

# Learning to Make Hydroponic-Based Animal Feed

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**Abstract:** Mild intellectually disabled is an individual who has intelligence far below the average individual in general. Although the intellectually disabled have intelligence that is far below the average, their abilities can be optimized and empowered through learning simple skills that do not require complex thinking or semi-skills. Hydroponic-based animal feed production is an activity in the semi-skills category that has the potential to be used as a medium for learning and empowering the intellectually disabled. This study aims to evaluate the potential of hydroponic-based animal feed production activities as a medium of learning and empowerment to improve the ability and physical suitability of the intellectually disabled. The research method used is field testing and Research and Development (R&D), and data is obtained through observation, interviews, and Focus Group Discussions (FGD). We found that the intellectually disabled can perform stages of work in the manufacture of hydroponic-based animal feed, the introduction of tools and materials, the manufacture of animal feed, the maintenance of tools and materials, and the maintenance of results. The results showed that every step in hydroponic-based animal feed production activities had been implemented and could be used as a medium of learning and empowerment to optimize and empower the intellectually disabled.

**Keywords:** Animal feed; Empowerment; Hydroponics; Intellectually disabled learning; Learning

## Introduction

The Republic of Indonesia guarantees that everyone, both normal and disabled, has the right to equal opportunity. The right to get a job according to their abilities without discrimination applies to all citizens as regulated in the 1945 Constitution of the Republic of Indonesia Article 27 paragraph 2 "Every citizen has the right to work and a decent living for humanity" (Mardayanti, 2022). This is also reinforced by Law Number 8 of 2016 concerning Persons with Disabilities, which specifically provides a strong legal basis in the struggle for equal rights for persons with disabilities (Dechezleprêtre et al., 2023). This can be said to be the first step for persons with disabilities to start a new struggle so they can live a better life and be recognized by society for their work abilities. To fulfill all of this requires the involvement of all parties to play

an active role in its implementation (Bombard et al., 2018), especially starting from changing the paradigm towards mentally disabled people who are considered to have no ability to work skills by the general public and job providers (Business World and Industrial World/DUDI).

Society in general still thinks that people with mental retardation do not have the skills that can be used as their provision for work. The intelligence condition of mild mental retardation has an IQ between 52-68 based on the Binnet Scale and 55-69 based on the Weschler Scale (Sajewicz-Radtke et al., 2022). Even though mild mental retardation has intelligence far below average and limitations in social adaptation, they can still learn to read, write, and count which are simple in nature. This condition causes mild mental retardation to be less able to participate in academic learning, to optimize and empower them through learning simple skills that do

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not require complex thinking (Darling-Hammond et al., 2020). This is also confirmed by Apollon's opinion (1981) which states that the most essential thing in vocational learning for mild graphite is there is a match between basic skills and employment (Rahayu et al., 2020).

One type of skill that can be given to light grahita is making forage fodder from corn seeds hydroponically (Hydroponic Fodder, HF). HF is an alternative forage for livestock that can be easily and inexpensively produced individually (Hristov et al., 2019) a hydroponic production method without soil, and (the product has sufficient protein content. to meet the needs of livestock (Henchion et al., 2017). In the production process, HF only requires a minimum space and simple tools and (Balaram & Subramanyam, 2022). There are several HF that are commonly cultivated, including seeds from corn, barley, wheat, rice, and sorghum (Gurikar et al., 2023). In Indonesia, the easiest HF to develop is HF which comes from corn seeds or is called Hydroponic Maize Fodder (HMF) (Ramachandran et al., 2022) considering the availability of seeds that are easily available and in excess (De Vitis et al., 2020).

The sequence of work makes HMF possible for mild mentally retarded people because the work is not complicated (Shapla et al., 2018) and they are used to seeing corn plants in their daily lives around the place. stay them. This will be the initial capital for their ability to learn the skills of making animal feed, which is learned from the easiest to the most difficult stages, namely from the start; getting to know tools and materials, the process of making animal feed, maintain tools and materials, and maintain results (Makkar, 2018). Physically, mild mental retardation fulfills the requirements to do the job of making animal feed, because mild mentally retarded physically are almost the same as individuals in general, what distinguishes them is their intelligence or IQ. This study aims to evaluate the potential of the hydroponic forage manufacturing agro-industry as an inclusive industry and workplace to empower the abilities and physical suitability of persons with mental retardation.

