


Determinants of Labor Participation and Wages Toward People with Disabilities in Indonesia

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Abstract

Reductions in the supply of labor and wages occur to people with disabilities. Disability conditions cause a decline in productivity so that the probability of being a labor is small, risk of unemployment and loss of income. The high prevalence of disabilities in Indonesia causes inequality of labor participation and wages for disabilities in Indonesia based on the type of disabilities. The data used is Indonesia Family Life Survey (IFLS) waves 4 and 5 by pooled cross-section. The analysis methods are logit and tobit models. The results showed that communicative disabilities have a higher chance of labor participation and wages. Factors of the degree of severity, age, male, head of household, education, urban, chronic disease, ownership of insurance, and ownership of assets also affect labor participation and wages for disabilities. The labor activation program for disabilities is a succession and initiative as welfare reform, poverty alleviation and an indicator of inclusive development.

Keywords: People with disabilities, labor participation, wages, logit, tobit

1. Research Background

The prevalence rate of People with disabilities in a country is recorded at 15% of the population per year, including Indonesia (WHO and World Bank, 2011). In developing countries, the prevalence of People with disabilities is higher than in developed countries (World Bank, 2011). People with disabilities are a vulnerable group of people who have a higher probability of economic deprivation than non-disabled People, so these shocks affect the productivity and work of individuals with disabilities (Mitra et al., 2012; Mizunoya & Mitra, 2012; Mani et al., 2018). This is due to health conditions, environment, and mobility barriers faced by disabilities to carry out activities (Mitra et al., 2012; WHO, 2001). Indonesia is a country that has segmentation of the formal and informal sector labor market, the formal sector tends to be relatively easy to enter (Fields, 2005).

Figure 1 shows that most People with disabilities work in the informal sector at 64.93% (mild disability) and 75.80% (severe disability). People with disabilities are one group in society that has a lower probability of being employed (Gayle-Geddes, 2015;

Payne et al., 2013; Trani & Loeb, 2010; World Bank, 2009; Mitra & Sambamoorthi, 2008; Mete 2008; Hoogeveen, 2005; Fields, 2005). Mani et al (2012) added that a reduction in the supply of labor occurred in groups with health problems and groups with disabilities.

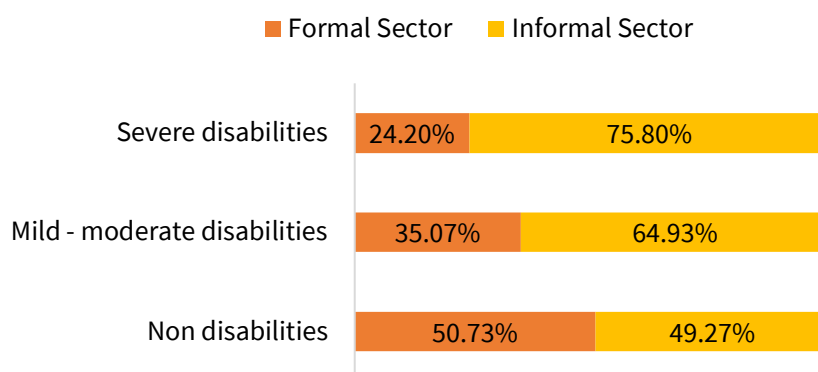


Figure 1. Employment Status of People with Disabilities by Sector. Source : ILO data, 2022

This is because the condition of disability allows a person to choose, to leave or be expelled from work (Priebe, 2017; Mani et al., 2018). The special needs experienced by People with disabilities are considered to interfere with the use of their abilities to participate in the labor market and thus have a disproportionate effect on the welfare of the group (Mani et al., 2012). Conditions with disabilities trigger a two-fold risk of unemployment and loss of income, making it easier for People with disabilities to become poor or vulnerable to poverty (OECD, 2010; Mani et al., 2012). Data from the ILO (2017) shows that the average wage for mild disabilities is 14% lower than for non-disabled people and the average wage for severe disabilities is 32% lower than for non-disabled people.

