

The Impact of Urban Sprawl on the Socioeconomic Conditions of the Population in Tamanan Village, Indonesia

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Abstract. This study aimed to analyse the impact of urban sprawl on the (1) social, (2) economic, and (3) technological conditions of the population in Tamanan Village, on the outskirts of Yogyakarta City. For data collection, this survey research employed structured interviews with 40 respondents selected through multistage random sampling. It also used complementary in-depth interviews with seven (7) purposively sampled key informants to deepen the analysis. The answers from the structured interviews were analysed with descriptive statistics in the form of single-frequency tables, while the data derived from the in-depth interviews were processed using a qualitative descriptive approach. The results show that the impact of urban sprawl on the social (37.5%) and economic conditions (40%) was mostly high, while the effect on the technological conditions of the population in the study area fell mainly under the medium category (47.5%). In conclusion, the phenomenon of urban sprawl in the study area has affected the social, economic, and technological conditions of the population.

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1. Introduction

This research was motivated by the recent emphasis accorded in the regional development discourse to the increasing phenomenon of intensive urban sprawl (Brian, 2016; Dadi et al., 2016; Giyarsih & Harini, 2020a; Giyarsih & Marfai, 2017; Queslati, Alvanides, & Garrod, 2015; Skog & Steltnes, 2016; Sriartha & Giyarsih, 2017). This study defines urban sprawl as the process of propagation of the appearance of urban physical characteristics from the inner city towards the urban fringe area. Symptoms of urban sprawl can develop due to the availability of open space; this is an increasingly rare commodity in the inner city, meaning that residents and various urban functions spill over into urban fringe areas. On the one hand, urban sprawl is understood as a process towards the advancement of civilisation (Debbage, Bercitschaft, & Shepherd, 2016; Guo, Xiao, & Yuan, 2017; Hatam, Rijanta, Yunus, & Giyarsih, 2016; Lincaru, Atanasiu, Ciuca, & Pirciog, 2016), while on the other hand, it is a concern for various parties, particularly due to its diverse negative impacts (Buxton, Carey, & Phelan, 2016; Dupras, Marull, Pancerisas, Coll, & Gonzalez, 2016; Ewing, Hamidi, Grace, & Wei, 2017; Giyarsih, 2017; Wang, Liu, Li, & Li, 2016; Weilermann, Seidl, & Schulz, 2017). Examples of the negative impacts of urban sprawl include the massive conversion of agricultural land to non-agricultural land resulting in an impact on the food security system, security disturbances, social conflicts, land degradation, and the reduced serviceability of socioeconomic facilities (Kovacs et al., 2019; Lu, Li, & Xu, 2023).

The outskirts of Yogyakarta City include Tamanan Village, Banguntapan District, Bantul Regency. As seen in the outskirts of other Indonesian cities, the area has experienced the symptoms of urban sprawl (Amri & Giyarsih, 2022; Giyarsih, 2014; Giyarsih & Harini, 2020b; Giyarsih & Marfai, 2018). In the Yogyakarta City outskirts, such symptoms have begun to appear in specific spatial patterns and processes. People living in the outskirts, as well as in Tamanan Village, are then inevitably impacted by the social, economic, and technological impacts of urban sprawl.

It is against this background that the study analysed the impact of the symptoms of urban sprawl on the social, economic, and technological conditions of the population. This research offers two benefits, namely theoretical academic and practical empirical benefits. Regarding the theoretical academic benefits, the study is believed to contribute significantly to the development of Urban Geography. From a practical empirical perspective, it makes a significant contribution as an input for the formulation of development policies in the outskirts. The input referred to here concerns the formulation of appropriate development policies to reduce the various negative impacts that are currently, will, and are expected to occur in suburban areas that experience urban sprawl symptoms.

To the author's knowledge, no prior study has specifically documented the impact of the symptoms of urban sprawl on the social, economic, and technological conditions of the population in the study area. The originality of this research therefore lies in this assertion.