**Method**

The research uses the Research and Development (R&D) method, which is a research and development method used to produce and test the effectiveness of certain products (Snyder, 2019). The research subjects consisted of 5 (five) mild mentally retarded children at the SMALB level and 1 (one) Skills Teacher at Al-Fajar Special School (SLB), Pangalengan, Bandung Regency.

This research was conducted to evaluate the potential of the animal feed manufacturing agro-industry as an inclusive industry and workplace to

empower the work abilities and physical suitability of people with mental retardation. To answer the problems above, data collection begins with the steps (Bengtsson, 2016); analyze potential problems (analysis of job opportunities for mentally retarded children, physical suitability of mentally retarded children with types of work). In the first step regarding the suitability of work opportunities, data is obtained through identifying available job opportunities in the field then identifying and assessing the physical condition of mild mentally retarded children and conducting assessments to determine the initial abilities of mild mentally retarded children related to learning to make animal feed (Dimitropoulos et al., 2022); designing the design of a learning program for skills in making animal feed (Sridevi & Suganthi, 2022). The second step, reviewing the suitability of the learning program for making animal feed (Cockburn, 2020). With the conditions and characteristics of mild mentally retarded children, the goal is for children to be able to follow, program implementation.

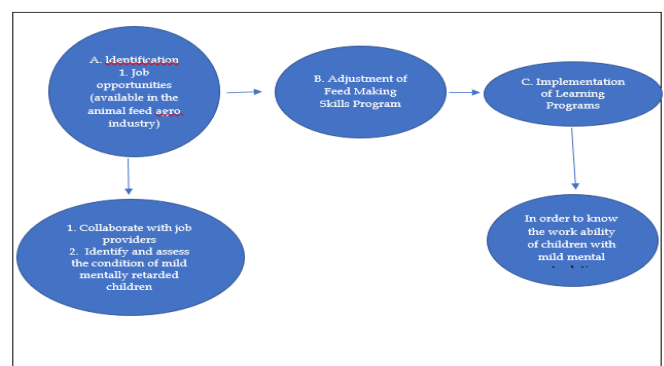


Figure 1. Data collection steps

**Result and Discussion**

*Identification and Assessment*

The identification results are related to the availability of jobs that are by the conditions and characteristics of children with mild mental retardation, it is found that these job opportunities are available, where the animal feed manufacturing agro-industry is one of the semi-skills category industries that have the potential to be used as a workplace for empowering people with mild mental retardation (Borsellino et al., 2020). So that mild mentally retarded children have the opportunity to work in the Agro-industry because the work can be done by mild mentally retarded children.

The identification results are related to the condition of mild mentally retarded children, out of the 5 mild mentally retarded children at the SMALB level, each of them has concern and interest in learning to make animal feed, as evidenced by (the child trying to

see the teacher is preparing tools and materials and trying to see the teacher practicing how to make animal feed), Mild mentally retarded children trying to practice making animal feed, cleaning tools, and materials and tidying up ready-made animal feed (Alvarado et al., 2017). This can be used as a reference that the skill of making animal feed is in demand by the 5 mentally retarded children.

