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# Income, Welfare, and Food Security of Coffee Farmer Households

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## ABSTRACT

**BACKGROUND AND OBJECTIVES:**
Belatungan Village in Pupuan Subdistrict, Tabanan Regency, has great potential in coffee production. However, its farmers face challenges such as fluctuating selling prices, limited market access, and high production costs. This has an impact on household income, welfare, and food security. This study aims to assess the income of coffee farmers, evaluate their food security, and assess their overall welfare condition

**METHODS:**
This study used a descriptive quantitative method. Data were collected through questionnaires and structured interviews with 49 farmers from two farmer groups, selected using the census method. Primary data was obtained directly from respondents, while secondary data came from written documents and references. Data analysis included: (1) net income calculation, (2) welfare assessment based on rice equivalent consumption, and (3) food security measurement through the proportion of household food expenditure

**FINDINGS:**
The average annual income of coffee farmers is IDR 73,46 million, or approximately IDR 6.12 million per month. Household welfare is considered good, as indicated by an average rice consumption equivalent to 1,440 kg per person per year. A total of 83.67% of households are classified as food secure, as their food expenditure accounts for less than 60% of total household spending. However, 16.33% of households remain classified as food insecure.

**CONCLUSION:**
Coffee cultivation significantly contributes to farmers' income, welfare, and food security in Belatungan Village. However, some farmers remain economically vulnerable. Strategies such as improving market access, enhancing production efficiency, and providing training on business diversification are essential. This research offers empirical insights into the linkages between income, welfare, and food security, highlighting the need for sustainable and targeted policy interventions. The main limitation of this study lies in its relatively narrow scope; therefore, further research with a broader and more in-depth approach is necessary to obtain a more comprehensive understanding.

**Keywords:** Income; Welfare; Food; Farmer; Coffee

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## INTRODUCTION

Belatungan Village in Pupuan Subdistrict, Tabanan Regency, is recognized as one of the potential coffee-producing areas in Bali. Despite having extensive land and high production levels, coffee farmers in this village continue to face various challenges, such as unstable selling prices, limited market access, and high production costs. These issues impact household income, which in turn affects their welfare and food security. When income is low, the ability to meet basic needs such as food and education declines, creating significant economic vulnerability (1), (2). These circumstances underscore the need for comprehensive studies that elucidate the relationship between income, welfare, and food security, thereby providing a foundation for policy-level improvements and practical field interventions.

This research is important because it highlights the actual conditions of coffee farmers in Belatungan Village who, despite possessing high production potential, continue to face various challenges such as price fluctuations, high production costs, and limited market access that negatively impact household welfare and food security (2). The findings of this study are valuable for farmers in designing more efficient farming strategies, for the government as a foundation for developing farmer-oriented policies, and for academics as a reference in rural economic research. The core issue that needs to be addressed is the disparity between the village's natural potential and the farmers' socioeconomic conditions. Therefore, concrete measures are essential to enhance farmers' bargaining power, stabilize crop prices, and ensure a decent standard of living so that the considerable potential of Belatungan Village in the coffee sector is not hindered by challenges that are, in fact, solvable through the right policies and support. Currently, there is still a lack of in-depth studies on the relationship between income from coffee farming and the levels of welfare and household capacity to maintain food availability, particularly in the Belatungan Village area. Most previous studies tend to focus on the economic aspects of coffee farming in general, without thoroughly exploring the relationship between farmers' income, welfare conditions, and household food security (3). Additionally, further research is needed to evaluate the effectiveness of government programs and policies in improving the living standards of coffee farmers, especially in terms of their impact on household food security (4).

The novelty of this research lies in its integrated approach, which simultaneously examines three important aspects that are rarely studied together: income, welfare, and food security of coffee farmer households. This approach offers a more comprehensive understanding of farmers' socio-economic conditions, in contrast to previous studies that typically focused on only one aspect. The objectives of this study are: (1) to analyze the income of coffee farmers in Belatungan Village, (2) to evaluate the welfare level of coffee farmers in the village, and (3) to measure their household food security. By understanding the relationship between these three aspects, this study not only provides deeper insights into the factors influencing farmers' welfare but also contributes valuable data and analysis to inform policy formulation aimed at improving welfare and food security at the local level. Furthermore, it serves as a reference for future research in the field of rural agribusiness.

