HLDSZE refers to number of family members other than household head. In a larger families (high dependency ratio), the wives may have to participate in paid employment. Increased household chores including child care responsibilities will restricts wives, daughter (married or not) or sister's participation in wage labor market. WRKPER denote number of family members in the labor market. We expect the larger WRKPER = husband, older son and brothers working elsewhere (in Malaysia they work in the plantation and fisheries industry), the less is the need for women to work. HSYINC represents monthly household income including remittances. Ipso facto: the lower HSYINC therefore greater motivation for women to work.

To get the bigger picture of seaweed industry in South Sulawesi, we visited two factories in Ujung Pandang (Makassar city) belong to PT. Rapid Niaga International and PT. Bantimurung Indah Makassar. Later we interviewed

Production Managers from both companies at their head office in Jakarta, they kindly furnished us with information on international trading, marketing and women involvement in seaweed farming.

#### 4. Results and Discussion

The Model Chi-Square 22.888 is significant at 1 % level (indicates whether the estimated coefficients are significantly different from zero), while the Goodness of Fit is 170.989 (shows the fit of model on the data), which is not significant at the 1% level indicating data fits the model. The variables that are significant in explaining women participation in both paid (she worked for her relative farms) and unpaid (working at her husband or brother's farm) at 10% significance level are AGE, WRKPER and HSYINC.

DMYLOC is not significant in influencing women's participation in paid employment. Proximity of farming villages to Bontossungu -capital town or Makassar –capital city does not increase probability of women becoming employed in paid jobs unrelated to seaweed farming (domestic helper, shop assistance etc.). This is understandable because jobs i.e. seaweed farming are readily available in their village. In a artisanal fishing, labor are divided along socially constructed roles, male go fishing or do maintenance for boat and fishing gears whereas female do the household chores, childcare and fish processing. Luckily, almost all tasks in seaweed farming, including security and guarding territorial rights, can be done by women. With the husband working elsewhere (some husbands sending remittance), wives and daughters were doing almost all farming works- from buying seedlings, preparing the propagules, planting, maintenance, harvesting to the post-harvesting (*pasca-panen*) i.e. cleaning and biling dried seaweed.

AGE is found to have an inverse relationship with women participation in seaweed farming. By taking life expectancy into consideration, an increase in AGE reduces probability of women working. This could be attributed to the fact that aged female Makassar and Buginese lived up to 60 years, most has high blood pressure due to high level consumption of salty food and side effects of pill- family planning so they have less physical power to do the back breaking work in seaweed farming.

EDUC has negative relationship with women participation, indicating higher EDUC does not necessarily increase her employability. Perhaps seaweed farming does not require formal schooling. Women with no or lower EDUC can become skillful through learning by doing. Beside, most tasks are repetitive and monotonous anyway. Higher EDUC however has social benefits- woman who graduated primary schooling are capable to deal with buyers (more so when her husband is illiterate). All her children go to school.

HLDSZE has positive coefficient, even if women have larger families, the probability of them to participating in farming is higher. Except for planting and giving tender loving care to cultivated seaweed, most tasks are conducted in-house or at the platform adjacent to their stilt houses. She can prepare seedling while raising her young children. When she goes to the field, her extended family members or neighbors will keep an eye on the kids.

The higher the WRKPER, the more women participating in employment, but why would women with higher combined household income wanting to work more hours? Wife, daughters and sisters working at their family's farm are not paid a day salary but that does not mean their labor hours are not valued. Participation in seaweed farming allows women to derive job satisfaction and to be recognized by her own peers. In all sites, seaweed farming is a village-wide effort, supported by active family participation.

#### References

- Arief, 2006. Studi Mengenai Pengetahuan Lokal Nelayan Pattorani Di Sulawesi Selatan, Jurnal Hutan dan Masyarakat, 3(2):111-234.
- Neish, I.C.(2013a). Social and economic dimensions of carrageenan seaweed farming in Indonesia, SATOUMI.CO Monograph September 2013.
- Neish, I.C.(2013b). Social and economic dimensions of carrageenan seaweed farming in Indonesia, in D. Valderrama, J.Cai, N.Hishamunda & N.Ridler(eds.) Social and economic dimensions of carrageenan seaweed farming, Fisheries and Aquaculture Technical Paper No. 580, FAO.
- Restoring Coastal Livelihood (2010-2015), Oxfam Canada, Oxfam Great Britain and the Canadian International Development Agency.
- Y. Hikmayani, T. Apriliani, A. Zamroni. Analisis pemasaran rumput laut pada lokasi potensial di Indonesia (Marketing Analysis of Seaweed at Potential Regencies of Indonesia). Journal of Policy and Socio-Economic Research [Journal Kebijakan dan Riset Sosial Ekonomi] 2(2), 2007, pp. 159-175.
- Zamroni,A., and Masahiro Yamao (2011). Coastal Resource Management: Fishermen's Perception of Seaweed Farming in Indonesia, World Academy of Science, Engineering and Technology, vol.5:2011-20.
- Zamroni,A. and Masahiro Yamao(2013). An Assessment of farm-to-market link of Indonesian dried seaweeds: Contribution of middlemen toward sustainable livelihood of small-scale fishermen in Laikang Bay, African Journal of Agricultural Research vol.8 (17), pp.1709-1718.