In addition, people with disabilities tend to get low-paying jobs due to lower levels of education (Yin & Shaewitz, 2015; Clausen et al., 2004). The higher the educational attainment, the higher the wage rate. However, wage discrimination against disabilities still exists even among highly educated disabled workers. This is because the skills of people with disabilities are considered not as skilled as non-disabled people. Several countries have adopted a work quota system in law (UU) which requires public and private companies to employ People with disabilities above a certain percentage (Mori & Sakamoto, 2018). However, this quota system has not been considered effective because both public and private companies have not complied with the policy and choose to pay fees if they do not reach the targeted quota for disabled workers (Mori & Sakamoto, 2018; Waddington; 1995; National Institute of Vocational rehabilitation, 2002). reducing the demand for disabled workers (Acemoglu and Angrist, 2001; Jones & Latreille, 2010), or reducing income (Baldwin and Johnson, 2001; Jones & Latreille, 2010).

Trends in the employment gap for People with disabilities are a crucial indicator of the progress of inclusive development and evaluation of various subjects in the succession of labor market activation policy program initiatives for People with

disabilities. This is done to achieve equality and welfare reform (Baumberg, 2015; Schur et al., 2013). There are still few analyses of employment economic welfare in groups of people with disabilities in developing countries, so further research development and deepening are needed (Yao & Moore, 2003; Mizunoya & Mitra, 2012; Baumberg et al., 2015). Research attention to People with disabilities is still limited in the scope of economic development due to the lack of quality and quantity of data related to People with disabilities, especially in Indonesia.

This research refers to research conducted by Mani et al (2018), Boman et al (2015), Cai et al (2014) and Mizunoya & Mitra (2012). Previous research used observational measurements of activity daily life (ADL) reporting indicators and symptoms of illness experienced (morbidity) as a proxy for functional limitations or disability conditions (Mani et al., 2018; Cai et al., 2014; Strauss & Thomas, 2008; Gracia & Nicolas, 2006; Trani & Loeb, 2010). This study focuses on measuring People with disabilities as measured by the type of disability represented through the definition of a medical model, namely the question of the types of disabilities experienced, such as blind, deaf, speech, and physically impaired, then classified based on the severity of the disability experienced, namely mild-moderate disability and disability heavy. Therefore, this study aims to analyze the determinants of work participation and wages for People with disabilities in Indonesia using the 4th and 5th batches of the Indonesia Family Life Survey (IFLS) data.

2. Literature Review.

Studies on the analysis of the effect of physical limitations and employment show a negative effect on employment status, wages and working hours (Gertler & Gruber, 2002; Mete et al., 2008; Pohl et al., 2013 and Schultz, 2008; Swaminathan & Lillard, 2001; Strauss & Thomas, 1998). However, the studies of Genoni (2012) and Schultz (2008) stated that physical limitations do not affect an individual's income. A number of social and economic factors for People with disabilities influence the labor market. Variations in the type of disability experienced affect the employment status of People with disabilities (Crisp, 2005; Clausen et al., 2004; Booman et al., 2015). Communicative disabilities (hearing and sight) tend to have a higher chance of participating in the labor market than psychological disabilities (Clausen et al., 2004). Apart from the type of disability, the degree of severity of the disability experienced, namely severe and mild-moderate disability affects the labor participation of People with disabilities (Oguzoglu, 2009; Koning & Sonsbeek, 2017). This is due to the ability to work which is considered disruptive and reduces the work productivity of People with disabilities so that the type of disability is more influential than the level of education that has been attained (Boman et al., 2015).

Providing assistance can affect the participation of workers with disabilities such as providing disability insurance (Larasati, 2019; Koning & Sonsbeek, 2017; Muller & Boes, 2016; Roth et al., 2016) and loans or microcredit from microfinance institutions (Sarker, 2015). According to Koning & Sonsbeek (2017) found that disability insurance increased labor participation and earned income, although at some point there was a decrease in

income as the disability insurance expired. In contrast to the research by Muller & Boes (2016) and Roth et al (2016) it shows that disability insurance has a negative effect on labor participation. Providing loans or microcredit from microfinance institutions (MFIs) to People with disabilities can increase independence, change status in the family and increase business skills, capacity building and others (Sarker, 2015; Paauwe, 2010; Thomas, 2000).

Powers' study (2008) found that in India there are 21 percent of People with disabilities are self-employed workers, while only 4.8 percent are employees. People with disabilities aged 15-34 years are less likely to be employed in the public sector than in the informal sector. Men with disabilities have greater opportunities to work in the formal and informal sectors than women (Akono, 2013). Studies by Mitra (2008) and Koning & Sonsbeek (2017) show that married individuals with disabilities increase their chances of labor participation. However, Lopres et al (2016) found that single women with disabilities have a greater probability of participating in work than married women. As people with disabilities get older, they have a higher probability of labor participation (Mitra, 2008; Swaminathan & Lillard, 2001; Koning & Sonsbeek, 2017).