## RESEARCH METHOD

This study was conducted in Belatungan Village, Pupuan Subdistrict, Tabanan Regency, Bali Province. The village spans approximately 637.32 hectares, with total coffee production reaching 291.35 tons per year (5). Belatungan Village was selected as the research site due to its significant role in coffee cultivation within the Tabanan region. Moreover, the village possesses distinct geographic and socioeconomic characteristics and faces several issues related to farmers' income, welfare levels, and household food security.

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The study included all members of two active farmer groups in Belatungan Village Sibuh Wari and Jongkok Pratyaksa comprising a total of 49 farmers. Given the small population size, all farmers were selected as respondents using a census method to ensure comprehensive data collection.

The research data consisted of both primary and secondary sources. Secondary data were obtained from materials such as village documents, BPS publications, and scientific literature, while primary data were collected directly through interviews using questionnaires that covered information on income, household expenditure, and food consumption. All collected data were subsequently processed and analyzed to guide this research toward its primary objectives, namely:

The first objective, which is to study the income of coffee farmers, employs an analytical approach to farming activities. The income in question is determined by calculating the difference between total revenue and all costs incurred during the production process, which is then formulated as follows:

**Income = Revenue – Total Cost**

In calculating the profitability of coffee farming, the analysis method refers to the approach of (6), using the following formula:

**Revenue = Py × Y**

Explanation:
Py = Product price per kilogram (IDR/kg)
Y = Total production (kg)

As for the calculation of the total costs incurred in coffee farming, the formula from (6) is applied as follows:

**TC = FC + VC**

Explanation:
TC = Total cost (IDR)
FC = Fixed costs (IDR)
VC = Variable costs (IDR)

In addition, the researchers also calculated total household income. According to (7), farmer household income can be formulated as follows:

**Farmer Household Income = Coffee Farming Income + Non-Coffee Farming Income + Off-Farm Income**

The second objective, which is to analyze the household welfare conditions of farmers, was achieved by referring to total household expenditure. This approach utilizes an evaluation method based on comprehensive household spending patterns. The total household expenditure was calculated using a specific formula adapted to suit the needs of this study, based on the formula from (8).

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$$Ct = Ca + Cb + \cdots + Cn$$

Explanation:
Ct = Total household expenditure
Ca = Food consumption expenditure
Cb = Non-food consumption expenditure
Cn = Other expenditures

The third objective, to analyze the level of welfare, was assessed based on total household expenditure per individual. This includes annual expenditures on both food and non-food consumption, divided by the average number of household dependents. The result was then converted into rice-equivalent units (kg) using the prevailing price of rice as a reference. According to (9), household welfare is classified based on the annual level of rice consumption as follows:

1. Poorest: less than 180 kg of rice per year
2. Very poor: 180–240 kg of rice per year
3. Poor: 240–320 kg of rice per year
4. Nearly poor: 320–480 kg of rice per year
5. Adequate: 480–960 kg of rice per year
6. Prosperous: more than 960 kg of rice per year

The third objective, which is to analyze food security among coffee farmer households in Belatungan Village, was carried out by calculating the portion of food expenditure in relation to total household living costs. This portion was derived using a formula adapted from a relevant method, as stated in (10).

$$PF = (PP / TP) \times 100\%$$

Explanation:
PF = Portion of food expenditure (%)
PP = Household food expenditure (IDR)
TP = Total household expenditure (IDR)

According to (11), total household expenditure is the sum of food and non-food expenditures, formulated as follows:

$$TP = PP + PN$$

Explanation:
TP = Total household expenditure (IDR)
PP = Food expenditure (IDR)
PN = Non-food expenditure (IDR)

## RESULT AND DISCUSSION

### Income of Coffee Farmers in Belatungan Village, Pupuan Subdistrict, Tabanan Regency

The income of coffee farming in Belatungan Village was analyzed using an estimation technique based on the methodology proposed by (12), which involves calculating the difference between total revenue and total production costs. According to (13), farmer income is derived from the difference between total revenue (TR) and total cost (TC), calculated by subtracting all

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production expenses from the proceeds of product sales. The following provides a detailed explanation of the income earned by coffee farmers through their farming activities.

