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Dismantling Reductionism in the Green Revolution Project with Vandana Shiva's Approach

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Abstract

This research is philosophical research on actual problems. This study tries to present Vandana Shiva's critique of the Green Revolution project. This research uses the philosophical hermeneutic method with methodological elements consisting of description, historical continuity, and critical reflection. After the Second World War ended, one of the major impacts experienced by various countries was the destruction of the agricultural industry and an increasing food crisis around the globe. The newly independent Indonesia also experienced the impact of the war on national agriculture. This condition triggers a new demand for modern agricultural technology to achieve maximum yields. The Green Revolution project promises to meet this new demand, this project brings modern agricultural technology with superior seeds and mass production systems. In reality, the Green Revolution project reduces local knowledge about sustainable food production and replaces it with mass production of food. The diversity of local people's food is seen as unfavourable in the Green Revolution era. Vandana Shiva criticizes the impact of the Green Revolution project on life. Shiva explained the Green Revolution had the following impacts: creating a food monoculture, destroying the environment, promoting the capitalization of the agricultural industry, and displacing local knowledge. Therefore, local people are powerless as a result of reductionism in the Green Revolution project. Local knowledge is considered inferior compared to Western knowledge presented in the Green Revolution project.

Keywords

green revolution, reductionism, vandana shiva

1 Introduction

The world famine as a result of the Second World War led to various countries around the world needing food stocks to meet the needs of their populations (Perkins, 1997, p. 210). The reduction of agricultural land and the depletion of stocks of staple food barns due to the endless war. The former colonies that served as food suppliers were also significantly affected at that time. Agricultural fields and plantations are increasingly turning into minefields. Therefore, various countries are cleaning up and innovating in overcoming world hunger, the availability of staples, and the availability of agricultural land and plantations to meet the food needs of the population. One of the policies that emerged was the Green Revolution project. The Green Revolution is presented to overcome the depletion of world food availability by utilizing narrow agricultural and plantation land by producing quantity and quality of food. Superior quality is the main attraction for the developers of the Green Revolution, while the amount of production produced from the Green Revolution project is much more when compared to using traditional methods. This is due to the modernization of the application of technology in agriculture and plantations.

The Green Revolution policy was pursued by various countries around the world as a way to reduce world hunger and provide food for each country. Efforts to increase agricultural and plantation yields are targets that must be achieved to fulfil food together. The Green Revolution policy is also accompanied by a variety of competencies that are held by utilizing the minimum resources owned to produce superior quality and quantity of food sources that can meet the food needs of the community. Making superior plant seeds or superior varieties is one of the programs initiated and carried out by various countries. This Green Revolution policy was also implemented in Indonesia during the New Order (*Orde Baru*) era (Jamaludin, 2015, p. 280). With almost the same pattern in other parts of the world, Indonesia's Green Revolution policy focuses on the production of rice farmland as its production output.



Utilization of narrow land and optimization of high-yielding varieties were the initial ways taken by various countries. This was followed by the improvement and expansion of agricultural land in various regions to further increase food production (Horne & McDermott, 2001, pp. 15-16). The clearing of land that was originally peat fields and forests was converted into agricultural land with the selection of superior seeds. The results obtained from the harvest are not only to fulfil the basic needs of the community but also to produce more agricultural products to fulfil the world market. The Green Revolution policy turned into a tool of state capitalization in obtaining maximum profits from the sale of agricultural products.

In addition, various policies in agriculture such as fertilizer management and distribution in empowering agricultural land are also intensified by the government. A wide variety of crops are produced according to the conditions and local commodities of each region. The replacement of production tools from traditional tools to modern tools is also intensified to accelerate the production process in meeting the increasing market demand for foodstuffs (Horne & McDermott, 2001, p. 137). Various kinds of policies taken in this Green Revolution do produce various kinds of positive impacts felt by the community such as the fulfilment of the community's basic needs can be realized, but it cannot be denied that in its implementation it produces negative impacts as well such as the depletion of the world's lungs because it is used as agricultural land which is unable to produce enough oxygen production for the needs of human life.