The study by Mani et al (2018) shows that heads of households and spouses of household heads who experience disabilities have a greater probability of leaving or being expelled from their jobs. The educational attainment of People with disabilities also affects labor participation (Mani et al., 2018; Booman et al., 2015; Halimatussadiyah et al., 2015; Swaminathan & Lillard, 2001). Low educational attainment is the main obstacle for People with disabilities in entering the labor market (Halimatussadiyah et al., 2015). People with disabilities tend to get jobs with low wages due to their low level of education (Yin & Shaewitz, 2015; Clausen et al., 2004; Cameroon et al., 2017; Larasati, 2019). People with disabilities who live in urban areas tend to face greater obstacles in finding work and participating in the labor market (Akono, 2013).

3. Methodology

This study uses secondary data with the type of pooled cross-section data from the data source of the Indonesia Family Life Survey (IFLS) batches 4 and 5. The dependent variables in this study are labor participation and wages. The independent variables used in the study included the type of disability dummy, disability severity dummy, gender dummy, marital status dummy, partner disability status dummy, age, household head status dummy, length of education completed, residence location dummy, dummy chronic disease, morbidity dummy, insurance ownership dummy, loan/microcredit dummy, agricultural land ownership dummy, non-agricultural business ownership dummy.

The sample selection for this study was based on individuals with disabilities aged over 15 years with four (4) categories of People with disabilities, namely physical disability, hearing disability, visual disability, speech difficulty disability, and multiple disabilities. The object of this study consisted of 3,570 respondents with disabilities

through questions with health criteria over the last 4 weeks and experiencing disability conditions through book IIB codes CD01, CD01a, CD01c, CD01d, and CD01e.

This study used two methods of data analysis consisting of two methods, namely logit regression, which is an analytical approach with the dependent variable having a dichotomous or binary response scale (Wooldridge, 2016; Gujarati & Porter, 2013).

$$Li = \ln \left[\frac{P_i}{1 - P_i} \right] = Zi = \beta_1 + \beta_2 X_i + \mu_i \tag{1.1}$$

Logit method for model 1: Work participation of People with disabilities

$$\left[\frac{LFP_i}{1 - LFP_i} \right] = LFP_i = \beta_0 + \beta_1 ddaksa_i + \beta_2 dbuta_i + \beta_3 dtuli_i + \beta_4 dwicara_i + \beta_5 dganda_i + \beta_6 levdifa_i + \beta_7 age_i + \beta_8 age^2_i + \beta_9 dlaki_i + \beta_{10} dmarried_i + \beta_{11} dspouse_i + \beta_{12} dHoH_i + \beta_{13} educyr_i + \beta_{14} dchronic_i + \beta_{15} dmorbid_i + \beta_{16} dinsurance_i + \beta_{17} durban_i + \beta_{18} dcredit_i + \beta_{19} dtani_i + \beta_{20} dnontani_i + \mu_i$$

Meanwhile, the measurement of work wages uses the Tobit regression, which is an analysis approach to the dependent variable which only exists for a portion of the sample or censored sample where information about the independent variable is only available if the dependent variable is observed (Gujarati & Porter, 2013; Greene, 2005).

Then the probability of $Y_i = Y_i^*$ or $Y_i^* > 0$ (censored probability)

$$\begin{aligned} P(Y_i = Y_i^* | X_i^*) &= P(Y_i^* > 0 | X_i^*) \\ &= 1 - \phi \left(\frac{y_i - X_i' \beta}{\sigma} \right) \end{aligned} \tag{1.2}$$

Furthermore, two uncensored and censored models were obtained as follows:

$$f(Y^* | X'_i) dy^* = \frac{1}{\sigma} \phi \left(\frac{Y_1^* - X'_1 \beta}{\sigma} \right), Non\ tersensor \tag{1.3}$$

$$f(Y_i^* | X'_i) dy^* = p(Y_i^* \leq 0 | X'_i \beta) = \phi \left(\frac{y_i - X_i' \beta}{\sigma} \right), tersensor \tag{1.4}$$