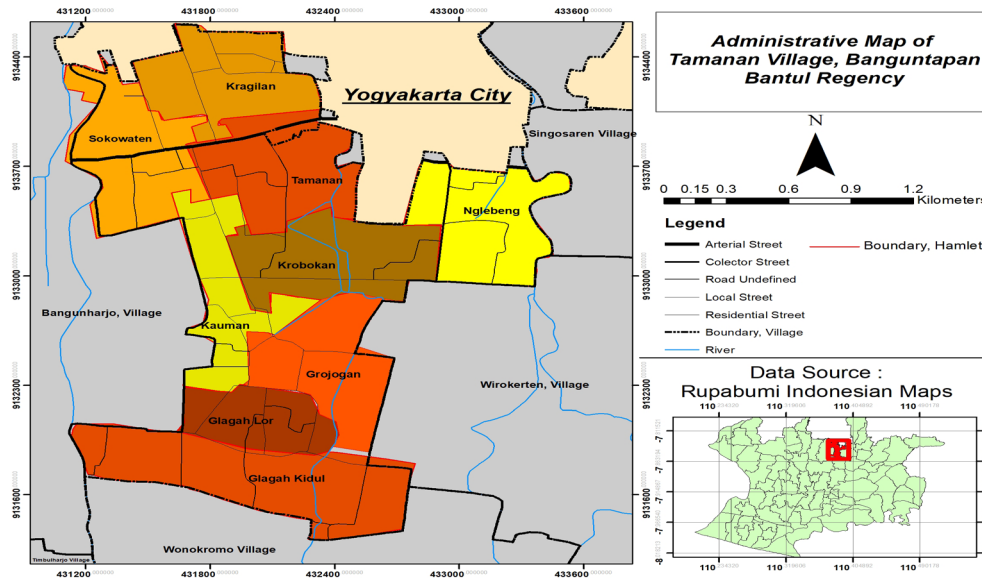


Figure 1. Administrative Map of Tamanan Village

2. Methods

This research was conducted in Tamanan Village, which is an administrative unit in Banguntapan District, Bantul Regency, Special Province of Yogyakarta, Indonesia (see Figure 1). The village was chosen as the research area based on a belief that the symptoms of urban sprawl had prompted social, economic, and technological development. The household was the unit of analysis.

The data were collected via structured interviews with 40 respondents, in-depth interviews with seven (7) key informants, field observations, and documentation.

The 40 respondents were selected using multistage random sampling, which considered the very large population in Tamanan Village. Among the various hamlets that comprise Tamanan Village, Tamanan Hamlet was chosen for the first-stage sampling. The population of Tamanan Hamlet was then subjected to second-stage sampling, which yielded a total of 40 respondents. As for the in-depth interviews, purposive sampling was used to determine the seven key informants.

Before the questionnaire was applied to the target group, it was tested for validity and reliability. Triangulation was used to ensure that the data obtained from the in-depth interviews were also valid and reliable.

The results of the structured interviews were analysed using descriptive statistics in the form of frequency tables, while the information acquired from the in-depth interviews was processed in the following stages: data reduction, data presentation, and drawing of conclusions. The field observation and documentation also produced a set of data that was reviewed using a qualitative descriptive approach.

3. Result and Discussion

In this study, the impact of urban sprawl was examined based on the emergence of changes or phenomena resulting from the expansion of urban physical properties from the centre of Yogyakarta City to its outskirts, namely Tamanan Village in Banguntapan District, Bantul Regency. The impact of urban sprawl on the socioeconomic conditions of the population was measured according to changes in three aspects of the population, namely social, economic, and technological. Each social, economic, and technological condition in the

population consisted of several research variables.

This study used two strategies to confirm that the phenomena attributable to the social, economic, and technological conditions of the population were the result of urban sprawl and not other factors. The first strategy was to rely on previous theories and research, while the second involved isolating the variables used to measure the impact of urban sprawl on the population's social, economic, and technological conditions. The latter strategy was accomplished by preparing the right instrument. Before questioning the respondents and the key informants, the researcher explained in advance that the study aimed to assess the impact of the symptoms of urban sprawl in the area and not the effect of other factors.

