

# Vegetable Cultivation with Hydroponic System Nutrient Film Technique In Karang Taruna Gendowang Village

Saufik Luthfianto<sup>1)</sup>, M. Haidar Aji Pratama<sup>2)</sup>, Afrizal Alimudin<sup>3)</sup>  
<sup>123</sup>Universitas Pancasakti Tegal Jalan Halmahera Km. 1 Kota Tegal  
Email: saufik.ti.upstegal@gmail.com<sup>\*)</sup>

Received : 06 Auguts 2021

Revised: 06 Auguts 2021

Accepted: 06 Auguts 2021

Publish: 09 Auguts 2021

## Abstract

The result of initial survey in Gendowang Village, Moga District, Pemalang regency is an area with a large potential agricultural area with a total land of 82 ha more and the average population is farming, so it is very potential in developing agricultural systems with hydroponic systems. Enthusiastic citizens are seen at the time of socialization activities. The initial method of applying this technology is an approach to the community, then socialization and workshop. The method used in developing this agricultural system is the application of hydroponic methods with NFT systems. The result is by increasing knowledge and skills in the insertion of this method by 43.95%.

*Keywords:* Hidroponik, NFT, Gendowang

## 1. Introduction

Gendowang village is a village located in Moga Subdistrict, Pemalang Regency. Gendowang village has an area of 459 ha consisting of 4 dukuh namely Karanganyar, Kepetek, Kreo and Cikalong. The geographical condition of the area in general Gendowang Village consists of: Building Area 123.4 Ha, Plantation Area 82 Ha, Plantation Area 2 Ha, People's Forest Area 13 Ha, Other Areas 23.6 Ha. Gendowang Village Boundary is located in the moga sub-district and has boundaries - the northern boundary of Pepedan Village, Moga District Pemalang, south of Sima Village, Moga District, Pemalang Regency, east of Pepedan Village, Moga District, Pemalang Regency, West Of Kajenengan Village, Bojong District, Tegal Regency. Demographic conditions of the population of men 4,094 people, women 4,665 people. The livelihoods of gendowang villagers mostly work in agriculture and trade. Farmers 827 people, Farm Labor 1,055 people, Transport 48 people, Traders 2,115 people, Fishermen 8 souls, Industrial Workers 173 people, Building Workers 159 people, civil servants 11 people, TNI / POLRI 2 souls. The level of education is completed by 28 people, Academic Graduates 14 people, High School Graduates / Equivalent 168 people, Tamat JSS / Equivalent 367

people, Elementary School Graduates / Equivalent 1,887 people (BPS Kabupaten Pemalang, 2020). From the data above the atmosphere and environment in gendowang village still clean and very cold at night.

Hydroponics consist of the words hydro which means water and ponos which means work (Astutik & Qomariyah, 2020) and (Alviani, 2015). Hence of hydroponics has a free understanding of farming techniques by emphasizing on the fulfillment of nutritional needs for plants, or in the everyday sense of farming without soil. According of (Masduki, 2018) Hydroponics is the cultivation of planting by utilizing water without using soil by emphasizing on the fulfillment of nutritional needs for plants. The need for water in hydroponics is less than the need for water in cultivation with soil (Roidah, 2014) therefor that hydroponics uses water more efficiently, so it is suitable to be applied to areas that have a limited water supply. Methods in the application of this technology in line with the needs of community to increasingly limited land and desire of the community in meeting its needs, according to (Mulasari, 2019) who use hydroponic technology as a planting medium that the public better understands the application of the method, namely by socialization, discussion and question and answer as well as the practice of farming directly, so as to reduce the impact of adding plastic waste to the community while according to (Mustikarini et al., 2019) conducted a survey in advance of the community about hydroponic training as the beginning of mapping to the public's interest in the program, then continued rank position analysis to increase the motivation of the program, the result is investment and capital and support from academics and government is the most important component. According to (Nugraha, 2019) using participatory methods is very helpful in the successful implementation of this hydroponic method program because it actively engages the community. (Rahmadhani et al., 2020) which uses two systems in developing vegetable cultivation, namely aquaponics and hydroponics, where these two systems especially in lettuce vegetables can increase the production of such vegetables. (Hidayat et al., 2020) use the lecture method then continued with the Q&A and the last is a demonstration. The method of demonstration on hydroponics applied is the wick system, a system that utilizes the capillarity of water with used bottles.

From the concept above, it's seen that the emergence of hydroponic planting techniques is initiated by the increasing human attention to the importance of fertilizer

needs for plants. Wherever the growth of a plant will still be able to grow well if the nutrients (nutrients) needed are always sufficient. In this context the function of the soil is to buffer the plant and the existing water is a nutrient solvent, to then be absorbed by the plant. This mindset eventually gave birth to hydroponic planting techniques, where what is emphasized is the fulfillment of nutritional needs. Therefore, community service activities through KKN UPS Tegal succeeded the work program of making Hydroponic Installation with Nutrient Film Tehnique (NFT) system. Our goal is to do this work program, because the growth of vegetables will be very good let alone the water in gendowang village <50 PPM and very beneficial for food security for the surrounding community.