There are reductive attitudes and actions towards the policies and practices of the Green Revolution. Attitudes and knowledge developed in the community are reduced by the policies and actions taken by the government. Local knowledge that has been sustainable with nature shifts to external knowledge that is not sustainable with nature. There is a shift in knowledge in the community, especially in agriculture. The community is only fixated on one monoculture crop that is used as a reference for production alone. The emergence of capitalization of agricultural production tools by the market and capital owners in agriculture. The emergence of market-driven control of agricultural production often harms lower-class farmers and farm labourers. The emergence of ecological damage is caused by environmental business activities carried out by financiers and corporations (Baidi, Ahmad, & Shoheh, 2023, p. 52). The acceleration in agricultural production activities is also suspected by the enforcement of the use of acceleration in agricultural production activities is also suspected by the enforcement of the use of fertilizers that are not friendly to the environment. So the reductive attitudes and policies in the Green Revolution have an impact on environmental damage, ecosystem balance, and human relations with nature.

2 About Green Revolution

2.1 History of the Green Revolution Project

After World War II, especially in the 1940s and 1950s, many countries faced a food crisis. A growing world population and the destruction of agricultural land due to war created the need for solutions to increase food production to fulfil basic human needs (Perkins, 1997, p. 210). In 1970 the American botanist, Norman Borlaug, Director of the Division for Wheat Cultivation at the Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT) in Mexico, was awarded the Nobel Peace Prize. He was honoured for having set in motion a worldwide agricultural development, later to be called the 'Green Revolution'. This development was based on the genetic improvement of particularly productive plants. Borlaug's so-called 'miracle wheat' doubled and tripled yields in a short period. The Green Revolution refers to the spread of advances in agricultural technology that began in Mexico and led to a significant increase in food production in the developing world. The program involved improved varieties of crops such as rice and wheat, the use of chemical fertilizers, and more efficient irrigation techniques (Glaeser, 2011, p. 1).

The new farming methods introduced by Borlaug doubled the wheat harvest in Mexico in the 1960s. Soon after, Borlaug's method was used in various parts of Asia, including Indonesia (Whaley, 2010, p. 44). On the other hand, Borlaug's success is considered by many to have aborted the thesis of Thomas Robert Malthus, who stated that population growth corresponds to a measuring series while food supply growth corresponds to a counting series (Nugroho, 2018, p. 56). The acceleration of agricultural production produced through the Green Revolution has yielded significant results in fulfilling food needs and alleviating hunger in several regions of the world. Modernization in agriculture accelerated the production and maintenance of agricultural land and its management.

The Green Revolution also emerged as a solution to dealing with population growth that was not matched by the availability of food and adequate agricultural land, which eventually led to various problems in rural areas, one of which was poverty. The Green Revolution presents a policy based on agricultural land that does not increase, while the population growth rate continues to increase so that food needs are in deficit (Perkins, 1997, p. 224). The Green Revolution can be defined as the process of modernizing old-style agriculture into modern-style agriculture by developing seeds and agricultural patterns from subsistence agriculture to capital-based and commercial agriculture. The Green Revolution is characterized by the diminishing dependence of farmers on weather and natural conditions and is replaced by the role of modern science and technology. Meanwhile, the goals of the Green Revolution are agricultural intensification, agricultural extensification, agricultural diversification, and agricultural rehabilitation (Farid et al., 2017, p.7).

2.2 Green Revolution Policies in Indonesia

The phenomenon of the Green Revolution emerged around the 1960s, but in Indonesia, it is thought to have become popular after 1975. The Green Revolution movement in Indonesia began during the reign of President Soeharto. The Green Revolution was a process of modernizing agricultural techniques through the development of superior seeds and a shift to the use of modern technology. The Green Revolution policy in Indonesia changed the pattern of substantial agriculture towards capital-based agriculture (Farid et al., 2017, p.8.). There are 5 programs or components that were intensified by the government in the Green Revolution with the name *Panca Usaha Tani*:

- a. Selection and use of high-yielding seeds or superior varieties
- b. Regular fertilization
- c. Adequate irrigation
- d. Intensive pest eradication
- e. More regular planting techniques

The implementation of the green revolution in Indonesia introduced superior rice varieties such as IR-5 and IR-8 which were the result of research in the Philippines by the International Rice Research Institute (IRRI). These rice varieties have higher yield potential than traditional varieties (Farid et al., 2017, p. 1). The Green Revolution policy in Indonesia also includes the widespread application of fertilizers and pesticides to increase productivity in agriculture. It aims to ensure that crops get enough nutrients and are protected from pests. The government also launched a rice intensification program by providing support to farmers to increase productivity through the provision of superior seeds, fertilizers, and an understanding of modern agricultural technology.