Then the transformation of the uncensored and censored model becomes:

$$f(Y_i^* | X'_i) dy^* = \left[\frac{1}{\sigma} \phi \left(\frac{Y_i - X'_i \beta}{\sigma} \right) \right]^{1-d_i} \left[\phi \left(\frac{y_i - X_i \beta}{\sigma} \right) \right]^{d_i} \tag{1.5}$$

So the likelihood function of the Tobit model can be written as follows:

$$L = \Sigma_0 \ln \left[1 - \phi \left(\frac{X'_1 \beta}{\sigma} \right) \right] + \Sigma_1 \ln \left[\sigma^{-1} (2\pi)^{-\frac{1}{2}} e^{-\frac{1}{2\sigma^2} (y_i - X_i' \beta)^2} \right] \tag{1.6}$$

Equation (1.1) until (1.6) is a derivative of the tobit model. The Tobit model is a regression analysis model where the dependent variable is partly the data that has a discrete or continuous measurement scale. Dependent variables that are continuous or discrete have a data structure that has a value of zero. This zero-valued data will be called censored data. This is because if you use multiple linear regression, the data with a value of zero or censored data on the dependent variable will not be read by the system, causing measurement errors or missing values. To avoid this measurement error, the appropriate regression model is a tobit analysis model where censored data can still be considered as part of the analysis. Observational data on this type of variable is grouped due to the presence of a lower limit (left censored), an upper limit (right censored) or both. . These restrictions can occur naturally, such as some values being closer to a certain value. Limitations can also be determined by the researcher depending on the objectives of the research. Equation 1.6 is a combination of a censored observation model and an uncensored observation model. And then, the tobit regression estimation model is written as follows:

Tobit method for model 2 estimation: Wages for People with disabilities

$$\ln W_i = \beta_0 + \beta_1 ddaksa_i + \beta_2 dbuta_i + \beta_3 dtuli_i + \beta_4 dwicara_i + \beta_5 dganda_i + \beta_6 levdifa_i + \beta_7 age_i + \beta_8 age_i^2 + \beta_9 dlaki_i + \beta_{10} dmarried_i + \beta_{11} dspouse_i + \beta_{12} dHoH_i + \beta_{13} educyr_i + \beta_{14} dchronic_i + \beta_{15} dmorbid_i + \beta_{16} dinsurance_i + \beta_{17} durban_i + \beta_{18} dcredit_i + \beta_{19} dtani_i + \beta_{20} dnontani_i + \mu_i$$

4. Result and Discussion

Table 1.1 shows the results of the estimation of the marginal effect on the work participation of People with disabilities in Indonesia. The results show that visual and hearing disabilities have a positive and significant effect on work participation. Visual and hearing disabilities have a greater chance of working than speech disabilities by 0.149 points and 0.24 points. This finding is in line with Crisp (2005), Clausen et al (2004), Boman et al (2015). Communicative disabilities (hearing and sight) tend to have a higher chance of participating in the labor market than psychological disabilities (Clausen et al., 2004). Mobility barriers experienced by physical and psychological disabilities are greater than communicative disabilities (Crisp, 2005; Clausen et al., 2004; Boman et al., 2015). The degree of disability severity shows a negative and significant effect on the work participation of People with disabilities, which means that People with disabilities with severe disability status lose 0.076 points to work. In line with the findings of Oguzoglu (2009) and Koning & Sonsbeek (2017) and Boman et al (2015) stated that the degree of severity of disability affects the ability to work and reduces the work productivity of People with disabilities.

The age variable shows an increase of 1 year in the age of People with disabilities who are able to increase 0.052 points to work or participate in work. This result is in line with the studies of Mitra (2008), Swaminathan & Lillard (2001) and Koning & Sonsbeek

(2017). gender has a significant positive effect, namely men have a higher probability of 0.31 points to work than women in labor participation. The status of heads of households with disabilities can increase 0.14 points for work. This condition is driven by meeting the needs of household members with disabilities (Mani et al., 2018; Angela, 2015).