Table 1
Average Income of Coffee Farmers in Belatungan Village, Pupuan Subdistrict, Tabanan Regency, 2025

| No | Source of Revenue | Total (IDR) |
|---|---|---|
| 1. | Annual Revenue | 83,848,571 |
| 2. | Annual Total Cost | 6,528,999 |
| Total | Annual Income | 77,319,572 |
| | Monthly Income | 6,443,298 |

*Source: Primary Data, After Processing, 2025*

The average income of coffee farmers in Belatungan Village in 2025 reached IDR 83,848,571 per year, derived from various sources such as coffee cultivation, other farming activities, livestock, and non-agricultural work. After deducting total operational costs of IDR 6.528.999, the farmers' net annual income was IDR 77,319,572, or approximately IDR 6,443,298 per month. This income is significantly influenced by factors such as land size, the selling price of the harvest, and production costs, where farmers with larger land areas tend to earn higher incomes. However, fluctuations in coffee prices pose a challenge that creates uncertainty in the economic planning of farming households.

These findings are consistent with research conducted by (14) in Ethiopia, which showed that coffee farmers' income is influenced by land size and market access. The key difference lies in the distribution system of the harvest. Ethiopian farmers are members of cooperatives that help stabilize prices, whereas Indonesian farmers sell directly to middlemen, resulting in more volatile prices. According to data from (15), coffee prices in Ethiopia range between 10 and 27 Ethiopian Birr, or approximately IDR 4,350– IDR 13,050 per kilogram, with total revenue reaching up to USD 6,30, or around IDR 91,350 per kilogram of roasted coffee.

In addition to Ethiopia, Vietnam is also one of the world's leading coffee-producing countries. According to (16), Vietnamese coffee farmers produce 3–5 tons per hectare, with production costs of around 40,000 VND or about IDR 25,200 per kilogram, and selling prices reaching 125,000–130,000 VND, equivalent to IDR 78,800–IDR 81,900 per kilogram resulting in substantial profits. An interview with Nguyen Van Hoan, a farmer in Dak Lak, supports these figures. He stated that the price of fresh coffee this year has doubled compared to the previous year, reaching more than 30.000 VND or approximately IDR 18,900 per kilogram, while raw coffee beans are currently priced at over 130,000 VND, equivalent to IDR 82,000 per kilogram.

A study by (17) in Aceh found that coffee farmers' income is highly dependent on access to agricultural credit, which enhances productivity. Based on findings from (18), the coffee price in Permata Subdistrict, Bener Meriah Regency, was IDR 26,625 per kilogram, with an annual income of IDR 28,968,000 per hectare. After deducting production costs of IDR 7,048,669, farmers earned a net income of IDR 21,919,331 per hectare per year.

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**Welfare Level of Coffee Farmers in Belatungan Village, Pupuan Sub-District, Tabanan Regency**

The analysis of the welfare level of coffee farmer households in Belatungan Village, Pupuan Sub-District, Tabanan Regency was conducted using the Household Expenditure Approach, as proposed by (8). This approach involves calculating the total expenditures incurred by the household, including both food consumption and non-food needs. This analysis provides a deeper insight into the welfare conditions experienced by coffee farmers in the area.