With these two strategies, this research asserts that various changes occurring in the social, economic, and technological conditions do indeed reflect the effects of urban sprawl and are not the result of other factors. When explaining the purpose of the interview to the respondents and key informants, the researcher refrained from using the term 'urban sprawl', which was unfamiliar within the communities in question. Instead, the local language was used as it was easily understood by the respondents and the key informants.

This study used two points of time to describe the process of change in the social, economic, and technological conditions: before 1980 and at the time of the study (in 2021). The time before 1980 was used as the initial point at which to measure the impact of urban sprawl in the study area because the beltway, the primary arterial road surrounding Yogyakarta City, was built in 1980. This road significantly influenced the regional development of Tamanan Village. This aligns with the finding by Pratama, Yudhistira, and Koomen (2022) in the Jakarta metropolitan area that road construction will further increase urban sprawl. After the construction of the beltway, various socioeconomic facilities emerged in Tamanan Village as overflows of socioeconomic activities that were no longer accommodated in the centre of Yogyakarta City. One example of these facilities that encouraged regional development in Tamanan Village was a university campus (Ahmad Dahlan University). Its establishment triggered the emergence of other economic activities that support campus life, including boarding houses, photocopying places, laundry, food stalls, computer rentals, and so on.

Moreover, the village appeared to become a destination for an influx of newcomers to settle down and build houses due to its proximity to the city centre. This phenomenon subsequently caught the attention of investors (business actors) in residential properties, who eventually built several housing complexes in Tamanan Village. The findings of this study align with those by Weilenmann et al. (2018) in Switzerland demonstrating that urban sprawl increased the densification of buildings. Therefore, the use of the dual time points, namely before 1980 and in 2021, is considered suitable for measuring the various changes in the social, economic, and technological conditions of the population as the impact of urban sprawl in the study area.

The impact of urban sprawl on the social conditions of the population

In this study, several variables were used to describe the impact of urban sprawl on the social conditions of the population, including changes in the intensities of night patrols, gatherings of men, gatherings of women, communal work for building/improving socioeconomic facilities, reciprocity in building houses or repairing damaged ones in the neighbourhood, communal work for cleaning the village roads, the provision of manual labour, and financial assistance for neighbours hosting festivities. The impact of urban sprawl on the social conditions of the population was observable from the changes in each variable from before 1980 to the current year (2021) (see Table 1).

Based on Table 1, the highest percentage for the variable ‘night patrols’ (55%) indicates that these activities are less frequent today than they were before 1980. This finding implies that the symptoms of urban sprawl have resulted in a decrease in the intensity of night patrols. Unlike settlements comprising local people in which this type of neighbourhood watch endures, in a housing complex containing newcomers (built by developers) it has been replaced by security guards—paid via a wage system—who are in charge of maintaining security within the housing complex. This finding aligns with Giyarsih and Marfai (2018).

Another variable relates to gatherings of men. Table 1 shows that these gatherings were less frequent in 2021 than before 1980 (70%), indicating that the symptoms of urban sprawl have reduced their intensity. The continuously developing area, resulting from the spread of urban social values, means that people nowadays are busy fulfilling their

growing economic needs. With intensified economic activities, local people do not have the spare time to participate in social events such as gatherings of men. Before 1980, many adult men would engage in, for instance, *arisan perondan* (money pool for the night watchmen), *arisan selapanan* (money pool every 35 days), *pengajian* (Quran study group), and *yasinan* and *tahlilan* (prayer rituals to commemorate a death).

The same result is evident for gatherings of women. Table 1 shows a dominant condition (72.5%) in which these gatherings were deemed to occur less frequently at the time of the study than before 1980. For the same reasons as the lower intensity of gatherings of men, the reduced frequency with which women’s social meetings occur represents the impact of urban sprawl. Before 1980, many adult women held *arisan dasawisma* (money pool with women in 10 neighbouring households), *arisan RT* (money pool in the Neighbourhood Association), *arisan dusun* (money pool in the hamlet), *pengajian* (Quran study group), etc.

