

## **Small-scale Automated Drip Circulation System** *Sistem Sirkulasi Tetes Otomatis Skala Kecil*

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Hunger and Poverty are one of the major problems faced in Sub-Saharan Africa. To get rid of this problem in line with the aim of the sustainable development goals, there is the need to increase current production levels of food. This can be achieved by mechanizing farming systems and introducing technology to farming systems. This paper seeks to introduce an automation system that uses automated drip irrigation with a circulation system to efficiently use energy and avoid the amount of water wasted during farming activities to attempt to increase food production levels..

## **References**

1. . Andaluz, V. H. et al. (2016) 'Automatic control of drip irrigation on hydroponic agriculture: Daniela tomato production', in 2016 IEEE International Conference on Automatica, ICA-ACCA 2016. doi: 10.1109/ICA-ACCA.2016.7778389.
2. . Ani, A. and Gopalakrishnan, P. (2020) 'Automated Hydroponic Drip Irrigation Using Big Data', in Proceedings of the 2nd International Conference on Inventive Research in Computing Applications, ICIRCA 2020. doi: 10.1109/ICIRCA48905.2020.9182908.
3. . Bhattacharjee, D., Prakash, O. and Islam, H. (2018) 'Smart fertilizer dispensary system for automated drip irrigation', 2018 3rd IEEE International Conference on Recent Trends in Electronics, Information and Communication Technology, RTEICT 2018 - Proceedings, pp. 1458-1462. doi: 10.1109/RTEICT42901.2018.9012416.
4. . Bottazzi, P. and Altobelli, F. (2020) 'Performance of different rice varieties under drip irrigation', pp. 333-337.
5. . Caya, M. V. C. et al. (2019) 'Integration of Water Control with a Drip Irrigation System for Agricultural Application', 2019 IEEE 11th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment, and Management, HNICEM 2019. doi: 10.1109/HNICEM48295.2019.9072773.
6. . Darfour, B. and Rosentrater, K. A. (2016) 'Agriculture and food security in Ghana', 2016 American Society of Agricultural and Biological Engineers Annual International Meeting, ASABE 2016. doi: 10.13031/aim.20162460507.
7. . DIvyapriya, S. et al. (2020) 'IoT enabled drip irrigation system with weather forecasting', Proceedings of the 4th International Conference on IoT in Social, Mobile, Analytics and Cloud, ISMAC 2020, pp. 86-89. doi: 10.1109/I-SMAC49090.2020.9243349.
8. . Fipps, G. (1995) 'Calculating Horsepower Requirements and Sizing Irrigation Supply Pipelines', Texas Agriculture Extension Services, pp. 1-10.
9. . Hidayat, M. R. et al. (2019) 'Soft Water Tank Level Monitoring System Using Ultrasonic HC-SR04 Sensor Based on ATmega 328 Microcontroller', Proceeding of 2019 5th International Conference on Wireless and Telematics, ICWT 2019, pp. 2019-2022. doi: 10.1109/ICWT47785.2019.8978229.
10. . Jain, R. K. et al. (2020) 'IOT Enabled Smart Drip Irrigation System Using Web/Android Applications', 2020 11th International Conference on Computing, Communication and Networking Technologies, ICCNT 2020. doi: 10.1109/ICCCNT49239.2020.9225345.
11. . Nosipho Hlophe-Ginindza, S. and Mpandeli, N. S. (2021) 'The Role of Small-Scale Farmers

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- in Ensuring Food Security in Africa', Food Security in Africa, (June). doi: 10.5772/intechopen.91694.
12. . Rani, M. J. (2021) 'IoT based Intelligent Fertigation through Drip Irrigation', (Icicv), pp. 0-4.
  13. . Shonkora, S. S. and Salau, A. O. (2020) 'Modeling and Implementation of an Automatic Drip Irrigation System', 2020 International Conference on Data Analytics for Business and Industry: Way Towards a Sustainable Economy, ICDABI 2020. doi: 10.1109/ICDABI51230.2020.9325665.
  14. . Sudana, D., Eman, D. and Suyoto (2019) 'Iot based: Hydroponic using drip non-circulation system for paprika', Proceeding - 2019 International Conference of Artificial Intelligence and Information Technology, ICAIT 2019, pp. 124-128. doi: 10.1109/ICAIT.2019.8834581.
  15. . Tangwongkit, B., Tangwongkit, R. and Chontanaswat, P. (2014) 'Drip irrigation powered by solar cell for dry rainfed and no electricity area', Proceedings of the 2014 International Conference and Utility Exhibition on Green Energy for Sustainable Development, ICUE 2014, (March), pp. 19-21.
  16. . Technologies, H. T. (no date) Water Usage In The Agricultural Industry | High Tide Technologies. Available at: <https://htt.io/water-usage-in-the-agricultural-industry/> (Accessed: 22 July 2021).
  17. . Xu, W. (2021) 'Home Smart Planting System Based on Internet of Things'.
  18. . Zaher, A. et al. (no date) 'Automated Smart Solar Irrigation System'.