Table 2
Average Food Expenditure of Coffee Farmers in Belatungan Village, Pupuan Sub-District, Tabanan Regency, 2025

| No | Food Expenditure Category | Total (IDR/Year) |
|---|---|---|
| 1. | Rice | 6,189,796 |
| 2. | Vegetables | 2,391,837 |
| 3. | Fruits | 2,785,714 |
| 4. | Eggs | 1,913,878 |
| 5. | Meals | 3,255,510 |
| 6. | Cooking Oil | 816,000 |
| 7. | Spices/Seasonings | 990,612 |
| 8. | Prepared meals/Snacks | 1,242,613 |
| 9. | Cigarretes | 1,493,878 |
| 10. | Others | 1,531,565 |
| Total Food Expenditure | | 22,611,402 |

*Source: Primary Data, After Processing, 2025*

The data above show household food expenditures over the course of one year. Most of the budget is allocated to purchasing rice, totaling IDR 6,189,796, which indicates that rice remains the primary staple food. Expenditures on other nutritional needs such as meat, fruit, vegetables, and eggs are also significant, reflecting the household's focus on nutritious food intake. In addition to basic needs, households allocate funds for prepared foods or snacks and cigarettes, each exceeding one million rupiah. Other expenses including cooking oil, kitchen spices, and unspecified items also contribute to the total annual food expenditure of IDR 22,611,402. Overall, this reflects a diverse consumption pattern that includes basic necessities, complementary goods, and discretionary spending.

Table 3
Average Non-Food Expenditures by Coffee Farmers in Belatungan Village, Pupuan Subdistrict, Tabanan Regency, Year 2025

| No | Non-Food Expenditure Categor | Amount (IDR/Year) |
|---|---|---|
| 1. | Clothing | 1,102,041 |
| 2. | Electricity | 618,776 |
| 3. | Water | 73,469 |
| 4. | Tax | 193,918 |
| 5. | Fuel | 1,416,735 |
| 6. | Communication (credit/quota) | 1,560,612 |
| 7. | Social | 3,225,720 |

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| | | | |
|---|---|---|---|
| 8. | Religion | 5,112,894 | |
| 9. | Recreation | 301,020 | |
| 10. | Education | 5,029,388 | |
| 11. | Health | 1,968,816 | |
| Total Non-Food Expenditure | | | 20,603,390 |
| Total Household Expenditure | | | 43,214,792 |

*Source: Primary Data, After Processing, 2025*

Based on the data shown in Table 2, household non-food expenditure throughout the year reached IDR 20,603,390, with the largest allocations for religious purposes (IDR 5,112,894) and education (IDR 5,029,388), indicating a strong emphasis on spiritual values and education. Additionally, substantial amounts were spent on social needs, healthcare, communication, and fuel. In contrast, expenditures on clothing, electricity, water, and taxes were relatively low. This pattern suggests that households prioritize not only basic necessities but also quality of life and social connections.

The data above indicates that the expenditure pattern of coffee-farming households in Belatungan Village, Pupuan Subdistrict, Tabanan Regency, is divided into two main categories: food and non-food needs. Overall, food consumption accounts for a larger share of household spending compared to non-food expenses. These findings suggest that most coffee farmers in the area continue to face relatively unstable economic conditions. Referring to reference (9), household welfare can be analyzed using the equivalent unit approach based on rice consumption per kilogram.

Based on the results of the analysis, it is known that the total household expenditure of coffee farmers in Belatungan Village, Pupuan District, Tabanan Regency is IDR 43,214,792 per year. To calculate the annual per capita income, the total household expenditure is divided by the average number of family dependents, which is two people, resulting in a per capita income of IDR 21,607,396 per year. Furthermore, to determine per capita household expenditure in rice equivalent units, the per capita income is divided by the price of rice per kilogram, which is IDR 15,000. Referring to the welfare classification according to the Sajogyo method, households with rice consumption exceeding 960 kilograms per capita per year are categorized as welfare households. Therefore, coffee farming households in Belatungan Village can be classified as prosperous, as they are not only able to fulfill their basic needs but also possess the economic capacity to meet non-food and other necessities.

The welfare status of Indonesian coffee farmers remains a complex issue and varies by region. The household expenditure technique, as described by (8), was used to estimate the welfare of coffee producers. Household welfare is categorized based on the percentage of expenditure on food and non-food consumption. According to (19), most coffee farmers in Indonesia belong to the lower-middle-income group, particularly those without access to international markets. Limited access to technology and market information are factors that hinder improvements in farmers' welfare. This finding aligns with the research by (20), which states that coffee farmers in various regions generally experience welfare conditions that depend heavily on market price stability. However, a notable difference is that coffee farmers in Bali benefit additionally from the tourism sector, which enhances the selling value of coffee through the specialty coffee industry.

