

Chapter 5

Climate–Resistant Smart Agriculture Policy for Healthy and Safe Food Production to Support Food Security and Rural Development in Taiwan and Indonesia

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ABSTRACT

This paper examines the development and implementation of climate-resistant smart agriculture policies in Taiwan and Indonesia, highlighting their contributions to healthy and safe food production as a strategic pathway toward enhanced food security and sustainable rural development. Both countries face increasing challenges from climate change, including extreme weather events, shifting crop patterns, and threats to food systems. In response, Taiwan has adopted precision agriculture

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and digital technology integration through its “Smart Agriculture 4.0” initiative, while Indonesia is advancing its “Agricultural Digitization Roadmap” and climate-resilient farming programs. Through a comparative analysis, this study evaluates policy frameworks, institutional support, technological innovations, and grassroots engagement in each country. The findings indicate that the integration of Internet of Things (IoT), AI, and sustainable agroecological practices has significantly improved crop resilience, minimized chemical inputs, and enhanced rural livelihoods.

I. INTRODUCTION

Climate change has emerged as one of the most critical threats to global agriculture, affecting crop productivity, food safety, and rural livelihoods. Nations across the Asia-Pacific, particularly Taiwan and Indonesia, face mounting challenges due to rising temperatures, erratic rainfall patterns, and the increasing prevalence of pests and diseases. These environmental disruptions significantly jeopardize food security and pose a direct threat to rural economic stability. In response, both countries are transitioning toward climate-resistant smart agriculture policies that integrate digital technologies, resilient farming systems, and sustainable development goals (SDGs).

Taiwan, with its advanced agricultural research institutions and precision farming innovations, has embraced smart farming technologies such as sensor-based irrigation, climate-adaptive crop breeding, and blockchain for food traceability. Its policies emphasize food quality, biosafety, and export competitiveness while reinforcing farmer resilience through institutional support and subsidies (Lee et al., 2021).

Indonesia, as an emerging economy with vast agroecological diversity, faces the dual challenge of boosting food production and ensuring equity in rural development. The government’s “Smart Farming 4.0” strategy aims to digitize farming practices using the Internet of Things (IoT), satellite mapping, and AI-based analytics, while also promoting agroecological methods and climate-smart food estates (Prabowo & Fauzi, 2022). However, resource disparities and varying levels of digital readiness among smallholder farmers necessitate tailored, inclusive policy interventions.

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