One of the results of the Green Revolution in Indonesia at that time was the realization of food self-sufficiency, especially rice self-sufficiency (Farid et al., 2017, p. 8). The program aimed to reduce dependence on rice imports and ensure national food security (Gultom & Harianto, 2021, p. 149). To support efforts to increase agricultural production, the government established the Agricultural Research and Development Agency (*Badan Litbang Pertanian*). This agency is tasked with conducting research and development in agriculture to improve technology and productivity.

The Green Revolution in Indonesia reflects the government's efforts to improve food security and agricultural productivity. However, in the course of its implementation, it also showed some impacts and challenges. The government continues to try to address these aspects through more inclusive and sustainable agricultural policies. However, the government's program was felt to be quite rigid and coercive to local farmers. Because of this, the Green Revolution program has also received a lot of criticism. One of the criticisms is that the strategy through the Green Revolution is not optimally creating conditions that free people from poverty, is not able or strong enough to withstand the flow of urbanization, and the production costs incurred by some farmers are not proportional to the results of production in agriculture, as well as the control of food prices by market policies that are so strong (Jamaludin, 2015, p. 281).

2.3 Impacts of Green Revolution

Policy recommendations must then include measures for dealing with major social problems (in particular, distributional problems) and ecological shortcomings (environmental problems). Socially responsible research must not cling to the pretence of political innocence and shy away from the basic (and particularly unpleasant) facts: research policy, Green Revolution or eco-development-oriented, must acknowledge that it has a service function to fulfil for individual consumers and producers. Food production must be labor-absorbing and environmentally sustainable, rather than capital-intensive and energy-wasting (Glaeser, 2011, p. 6). From that, the Green Revolution has two impacts to respond:

Positive impacts:

- a. Expansion of agricultural land
Along with the increasing need for food and agricultural production, the Green Revolution policy in agriculture stimulates the land expansion policy. The expansion of agricultural land is expected to be able to contribute to producing in meeting the food needs of the community (Rinardi et al., 2019, p. 128).
- b. Improved agricultural quality
The Green Revolution encouraged the development and discovery of quality agricultural systems. This is tailored to the efficiency and effectiveness of agricultural production. Quality agricultural products assure the quality of food for the community. The Green Revolution provides space in agriculture to genetically engineer various crops to produce valuable and high-quality crops. Because with high-quality crops, it will be more needed and ogled by the community. More competent agricultural quality will produce superior products and be more trusted by the market
- c. Improved quality of production
One of the main impacts of the Green Revolution was the increase in food production. Countries that adopted this technology saw a significant increase in agricultural yields and helped overcome the problem of hunger. This increase in production quality was an effort to fulfil the basic needs of the community and fulfil market demands that increasingly uphold product quality and quantity.
- d. Increased "farmer" income
The modernization of the means of agricultural production introduced by the Green Revolution has also increased the yield of agricultural production, especially for rich farmers (Sajogyo, 1977, p. 15). The harvesting system is faster when compared to the use of traditional tools. Increased income is obtained by farmers who have large capital because they can get large yields as well and can control production and turnover of production in the market so that the profits generated from the capitalization of the Green Revolution are high.

Negative impacts:

- a. Social and economic inequality
The modernization brought about by the Green Revolution resulted in social and economic inequality between farm workers, small farmers, and farmers with large capital (Gultom & Harianto, 2021, p. 151). The amount of work dedicated by farm labourers is not proportional to the income they generate when managing the farms of capital owners. Meanwhile, the income and social status of smallholder farmers are not comparable to the income and social status earned by farmers with large capital in the community and market environment. The community tends to give the best standards to farmers with large capital because the quality of agricultural products produced is far more perfect than that of small farmers. This is supported by production tools that are seen as higher quality and competent as well as agricultural products that are of high value and superior.
- b. The fading of the kinship system
The traditional farming systems that are marginalized due to modernization through the Green Revolution demand to produce large enough quantities to fulfil food and market needs. This has led to competition between farmers. The kinship that used to be prioritized in community life began to fade due to competition in agriculture. The income system obtained between small farmers and large farmers also further encourages the existence of confusion in social life (Gultom & Harianto, 2021, p. 152).