Meanwhile, research by (21) in the United States shows that farmers' welfare is also influenced by the level of agricultural mechanization, which has not been widely implemented

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among Indonesian coffee farmers. Another study by (22) indicates that farmers in Latin America tend to have higher welfare due to a government subsidy policy that guarantees a minimum selling price. In Kenya, research by (23) found that access to technical and financial training contributes to improved welfare through better business management. This contrasts with the situation in Indonesia, where access to agricultural training remains limited for smallholder coffee farmers.

As explained by (2), community welfare can be assessed through various indicators, including demographic characteristics, health and nutrition, education levels, employment opportunities, living patterns, housing and neighborhood conditions, poverty levels, and other relevant social aspects. If coffee farmers meet these criteria, they can be classified as a community group that has achieved a level of prosperity.

**Food Security of Coffee Farmer Households in Belatungan Village, Pupuan District, Tabanan Regency**

An evaluation of the ability of coffee farmer households to meet their food needs is conducted by examining the level of food consumption adequacy and the ratio between food expenditure and total household expenditure. Based on the views of relevant sources (11), food security at the household level can be understood through two main indicators: the amount of money spent on food and the amount of energy available for family members. In addition, the proportion of household expenditure on food needs (both food and non-food) is also an important indicator in assessing the condition of household food security (24).

The World Health Organization (WHO) identifies three main pillars of food security: food availability, food accessibility, and food utilization. This view aligns with the opinion of (1), which states that the subsystems in the food security system consist of aspects of food availability, affordability, and utilization. In the context of this study, household food security indicators are classified as follows:

1. Households are categorized as food secure if their expenditure on food is less than 60% of total household expenditure.
2. Households with a proportion of food expenditure of 60% or more are categorized as food insecure.

Table 4
Assessment of Food Security Conditions in Coffee Farming Families in the Area of Belatungan Village, Pupuan Subdistrict, Tabanan Regency, in 2025

| No | Description | Number of Respondents (People) | Percentage (%) |
|---|---|---|---|
| 1. | Food Secure (PPP < 60%) | 41 | 83,67 |
| 2. | Food Insecure (PPP ≥ 60%) | 8 | 16,33 |
| | Total | 49 | 100 |

*Source: Primary Data, After Processing, 2025*

The majority of coffee farmer households in Belatungan Village 83.67% or 41 out of 49 respondents are classified as food secure because they allocate less than 60% of their income to food, allowing them to meet other non-food needs such as health and education. However, around 16.33%, or eight respondents, are classified as food insecure because more than 60% of their income is spent on food consumption, indicating vulnerability to food insecurity due to limited purchasing power. Overall, the level of food security among coffee farmers in this village is quite

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high, although some households still require additional support, particularly during the harvest period when the risk of food shortages increases. This study supports the findings of (25), which show that Indonesian coffee farmers often face inconsistent food security due to fluctuations in coffee selling prices. Furthermore, research by (26), shows that the food security of coffee farmers during the COVID-19 pandemic declined due to reduced access to economic resources. In Brazil, research by (27), revealed that the COVID-19 pandemic reduced coffee farmers' food security by limiting their access to financial resources.

Research in Vietnam by (28), shows that the government's policy of providing social assistance during periods of famine is effective in maintaining food security. In contrast, in Indonesia, government policies such as fertilizer subsidies and training in sustainable cultivation techniques can increase productivity; however, ineffective implementation often reduces their positive impact. According to (3), although the government has introduced various assistance programs, their long-term sustainability remains questionable due to the lack of support for farmers in independently managing their coffee farms.

The results of this study indicate that coffee farmers' income, welfare, and food security are closely interrelated. Therefore, comprehensive policies such as strengthening market access, stabilizing prices, and encouraging business diversification are essential. The government needs to take concrete actions through incentives, empowerment programs, and improved access to technology to sustainably enhance the welfare and food security of coffee farmers.