The results of the assessment of the 5 mildly mentally retarded children; Physical, Physical condition results from the observation that the physical condition of the 5 mildly mentally retarded children mostly meets the requirements to be able to do the job of making animal feed. Starting from the posture, height according to age, good sitting position, good eyesight, and speaking without stuttering. As for 2 children, the strength of the hand muscles to lift weights requires a little training. This condition is caused by a lack of training in carrying objects that weigh more than 5 kilograms (Brzęk et al., 2017); Mental. Of the 5 mildly mentally retarded children, 4 have sufficient memory to remember events in daily activities carried out before going to school, and 1 mildly mentally retarded child takes a long time to remember the activities carried out daily. Understanding orders, out of the 5 mild mentally retarded children, they were able to understand simple instructions given by the teacher; Social, out of 5 mild mentally retarded children all able to communicate with friends, teachers, and people at school, able to move places (going to and from school), 4 mild mental retardation was able to understand the meaning of danger, whereas 1 person was a little careless. In reporting incident 5 (five mild mentally retarded children were able to do it, d) Occupation (Khan et al., 2018), the five mild mentally retarded children had an interest in learning to make animal feed (Dimitropoulos et al., 2022), this was shown through children's enthusiasm during the implementation of learning Ability to survive at work three children with mild mental retardation survived while participating in learning from beginning to end, while two people were less persistent because they did not fully understand the stages of work.

#### *Program Adjustments*

Adjustments to the program for making animal feed need to be made, this is due to the condition of mild mentally retarded children physically, mentally, socially, and interest in work, experiencing several differences caused by their intelligence which is far below average (Belkhanchi et al., 2023). Such as; physically, although in general mild mentally retarded children have no differences from children in general. However, they may have slight differences, for example

in muscle strength, walking strength, and so on. Although there is a slight difference they are capable of doing the job of making fodder (Alfiko et al., 2022); IQ, is what characterizes mild mentally retarded children because of their intelligence, so in learning programs, it is necessary to adapt to the conditions of intelligence of mentally retarded children (Lubis et al., 2019), for example, words in conveying material must be adapted to their level of understanding, namely using sentences which is simple, and in implementing learning it needs to be done through practice performance, not using the long lecture method because it will be less understandable for mentally retarded children.

#### *Implementation of the Learning Program for Making Animal Feed*

The implementation of learning the skills of making animal feed is carried out as is usually a learning activity, starting with (Mishra et al., 2020); initial activity in which the teacher conditions the child to be ready to learn, takes absences, prays and conducts apperceptions and informs the learning that will be delivered; core activities, starting with preparing tools and materials, teachers and mild mentally retarded children prepare tools and materials to be used in learning to make animal feed (Mansur et al., 2023), then the teacher explains one by one the tools and materials then the child is asked to observe and then allowed to ask questions, the next stage is the practice of making animal feed according to the stages, the child observes the teacher's explanation then the child is asked to practice the stages of making animal feed. The stages of cleaning up the lats and the materials for their implementation are almost the same as the practical stages of making animal feed (Zglobisz et al., 2010). After everything is finished, the children are asked to retell the tools and materials, practice making animal feed, maintain tools and materials, and maintain the results. This is done as an evaluation of learning outcomes, to find out the achievement of learning or workability possessed by mentally retarded children based on the subject matter previously presented.

#### **Conclusion**

In general, mild mentally retarded children at the SMALB level can carry out the stages of work making animal feed. This can be seen from the physical condition, the physical condition of mild mentally retarded children in general is not much different from other children in general; intelligence, the IQ of mild mentally retarded children ranges from 55-70. They can do work that is not too complicated (semi-skilled), such as the job of making animal feed, the stages of work are not too complicated so that mentally retarded children

can do it; socially, mentally retarded children can communicate both at school and in the surrounding environment, children can behave politely towards people who are older than them.

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#### Author Contributions

Conceptualization E. M., F. I. W. R., D. S., and M. M. R.; methodology, F. I. W. R.; validation, D. S., and M. M. R.; formal analysis, E. M.; investigation, F. I. W. R. and D. S.; resources, M. M. R. and E. M.; data curation D. S.: writing – original draft preparation, F. I. W. R and D. S.; writing – review and editing, M. M. R.: visualization, N. N. and F. I. W. R.; supervision, E. M.; project administration, F. I. W. R.; funding acquisition, D. S. and M. M. R. All authors have read and agreed to the published version of the manuscript.

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#### Conflicts of Interest

No Conflicts of interest.

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