- c. The rise of a consumptive culture
This consumptive behaviour means that the fulfilment of production needs is no longer the main target in agricultural management. The Green Revolution, in addition to having a positive impact on increasing agricultural production, also has a side effect in the form of purchasing the latest production equipment which only has the impact of unnecessary spending. Dependence on external factors outside the fulfilment of production will later create economic instability in the long run.
- d. Waning trust and environmental pollution
The use of profit-making means of production without regard to environmental impacts results in pollution on multiple fronts (Nugroho, 2018, p. 58). Environmental pollution generated by environmentally unfriendly management and production tools causes ecological and economic damage. The use of chemical fertilizers and pesticides can cause soil degradation and water pollution. Thus, greater costs are required to improve the environment and soil fertility for sustainable production.

3 Vandana Shiva's Approach

3.1 Reductionism Effect

Reductionism is a perspective that sees complex reality into small, simple and singular parts. The reductionist mindset is built on an ontological foundation that emphasizes the homogeneity and simplification of things. According to Shiva, reductionism seeks to reduce the complexity of ecosystems into single components and from single components into single functions. Homogeneity or uniformity arises because of the demand from the market (Shiva, 1997, p. 105).

Reductionist knowledge views reality as uniform, with all systems consisting of the same basic choices. Reality is an atomic fact detached from its relationship with humans. The uniformity built into the pattern of reductionism thwarts the narrative of diversity and complexity that arise in knowledge. Therefore, science, which is supposed to be a means of emancipation from the practice of oppression, can function as an instrument to perpetuate, justify and support the continuity of oppression when developing through reductionist patterns. Oppression and violence produced by reductionism in science, according to Vandana Shiva, include (Shiva & Mies, 2005, pp. 28-29):

- a. Violence against women as a subject of knowledge is socially persecuted through the separation of experts and non-experts. Women become marginalized because their knowledge does not receive positive appreciation in the knowledge system.
- b. Violence against nature takes place in the form of nature being used as an object of knowledge. Its integrity is undermined by modern science both in the process of perception and manipulation
- c. Violence against others because of their inability to own, determine, and voice their aspirations related to the management and utilization of knowledge so that they become victims who lose access to freedom and life support systems.
- d. Violence on knowledge itself. Reductionism creates a single truth claim that declares itself more valid, true and superior and then denigrates other alternative knowledge.

Reductionism domination in modern science is embodied in developmentalism (Krisnadi, 2023, p. 5). The reductionist mindset has an ethical impact on people's knowledge. Reductionism dichotomizes and alienates specialists from non-specialists. Specialists displace lay knowledge that has been passed down through generations. Reproduction of knowledge can only be done by people who are experts/specialists, while the statements of lay people and traditional people are considered stupid (Fakih, 1997, p. xxv). Shiva's thought criticizes the thought of dualism and then integrates it into every aspect of human life. Shiva provides evidence of the bad dichotomous dualism that harms the existence of women and nature which is only used as an object.

3.2 About *Prakriti*

The everyday struggles of women for the protection of nature take place in the cognitive and ethical context of the categories of the ancient Indian worldview in which nature is *Prakriti*, a living and creative process, the feminine principle from which all life arises. Women's ecology movements, as the preservation and recovery of the feminine principle, arise from a non-gender-based ideology of liberation, different both

from the gender-based ideology of patriarchy which underlies the process of ecological destruction and women's subjugation, and the gender-based response which has until recently, been characteristic of the west (Shiva, 1988, pp. xv-xvi).

Contemporary Western views of nature are fraught with the dichotomy or duality between man and woman, and person and nature. In Indian cosmology, by contrast, person (*Purusha*) and nature (*Prakriti*) are a duality in unity (Shiva, 1997, pp. 50-52). They are inseparable complements of one another in nature, in woman, in man. Every form of creation bears the sign of this dialectical unity of diversity within a unifying principle and this dialectical harmony between the male and female principles and between nature and man becomes the basis of ecological thought and action. Shiva describes *Prakriti* as nature has been treated as integral and inviolable. *Prakriti*, far from being an esoteric abstraction, is an everyday concept which organizes daily life. There is no separation here between the popular and elite imagery or between the sacred and secular traditions. As an embodiment and manifestation of the feminine principle it is characterized by creativity, activity, productivity; diversity in form and aspect; and connectedness and inter-relationship of all beings including man; continuity between the human and natural; and sanctity of life in nature (Shiva, 1988, p. 39). The relationship is realized between nature (*Prakriti*) and humans (*Purusha*) who nurture each other and are inseparable.