Length of education indicates that an increase in one year of education can increase 0.0012 points to participate in the labor market. This study is in line with the findings of Mani et al (2018), Boman et al (2015), Halimatussadiyah et al (2015) and Swaminathan & Lillard (2001) that higher education can improve the expertise, skills and thinking abilities of People with disabilities. On the health side, People with disabilities who have a history of chronic illness reduce their employment by 0.05 points. These results are in line with Cai et al (2014) and Mani et al (2018). Insurance owned by People with disabilities increases the probability of participating in work by 0.039 points. The Koning & Sonsbeek study (2017) also found that disability insurance provides benefits for People with disabilities to participate in the labor market. However, these results are not in line with the studies of Muller & Boes (2016), Roth et al (2016), and Gruber & Kubik (1997).

People with disabilities who live in urban areas have a lower probability of working by 0.0496 points than those who live in rural areas. People with disabilities who live in urban areas tend to face greater obstacles in terms of mobility and accessibility barriers in finding work and participating in the labor market (Akono, 2013; Mani et al., 2018; Fields, 2005). On the credit program side, People with disabilities who receive financial loans have a higher probability of working. Providing credit loan assistance can increase independence, change status in the family and improve business skills, strengthen business capacity and others (Sarker, 2015; Paauwe, 2010; Thomas, 2000). In addition, ownership of agricultural land and non-agricultural businesses has a significant positive effect, which means that assets owned by People with disabilities can increase their opportunities to work or participate in work by 0.07 points and 0.135 points.

Table 2 shows the results of the estimation of the tobit method for the wages of persons with disabilities in Indonesia. The results found that variations in the type of work wage disability were mainly sensory disabilities. Likewise, the degree of disability severity variable has a negative and significant effect on disability wages. Persons with disabilities tend to receive reduced wages/income (Baldwin & Johnson, 2001; Jones & Latreile, 2010). The variables age, gender (male), status of head of household, marital status and years of education of persons with disabilities show a positive and significant effect on wages.

Men with disabilities have higher wages than women with disabilities. Disabled women tend to reduce employment opportunities due to health conditions and impaired work ability (Boman et al., 2015; Jones et al., 2015; Cai et al., 2014). Heads of households with disabilities will try to meet household needs in order to earn higher wages than non-heads of households (Mani et al., 2018; Akono, 2013; Mitra, 2008).

The addition of 1 year of education taken will increase 0.26 points of work wages. These results are in line with Mani et al (2018), Boman et al (2015), and Swaminathan and

Lillard (2001). Possession of disability insurance shows an increase in wages by 0.98 points compared to those with disabilities who do not have insurance. Disability insurance provides health and work injury protection benefits from the benefits received (Koning & Sonsbeek, 2017). Furthermore, persons with disabilities who have a history of chronic illness will reduce their wages by 0.79 points. While the location of residence shows a negative and significant relationship to work wages. This indicates that persons with disabilities who live in urban areas have wages 0.98 points lower than those in rural areas. This condition is due to greater physical or non-physical mobility/accessibility barriers in urban areas than in rural areas (Akono, 2013).

Table 1. Estimation results of Marginal Effect at Means Logit

Independent Variables	Dependent Variable : dummy Work			
	(1)	(2)	(3)	(4)
Physical disabilities	0,2246*** (0,0557)	0,1072* (0,0635)	0,0924 (0,0642)	0,0834 (0,0646)
Visual disabilities	0,1847*** (0,0515)	0,1664*** (0,0592)	0,1599*** (0,0597)	0,149** (0,0598)
Hearing disabilities	0.1902*** (0.0562)	0,2575*** (0,0645)	0,249*** (0,065)	0,2399*** (0,0655)
Speech disabilities	(base)	(base)	(base)	(base)
Multiple disabilities	0.0851 (0.0802)	0,0038 (0,0889)	0,0005 (0,0898)	-0,0043 (0,0964)
Disability severity level	-0.1144*** (0.0171)	-0,0759*** (0,0199)	-0,0784*** (0,020)	-0,0765*** (0,0202)
age		0,0529*** (0,0037)	0,0535*** (0,00372)	0,0523*** (0,0046)
Age (Square)		-0,00062*** (0,00004)	-0,0006*** (0,00004)	-0,00061*** (0,000052)
Gender (dummy male)		0,3279*** (0,026)	0,3219*** (0,0262)	0,314*** (0,0258)
Married (dummy)		0,0413 (0,0286)	0,0353 (0,0288)	0,0419 (0,03)
Spouse of disabilities (dummy)		0,0118 (0,0318)	0,0098 (0,0318)	-0,0066 (0,0319)
Head of household		0,1175*** (0,0277)	0,1175*** (0,0318)	0,140*** (0,0275)
Education of disabilities		0,0108*** (0,00235)	0,0122*** (0,00247)	0,00116*** (0,00249)
Chronic disease			-0,0479** (0,021)	-0,0502** (0,0211)
Morbidity Level			0,0463 (0,0319)	0,046 (0,0324)
Insurance ownership			0,0286 (0,0207)	0,0388* (0,0209)
Domicile (dummy urban)			-0,064*** (0,0229)	-0,0496** (0,0251)
Credit (dummy)				0,0307 (0,0217)
Farming land ownership (dummy)				0,0701*** (0,0249)
Non-farm business ownership (dummy)				0,1347*** (0,0202)
Total Observation	3.570	3.570	3.570	3.570