Another measurable impact on the social conditions is evident in the intensity of communal work for improving/building socioeconomic facilities. Based on Table 1, most of the population (57.5%) felt that, compared to before 1980, communal works in the renovation and construction of socioeconomic facilities were less frequent by 2021. This indicates a decrease in the intensity of mutual aid in the community due to the symptoms of urban sprawl. In other words, the outskirts have witnessed the expansion of urban social values from the city, which is in line with Giyarsih (2010). Before 1980, many residents organised communal works to build public facilities such as mosques, patrol posts, and community centres.

The research also considered mutual aid practices in cleaning the village roads. According to most of the population (55%), this social activity occurred ‘equally often’ in 2021 (Table 1), thus indicating an absence of the impact of urban sprawl symptoms. This activity has long been carried out in the study area, with no difference between now and before 1980. Figure 2 shows that the roads in Tamanan Village at the time of the research were clean. This finding represents a condition where the impact of urban sprawl has neither increased nor decreased the communal aspect of cleaning the village roads.

Regarding the reciprocity in house construction and reparation in the neighbourhood, the majority of the population (87.5%) felt that these practices occurred less frequently in 2021 than before 1980 (Table 1). Before 1980,

Table 1. Changes in the Population’s Social Conditions as the Impact of Urban Sprawl in Tamanan Village, 1980–2021

Variables	Intensities (%)		
	More Often	Equally Often	Less Often
Night patrols	2.5	42.5	55.5
Gatherings of men	2.5	27.5	70.0
Gatherings of women	0	27.5	72.5
Communal work for building/improving socioeconomic facilities	5.0	37.5	57.5
Communal work for cleaning the village roads	35.0	55.0	10.0
Reciprocity in house construction and reparation in the neighbourhood	5.0	7.5	87.5
Provision of manual labour	15.0	40.0	45.0
Material contributions	37.5	15.0	47.5
Financial assistance	82.5	17.5	0
Ordering meals from catering services	90.0	2.5	7.5



Figure 2. The Roads in Tamanan Village

neighbours would jointly repair a damaged house; nowadays, however, the residents have abandoned such reciprocity and prefer to pay construction workers (e.g. masons and carpenters). This type of change may have occurred due to the effects of urban sprawl, whereby urban social values have extended into the study area.

Another observable change lies in the intensity of the provision of manual labour to neighbours who organise festivities. Table 1 shows that most of the village population (45%) considered that this type of contribution occurred less frequently in 2021 than before 1980. Again, this may reflect the emergence of urban social values in the study area. This study therefore postulates that there has been a reduction in the intensity with which neighbours provide manual labour to each other when hosting celebratory events.

Before 1980, if a resident held an event, the neighbours would undertake preparations together. There would generally have been a gender-based division of labour at such events. The men would have been tasked with installing *trataq* (canopy tents; non-permanent buildings made of bamboo poles and zinc roofs) and *luweng* (a fireplace for large-scale cooking made of a set of red bricks polished or smeared with clay), and preparing the drinks (called *patehan*), while the women prepared the dishes in the kitchen and delivered them to the neighbouring houses (called *punjungan*). Before 1980, *punjungan* was also intended as an invitation for neighbours and relatives to the celebratory event. However, the provision of manual labour to neighbours hosting such events has not faded entirely and may now take place alongside the proliferation of catering services and meeting houses.

Aside from the provision of manual labour, the population in the study area also donated ingredients or items less frequently in 2021 than before 1980 (47.5%) (Table 1). As with other variables, this may be attributable to the introduction of urban social values into the study area as a symptom of urban sprawl. This finding is in line with Giyarsih (2012). Before 1980, if a resident hosted a celebration, the neighbours would donate ingredients for the event, e.g. rice, sugar, tea, coconut sugar, dried noodles, cabbages, eggs, onions, and garlic.

In contrast to the decreased intensities of the variables mentioned above, the provision of financial assistance

was deemed to be more frequent in 2021 than before 1980 (82.5%). Unlike the provision of manual labour and goods that was common before 1980, nowadays, more people contribute financially to the host of the celebration. This type of phenomenon is typical in urban communities, thus further affirming the proliferation of urban social values in the research area.