The introduction of *Prakriti*, with its emphasis on diversity as a unifying principle, the sanctity of life in nature is achieved through creativity, activity and productivity (Garrity-Bond, 2018, p. 194). The connectedness and interrelatedness of all beings insist on an ethical way of living that honours nature instead of conquering through exploitation and domination. Shiva is not without hope when she claims, "Our experience shows that ecology and feminism can combine in the recovery of the feminine principle, and through this recovery, can intellectually and politically restructure and transform maldevelopment (Shiva, 1988, p. 46).

3.3 Critique of Dichotomic Dualistics

Dualistic thinking views reality as consisting of two distinct and separate parts. Two different things are seen as enemies that are opposed, fought against, and subjugated. This opposition creates a dominant position and a subordinate position that try to subdue each other. For example, the opposition is followed by unfair treatment between the first, and men, who are considered superior and better than the second, women. Thus, the dualistic-dichotomous mindset has the potential to create injustice because it tends to exclude, marginalize, and subordinate those who are considered inferior (Utama, 2001, p. 1).

Vandana Shiva believes that a dualistic-dichotomous mindset is dangerous because it can lead to policies that dominate certain parties. Shiva views that this approach through binary categories often results in hierarchy and inequality in human life. For example, the position of humans is strictly separated and contrasted with nature. Humans feel that they have a higher position than nature and thus behave exploitatively. This exploitative nature arises while humans utilize what is provided by nature. Humans appear as masters who always want to be served and nature appears as a servant who is forced to always be ready to serve his master. This is motivated by reductionist knowledge that states that humans are subjects while nature is only an object. This dualistic mindset about the physical environment reinforces a worldview that regards nature as a helpless and passive object that can be subjugated for the benefit of humans. Shiva opposed the dualism between humans and nature as an unrealistic separation and proposed a holistic approach that recognizes the interconnectedness and dependence of humans on nature (Suliantoro & Murdiati, 2019, p. 93). In social-environmental relations, the position of men has a more dominant position than women, resulting in a culture of oppression. Various forms of oppression such as subordination, double burden, and violence take place systematically and structurally against women. Therefore, according to Shiva, this dichotomous-dualistic concept has the potential to produce oppression against nature and women (Shiva, 1997, pp. 52-53). This is what causes women to become increasingly alienated from their worlds (Tong, 2004, p. 394). Shiva highlights the concept of gender dualism that is common in society, where certain roles and characteristics are attributed exclusively to men and women. Her critique of this dualistic gender dichotomy includes a rejection of stereotypical gender roles and gender hierarchies that often disadvantage women. Shiva championed gender equality and the recognition of women's contributions in various fields, including agriculture and the preservation of natural resources.

The dichotomous dualism also creates two significant differences in terms of traditional and modern knowledge. Shiva argues that the traditional knowledge of local communities is often ignored or deemed of no value in the context of modern development. Shiva introduced the merging of traditional and modern knowledge to create sustainable solutions (Selviani et al., 2021, p. 145). This is also expressed in the merging of production and reproduction processes. Shiva highlights the contribution of women in

maintaining biodiversity and sustaining genetic heritage as well as the important role of women in food production and reproducing environmental maintenance. By rejecting the separations and hierarchies that arise in dichotomous dualism, Vandana Shiva advocates for an approach that is holistic, contextual, and inclusive. Shiva stimulates thinking to address the inequalities and environmental damage that such separations may produce.