## 2. Method

The implementation method begins with the initial data collection. Data collection is conducted with observations (observations), interviews and Questionare in order to obtain supporting data for the preparation and analysis of work programs. Observations had a purpose to recognize the problems that are being experienced by gendowang residents related to gardening activities. Interviews conducted discussions with the surrounding community, village devices, and related institutions / agencies around the village that can be completion of the collection data. Furthermore, the method of implementation of the program is as follows:

1. Approach method. This method is done with partners, namely coral cadets in order to create a friendly and harmonious condition so that the implementation of the program can run casually



Figure 1. Deliberations with youn ng organization about the needs of the implementation of the program

2. Implementation of the program. The implementation of this activity is carried out with socialization and workshop and designing a good marketing strategy and then assisted



Figure 2. Implementation of socialization programs and workshops

Reporting and evaluation, reporting and evaluation is done using pre test and post test system on basic hydroponic knowledge in order to know the understanding in the activities of this program both before and after the activity.

### 3. Result and Discussion

#### 3.1. Result

Hydroponic training was conducted in Balaidesa Gendowang Hall, Moga Subdistrict, followed by 20 villagers. In the implementation of counseling on hydroponics which is then continued with the practice of making simple hydroponic planting media, namely

a. Material and Steps:

1. Using used bottles, rockwool and flannel fabric as wicks,
2. Breeding chilies and vegetables that are done on soil media that is put on small plastics for seeding.
3. Connect the pipes by making a pattern and stand upright.
4. At the bottom end is directed to the water reservoir.
5. Make the place where the seed grows by perforated with a diameter of about 4 cm.
6. Installing shade for plant seeds from direct sunlight
7. Planting media for hydroponics is able to absorb water and conduct water, not rot, and does not affect the pH
8. Create a green house media used to store plants at the time of seedlings and transfer plants to larger media.
9. Treatment is done by pruning, cleaning weeds, spraying fertilizers and leaves.

b. Sistem hydroponic NFT (*Nutrient Film Technique*):

1. Put the roots of plants on a shallow layer of water, so that water containing nutrients is well circulated.
2. Reduce the amount of moisture content so that oxygen is sufficient, with the NFT system made a maximum solution height of 3 mm.



Figure 3. Explaining Materials and Steps

### 3.2. Discussions

After hydroponic training, evaluation of the training is conducted by giving a questionnaire to assessing knowledge and skills and also collect data in absorbing materials. The question already validated by the expert in those field that consist of 20 questions each test. The results can be seen in figure 5. graph of pre test and post test score results of trainees:

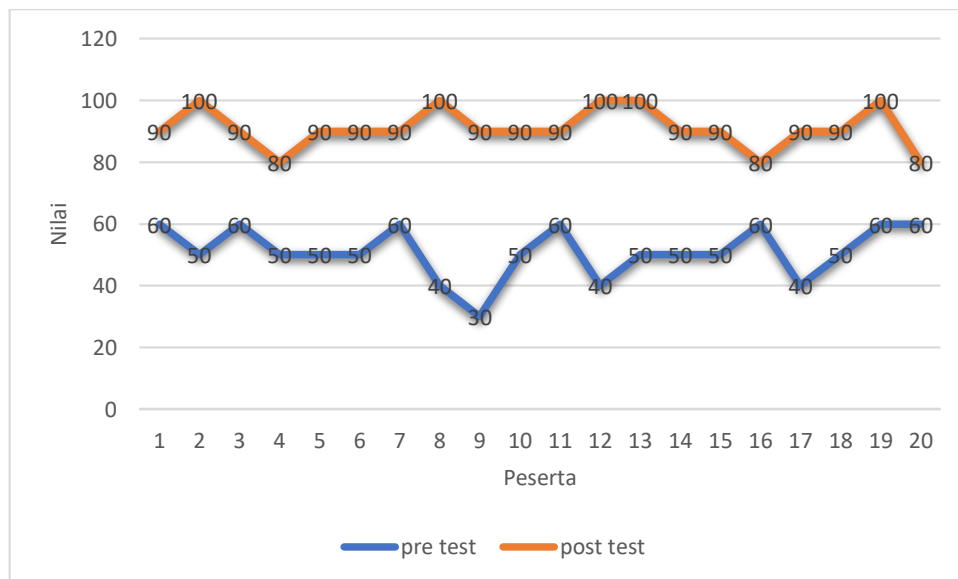


Figure 4. Pretest and Posttest Result

From the graph above the trainees appear to show improved results after hydroponic training both in terms of knowledge and skills. The average value produced before the training only got an average score of 51, after the training showed an average score of 91 or an increase of 43.95%.