Table 4
Previous Research on Income, Welfare and Food Security of Farmer Households

| Number | Researcher | Research Title | Research Results |
|---|---|---|---|
| 1. | (29) | Analysis of Income and Welfare Level of Coffee Farmer Households in Ulu Belu District, Tanggamus Regency (29) | Research in Ulu Belu showed that the average household income of coffee farmers reached IDR 37.29 million per year, with coffee farming considered profitable based on R/C ratios of 4.26 (cash costs) and 2.31 (total costs). Based on the Sajogyo classification, farmers in this region are categorized as moderate to prosperous. Factors such as land area, yield, and the selling price of coffee are the main determinants in increasing their income and overall welfare. |
| 2. | (30) | Income and Welfare of Coffee Farmer Households in Underdeveloped and | Research in North Lampung Regency shows that although there is a difference in coffee farming income between underdeveloped villages (IDR 30.4 |

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| | | | |
|---|---|---|---|
| | | Developing Villages of North Lampung Regency (30) | million per ha) and developing villages (IDR 31.5 million per ha), the welfare level of farmers in both areas is relatively good. The total household income in underdeveloped villages is IDR 53.8 million per year, compared to IDR 88.5 million in developing villages. Factors such as income from coffee, non-agricultural businesses, and education play an important role, although differences in socioeconomic conditions do not significantly affect farmers' welfare. |
| 3. | (31) | Growing Inequality in the Coffee Global Value Chain: A Complex Network Assessment (31) | The study found that, although the green coffee trade increased significantly from 1995 to 2018, the number of countries involved in exports declined, resulting in the dominance of a few major producers, such as Brazil, Vietnam, and Colombia. In contrast, smaller coffee-producing countries saw a reduction in market share, making it increasingly difficult for them to compete and improve farmers' incomes. |
| 4. | (32) | *The Government Subsidy Policies for Organic Agriculture Based on Evolutionary Game Theory* (32) | This research demonstrates that well-designed subsidies can enhance farmers' welfare, particularly for organic farmers by stabilizing selling prices and reducing production costs. Retailer incentives also help expand the market, thereby supporting farmers' incomes. Additionally, government policies that promote sustainable organic farming contribute to more consistent earnings. Overall, effective subsidies support sustainable agriculture and improve long-term farmer welfare. |
| 5. | (33) | Food Security and Food Sovereignty: A Review of Commonly Used | The research shows that food security is influenced by environmental sustainability, food access, and |

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| | | |
|---|---|---|
| | Indicators and Consideration of Environmental Sustainability Aspects (33) | economic factors, with key indicators such as food costs, nutritional adequacy, and stable food availability. Key challenges include price fluctuations, unequal distribution, and the impacts of climate change. However, environmental aspects are rarely discussed in depth, which calls for the integration of food security policies with sustainability strategies to ensure stable food availability in the future. |

## CONCLUSION

Based on the results of the study, it can be concluded that coffee-farming households in Belatungan Village have a relatively good income derived from various sources, including coffee cultivation, livestock, and side jobs. Their level of welfare is classified as prosperous, as they are able to meet their basic needs appropriately according to relevant economic indicators. In addition, the food security conditions also show positive outcomes, with most households falling into the food-secure category. However, a small number remain classified as food insecure and require greater attention to mitigate the risk of food insecurity.

## RECOMMENDATION

This study has a limitation in the small number of respondents, as it only involves two farmer groups; therefore, it does not fully represent all coffee farming households in Belatungan Village. Additionally, the research location is limited to a single village, making it impossible to compare the findings with conditions in other villages. Consequently, future researchers are advised to increase the number of respondents and broaden the research scope for instance, by including more farmer groups from various hamlets or nearby villages so that the resulting data can offer a more accurate and relevant representation.

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| | Contributions | Conducting a literature review involves searching for and selecting relevant sources, such as journals and books, then analyzing and summarizing the gathered information. This process includes comparing previous studies, identifying research gaps, and developing a theoretical framework as the foundation of the research. Additionally, it requires writing the literature review clearly, ensuring proper citation of all sources, and revising the content for better clarity and comprehension. |

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**GRAPHICAL ABSTRACT**