Furthermore, compared with the situation before 1980, most of the population (90%) ordered meals from catering services more frequently in 2021 (Table 1). This change has occurred in tandem with the fall in the number of neighbours providing manual labour and cooking ingredients for a social event. Although neighbours continue to assist, no one goes to the effort of cooking for themselves. This phenomenon mimics the common situation in urban society, thus further supporting the claim that urban sprawl symptoms have led to the introduction of urban social values in Tamanan Village.

The next discussion relates to the total score for the impact of urban sprawl on the population's social conditions. The total score was determined based on the number of answers from each respondent. Table 2 presents the categories for the impact of urban sprawl.

Based on Table 2, more than one-third of the population (37.5%) considered that the impact of urban sprawl on social conditions fell mostly within the 'high' category. This demonstrates that the symptoms of urban sprawl have affected the social conditions of the population in the study area. The previous discussion revealed that the symptoms of urban sprawl had led to a decrease in the intensities of night patrols, gatherings of men, gatherings of women, communal works for building/improving socioeconomic facilities, reciprocity in house construction and reparation in the neighbourhood, and the provision of labour and goods to neighbours hosting a celebration. However, they also increased the intensity of giving financial assistance to neighbours hosting a festivity and the use of catering services to provide meals for parties. These phenomena may be attributable to the introduction of urban social values to the research area as the consequences of urban sprawl. Meanwhile, the symptoms of urban sprawl have neither increased nor decreased the intensity of communal work for cleaning the village roads.

Table 2. The Impact of Urban Sprawl on the Population's Social Conditions in Tamanan Village in 2021

Impact of Urban Sprawl on Social Conditions	Number of Respondents	Percentage
Low	14	35
Medium	11	27.5
High	15	37.5
Total	40	100

The impact of urban sprawl on the economic conditions of the population

Alongside the prospects of land and houses for business investment and economic welfare, the impact of urban sprawl on the economic conditions of the population in the study area was identified from the quality of the owned houses, house facilities, vehicles, furniture, kitchen appliances and cookware, electronics, and communication devices. The impacts were observable from the changes in each variable from before 1980 to 2021. The following paragraphs describe the impact of urban sprawl on the economic conditions of the population for each variable.

Compared with the situation before 1980, the prospects for business investment in land and houses were more favourable in 2021 (100% in the 'more often' category) (Table 3). The symptoms of urban sprawl have turned

Tamanan Village, which lies on the outskirts of Yogyakarta City, into a destination for an influx of both population and socioeconomic facilities, such as higher education buildings. A campus for Ahmad Dahlan University is currently under construction within the research area (see Figure 3). While building work at the campus is ongoing, academic activity and the construction of student lodgings to support campus life have already commenced (see Figure 4).

Tamanan Village is predicted to experience the same phenomenon as Tamantirto Village in Kasihan District, Bantul Regency, which is currently developing rapidly due to the construction of a campus building for Muhammadiyah University of Yogyakarta in the area. Both villages have undergone a similar rapid development process in the wake of the construction of the beltway and campus buildings.

Table 3. Changes in the Population's Economic Conditions as the Impact of Urban Sprawl in Tamanan Village, 1980–2021

Variables	Intensities (%)		
	More Often	Equally Often	Less Often
The prospect of land/house for investment	100.0	0	0
The quality of house building	82.0	15.0	2.5
The quality of house facilities	82.0	17.5	0
The quality of owned vehicles	100.0	0	0
The quality of owned furniture	52.5	47.5	0
The quality of owned kitchen appliances and cookware	82.5	17.5	0
The quality of owned eating utensils	55.0	45.0	0
The quality of owned electronics	92.5	7.5	0
The quality of owned mobile phones	100.0	0	0
Economic welfare	60.0	32.5	7.5



Figure 3. The Ongoing Construction of the Ahmad Dahlan University Campus in Tamanan Village



Figure 4. Student Lodgings Appearing Rapidly in Tamanan Village

With the availability of various socioeconomic facilities—supported by the physical accessibility of the area (i.e. the proximity to the primary arterial road)—several pieces of land in the study area have encouraging economic prospects as a place of business. Significant increases in land prices are the inevitable consequence of this positive economic outlook. The findings in this study are in line with those of Liu, Fan, Yue, and Song (2018) in China who found that urban sprawl had an impact on increasing land prices. During the in-depth interview, Informant 1 explained the rise in land prices in Tamanan Village.