Noted : Robust standard error adjusted based on the level of significance ie * $\rho = 0,1$; ** $\rho = 0,05$; and *** $\rho = 0,01$.

Source : IFLS 4 and 5, data processed by author, 2023

Asset ownership has a positive and significant effect on wages for persons with disabilities. Persons with disabilities who own agricultural land have a 1.14-point higher chance than persons with disabilities who do not own agricultural land assets. Likewise for non-agricultural businesses, persons with disabilities have a higher chance of 2.46 wage points than persons with disabilities who do not own non-agricultural businesses. Persons with disabilities tend to maximize their assets to make ends meet due to barriers to work participation in the public and private sectors (Akono, 2013; Powers, 2008; Fields, 2005; Ali et al., 2010).

Table 2. Estimation result of Tobit method

Independent Variables	Tobit method
	Wages
Physical disabilities	1,98009 (1,523)
Visual disabilities	3,233** (1,455)
Hearing disabilities	4,632*** (1,532)
Speech disabilities	(base)
Multiple disabilities	0,26754 (2,1795)
Disabilities Severity Level	-1,545*** (0,3944)
Age	1,04164*** (0,098)
Age (Square)	-0,012*** (0,00109)
Gender (dummy male)	6,2733*** (0,5185)
Married (dummy)	1,3770** (0,6446)
Spouse of disabilities	-0,7603 (0,6313)
Head of household	1,9576*** (0,5322)
Education of disabilities	0,26174*** (0,0477)
Chronic disease	-0,7968** (0,3933)
Morbidity level	0,73075 (0,6215)
Insurance ownership (dummy)	0,98436** (0,4038)
Domicile (dummy urban)	-0,98465** (0,4686)
Credit status (dummy)	0,59144 (0,4019)
Farming land ownership (dummy)	1,13707** (0,454)
Non-farming business ownership (dummy)	2,4067*** (0,380)
Total Observation	3.570

Noted : Robust standard error is adjusted based on the level of significance, namely * $\rho = 0.1$; ** $\rho = 0.05$; and *** $\rho = 0.01$. Work wages: 1,666 left-censored observations at wage ≤ 0 ; 1,903 uncensored observations; 1 right-censored observation at wage ≥ 18.14624 . Working Hours : 1,677 left-censored observations at wh_1 ≤ 0 ; 1,892 uncensored observations; 1 right-censored observation at wh_1 ≥ 136

5. Conclusion and Implication

Based on the research questions and discussion analysis, this research concludes that the type of disability and the degree of severity of disability affect the work participation and wages of persons with disabilities in Indonesia. This is caused by the condition of disability reducing ability, skills and work productivity, as well as barriers to physical and non-physical accessibility so that there is a reduction in income, a reduction in the supply of labor for groups of people with disabilities. Socio-economic factors, namely age, gender (male), status of head of household, length of education, and ownership of agricultural and non-agricultural land assets have a positive and significant relationship to the work participation and wages of persons with disabilities in Indonesia. Meanwhile, the location of residence and history of chronic illness show a negative and significant effect on the work participation and wages of persons with disabilities in Indonesia.

Persons with disabilities need attention and encouragement in increasing employment activities. The trend of the employment gap for groups of persons with disabilities is an indicator of the success of inclusive development and evaluation of work activation policy programs and poverty alleviation among groups of persons with disabilities. Infrastructure development policies are based on inclusion criteria such as adding RAM for physical disabilities, braille signs for visual disabilities and so on. In fulfilling the skills of persons with disabilities, expertise and skills assistance from the local government (PEMDA) or non-PEMDA is required.

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