3.4 Reductionism in the Green Revolution

Vandana Shiva views that there is a reductionism that exists in the Green Revolution project. From Shiva's thoughts, some critiques of the effects of reductionism can be drawn, especially in the context of the Green Revolution in Indonesia and its influence on agriculture and technology. Several important points show reductionism in the Green Revolution project, as follows:

1. The dominance of Western knowledge over local knowledge
The reductionism approach produces knowledge that applies and develops in society. The presence of modernization in agriculture through the Green Revolution project has the potential to shift the traditional knowledge that has been developing in the community. Modern knowledge brought by the West is used as a benchmark and occupies the highest stratum or standard in the agricultural production process (Nugroho, 2018, p. 60). This has shifted the existence of traditional knowledge in agriculture, which has been sustainable with nature. People are trapped in a narrative of dependence on plant species and the use of drugs and fertilizers that accelerate plant growth. If not using certain types of plants or drugs that have been recommended, the production results are not optimal. The demand for high production encourages farmers to plant rice continuously without being balanced by a change in other crops such as corn, cassava or secondary crops. Traditional agricultural systems are considered incompetent in the Green Revolution project because the process of accelerating production is said to be slow. Modernization of agricultural production tools becomes an absolute unity to produce optimal results in the production process. So that people have the knowledge and necessity to use modern tools in supporting the agricultural system. Shiva promotes a holistic and local approach to development that values traditional knowledge and integrates it with modern knowledge. Shiva argues that through this approach, communities can maintain environmental sustainability, promote social justice, and reduce reductionist models that can damage ecosystems.
2. Create a food monoculture
Vandana Shiva opposes the reductionist approach to the Green Revolution project in modern agriculture that tends to promote monocultures and the intensive use of chemical inputs (Shiva, 1988, p. 117). According to Shiva, this approach reduces biodiversity, destroys local ecosystems, and increases farmers' dependence on industrial seeds and inputs. Whereas the Green Revolution project itself has promoted diversification in agriculture. Diversification is an effort to diversify the types of crops to avoid dependence on one agricultural product. This aims to maintain the contours of the land and the diversity of products produced in agriculture so that farmers do not only depend on one type of product.
3. Destroying the environment
Shiva also critiques reductionist approaches to technology development and biotechnology. Shiva argues that a narrow focus on scientific discovery often ignores the wider social, ecological and economic impacts of the technology. Farmers become dependent and encouraged to use only certain varieties without considering the effect and sustainability of environmental conditions. This is demonstrated by the use of genetically modified seeds that often lead to problems such as loss of genetic diversity and farmers' dependence on industries that produce genetic engineering. This is also accompanied by the exploitation of various land clearing without being balanced with a strong study. Thus, the exploitation that occurs in the environment by humans results in placing the environment as an object (Agger, 2006, pp. 175-179). Reductionist approaches can also trivialize the role of women in natural resource management and agriculture. Vandana Shiva highlights the gendered consequences of development models that focus too much on certain aspects without considering the impact on women's daily lives, especially in the context of agricultural product management. The environmental damage experienced by the environment will result in suffering for women.
4. Promoting the capitalization of the agricultural industry
Capitalization in the agricultural system through the Green Revolution refers to the role played by capital, technology, and industrial inputs in the effort to increase agricultural production (Gultom

& Harianto, 2021, p. 147). The process of capitalization in the Green Revolution project involves various key elements such as *first*, the emphasis on the use of chemical inputs to increase crop yields and controlling pests. *Second*, the introduction of modern agricultural machinery is an important aspect of capitalization. The adoption of this technology can help farmers improve production efficiency, although it also often requires significant capital investment. *Third*, the development of modern irrigation infrastructure also often requires large capital investments. *Fourth*, the Green Revolution was often followed by a shift towards more market and export-oriented agricultural production. This can result in farmers' dependence on global markets and fluctuations in world prices with significant impacts especially on smallholders or farm labourers.

Although the Green Revolution provided benefits in increasing production in the form of effectiveness, efficiency and reducing world hunger there were shortcomings in its implementation. The Green Revolution approach has also encountered reductionist knowledge that has led to challenges and criticism. Dependence on industrial inputs can lead to soil degradation, environmental pollution, and socioeconomic problems, especially for small farmers and farm labourers as marginalized groups who experience difficulties in financing the technological requirements of modern agricultural production tools. In addition, emerging capitalization often favours a more product-centric agricultural system thereby increasing high competition and economic disparity between large farmers and small farmers and even farm workers.

4 Conclusion

The Green Revolution aimed to increase agricultural and food production through modernization in agriculture. The reductionism of the Green Revolution impacted society by displacing local knowledge and creating various kinds of violence against women, nature, and marginalized communities due to technological modernization. There needs to be a more in-depth study of the impact of policies closely related to the Green Revolution in Indonesia so that the need for food and welfare for all elements of society can be realized.

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