Figure 5. Submission of program evaluation results

#### 4. Conclusion

From the results and discussions above, it can be concluded about the program of implementation of the NFT hydroponic system training, namely in the early stages of the implementation of this program is first carried out methods of approach to the community, especially youth then conducted stages of socialization and workshop, at this stage explained about the material and its application so that participants easily understand. This Program also conducted to encourage the youth knowledge for hydroponic system training.

The last stage is evaluation, this evaluation is carried out by means of pre test and post test so that measurable results are known. This evaluation stage produced an average value for pre test is 51 and post test 91 or there is an increase in training value by 43.95%.

#### Acknowledgement

We would like to express our gratitude to the Gendowang villagers who have tried hard to progress, Mr. Nur Aufa Sidiq as the Head of Gendowang Village and LPPM of Universitas Pancasakti Tegal as the organizer of KKN Pemalang Area.

## Reference

- Alviani, P. (2015). *Bertanam Hidroponik Untuk Pemula: Cara Bertanam di Lahan Terbatas* (W. Rini (ed.); pertama). Bibit publisher.
- Astutik, M., & Qomariyah, U. N. (2020). Pelatihan Pengelolaan Taman Hidroponik Sebagai Bekal Berwiraswasta Pada Warga Binaan Lapas Klas IIB Kabupaten Jombang. *Comvice: Journal of ...*, 4(1), 31–36. <http://ejournal.stiedewantara.ac.id/index.php/COMVICE/article/view/661>
- BPS Kabupaten Pemalang. (2020). Kabupaten Pemalang Dalam Angka 2020. In *Badan Pusat Statistik Kabupaten Pemalang* (pp. 1–582). Bada. <http://library1.nida.ac.th/termpaper6/sd/2554/19755.pdf>
- Hidayat, S., Satria, Y., & Laila, N. (2020). Penerapan Model Hidroponik Sebagai Upaya Penghematan Lahan Tanam Di Desa babadan kecamatan Ngajum kabupaten Malang. *Jurnal Graha Pengabdian*, 2(2), 141–148. <http://journal2.um.ac.id/index.php/jgp/article/view/13346>
- Maps, G. (n.d.). *Lokasi Desa Gendowang Kecamatan Moga Kabupaten Pemalang*. <https://www.google.co.id/maps/place/Gendowang,+Moga,+Pemalang+Regency,+Central+Java/@-7.1052828,109.225186,3111m/data=!3m1!1e3!4m5!3m4!1s0x2e6feb7f24c718e9:0x7bb12d5505955eac!8m2!3d-7.1066232!4d109.2326031>
- Masduki, A. (2018). Hidroponik Sebagai Sarana Pemanfaatan Lahan Sempit Di Dusun Randubelang, Bangunharjo, Sewon, Bantul. *Jurnal Pemberdayaan: Publikasi Hasil Pengabdian Kepada Masyarakat*, 1(2), 185. <https://doi.org/10.12928/jp.v1i2.317>
- Mulasari, S. A. (2019). Penerapan Teknologi Tepat Guna (Penanam Hidroponik Menggunakan Media Tanam) Bagi Masyarakat Sosrowijayan Yogyakarta. *Jurnal Pemberdayaan: Publikasi Hasil Pengabdian Kepada Masyarakat*, 2(3), 425. <https://doi.org/10.12928/jp.v2i3.418>
- Mustikarini, E. D., Santi, R., & Inonu, I. (2019). Pemberdayaan PKK Desa Pagarawan melalui Budi Daya Tanaman Sayuran dengan Sistem Hidroponik. *Agrokreatif: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, 5(3), 173–180. <https://doi.org/10.29244/agrokreatif.5.3.173-180>
- Nugraha, A. W. (2019). Pemberdayaan Masyarakat Desa Sumberdadi dengan Pelatihan Hidroponik dan Pupuk Organik. *JPP IPTEK (Jurnal Pengabdian Dan Penerapan IPTEK)*, 3(1), 25–32. <https://doi.org/10.31284/j.jpp-iptek.2019.v3i1.481>
- Rahmadhani, L. E., Widuri, L. I., & Dewanti, P. (2020). Kualitas Mutu Sayur Kasepak (Kangkung, Selada, Dan Pakcoy) Dengan Sistem Budidaya Akuaponik Dan Hidroponik. *Jurnal Agroteknologi*, 14(01), 33. <https://doi.org/10.19184/j-agt.v14i01.15481>
- Roidah, I. S. (2014). Pemanfaatan Lahan Dengan Menggunakan Sistem Hidroponik. *Jurnal Universitas Tulungagung BONOROWO*, 1(2), 43–50.