‘Before the beltway was constructed, the price of the land here was very low, i.e. only around IDR 25,000 per square metre. Now, it has reached IDR 3.5 million per square metre. Moreover, the lands on the north of the beltway, which are very close to Ahmad Dahlan University, can cost up to IDR 5 million per square metre.’ (Interview with Informant 1 on 22 September 2021). The explanation given by Informant 2 support this statement.

‘Before the construction of Ahmad Dahlan University, the price of the land here was around IDR 2 million per square metre, but afterwards, now, it can reach IDR 4 or 5 million.’ (Interview with Informant 2 on 22 September 2021)

The results of these two in-depth interviews reveal that the construction of the beltway and the establishment of Ahmad Dahlan University led to a significant increase in land prices. In Tamanan Village, land prices have risen in accordance with the economic law on demand and supply; thus, if the demand for an item exceeds its supply, the price will automatically increase. At present, plots of land in Tamanan Village, especially those functioning as yards (i.e. where multiple plant species grow), have become increasingly scarce. According to

the following informant, people outside Tamanan purchase land in the village almost every month. However, there is no more land available to sell.

‘Since the establishment of Ahmad Dahlan University, now, almost every month, there have been people from outside the village looking for land to buy. But, yes, there is no more land because it is sold out. Well, the lands are sold to individuals and developers. These individuals usually build a house on it and, then, turn the house into lodging. If the buyer is a developer, then a housing complex will be built on the land, for instance, the many housing complexes in Grojokan, Glagah Lor, and Glagah Kidul Hamlets.’ (Interview with Informant 3 on 22 September 2021)

The results of the in-depth interview with Informant 3 prove that there has been a rapid increase in the process of land buying and selling between local people and newcomers to the village. Up to the time of the research (in 2021), the most traded land in Tamanan Village was that used for yards. Developers built numerous housing complexes in some of the hamlets, namely Gajahan Lor, Gajahan Kidul, and Grojokan. Figure 5 shows a housing complex built by developers in the study area.

As mentioned, until recently, yards were the preferred land use for the development of settlements (for newcomers) and socioeconomic facilities. In the future, however, rice fields in Tamanan Village may be converted into buildings. This would reduce the amount of agricultural land area, which in turn would have a serious impact on the food security system. The results of this study align with those of Shah, Ali, and Nizami (2021), who found that urban sprawl in Pakistan had reduced the area of agricultural land from 41.7% to 5.20% during the period 1979–2019.

Based on the field observations, some rice fields remain in the village, as presented in Figure 6.



Figure 5. Housing Complex Built by Developers in Tamanan Village



Figure 6. Some of the Remaining Rice Fields in Tamanan Village



Figure 7. House Condition in Tamanan Village

Over the next 10 to 20 years, the potential exists for the scarcity of agricultural land seen in Tamantirto Village, Kasihan District to also occur in Tamanan Village, Banguntapan District. This phenomenon is in line with the findings in Sudrajat (2016), Giyarsih (2017), and Giyarsih and Marfai (2017, 2018).

Another variable used to represent the economic impact of urban sprawl is the quality of the houses owned by the population. Table 3 shows that the houses in Tamanan Village are better in terms of quality today than they were before 1980, indicating that the symptoms of urban sprawl have led to an increase in house quality. This improvement can be caused by two factors, namely (1) the increased economic welfare of the population and (2) the infiltration of urban economic values into the study area. The increased welfare is induced by new economic opportunities that provide the population with the financial capacity to improve the quality of their houses. The new economic opportunities created in the area can include, among others, the building by certain residents of boarding houses/lodgings for rent, food stalls, laundry services, photocopying services, and computer rentals. In this regard, the findings in this study reflect those of Zhang, Miao, Zhang, and Chen (2018), who noted that urban sprawl had an impact on economic development. Meanwhile, similar to the findings of this study, Guite (2019), in the City of Bathinda, India, stated that urban sprawl had a positive impact in terms of increasing the number of retail traders, which boosted economic activity.

The same trend applies to the second factor, wherein residents alter or construct their houses to incorporate architectural styles commonly found in urban areas, thus contributing to an increase in house quality. Figure 7 presents the typical condition of residential buildings in the study area.

The impact of urban sprawl is also visible in the quality of the house facilities. The results showed that the house facilities owned by most of the population (82.5%) were of better quality compared to before 1980 (Table 3).

Another measurable economic impact is the quality of the owned vehicles. The finding indicates that, when compared with the condition before 1980, all residents (100%) have higher-quality vehicles (see Table 3). Such improvement is caused by two factors, namely (1) the increased welfare of the population and (2) the entry of urban economic values into the research area, which sits within the outskirts of Yogyakarta City. The increased welfare is the result of the economic opportunities available in the outskirts, which provide the population with the financial means to buy vehicles. As for the entry of urban economic values, the preferences of the residents in the study area now match those of urban area residents in the context of

improving the quality of their vehicles. These findings imply that urban sprawl has induced the population to improve their vehicle quality.

The same tendency applies to the improvement of furniture quality. Table 3 shows that most of the population (52.5%) had better furniture in 2021 than before 1980, for the same reasons as they have better-quality vehicles. Before 1980, many residents had low-quality furniture, e.g. simple guest chairs made of wood and rattan, simple beds made of wood or bamboo, and simple wardrobes. Today, many residents have good-quality, modern furniture, e.g. corner sofas, spring beds, and manufactured wardrobes.

Concerning the quality of owned kitchen appliances or cookware, most of the population now own better items (82.5%) (Table 3), thus proving that the impact of urban sprawl has extended to the economic values behind kitchen quality improvement. Before 1980, many residents had simple kitchen/cooking appliances, including traditional stoves called *keren*, kerosene stoves, and cooking utensils made of clay such as *kwali* (cauldron), *pengaron*, and *genthong* (water container for cooking purposes). Nowadays, in contrast, they no longer use these traditional appliances. This improvement in kitchen quality is also noticeable in the ownership of better eating utensils (55%) (Table 3). Before 1980, the residents in the study area used simpler tableware, such as metal plates and metal cups. Nowadays, however, it is more modern, e.g. Teflon pans and tableware from expensive brands such as Tupperware.

Aside from improved cooking and eating utensils, the spread of urban economic values in the study area has led to a rise in the quality of the electronic equipment owned by the majority of the population (92.5%) (Table 3). Before 1980, the electronics were relatively simple, for example, black and white TVs, transistor radios, and old tape recorders. Nowadays, however, the population in the research area has a wide variety of electronics, and almost all household chores, which were completed manually before 1980, are now assisted by machines, e.g. washing machines, dryers, rice cookers and warmers, and blenders.

Regarding the quality of the owned communication devices, this study identified an upgrade in mobile phone ownership as a consequence of urban sprawl (Table 3). The entry of urban economic values is typically accompanied by the common use of mobile phones, even in low-income communities. Before 1980, the population in the study area were not aware of such devices; instead, they would communicate with distant relatives or acquaintances via telegram or a telephone at the Telkom Office in Yogyakarta.

Table 4. The Impact of Urban Sprawl on the Population's Economic Conditions in Tamanan Village in 2021

Impact of Urban Sprawl on Economic Conditions	Number of Respondents	Percentage
Low	9	22.5
Medium	15	37.5
High	16	40.0
Total	40	100

People's welfare is the final variable used to describe the economic conditions. Compared with their situation before 1980, the majority of the population (60%) now has better welfare (Table 3). Economic welfare has increased due to the economic opportunities offered in the outskirts as a result of urban sprawl.

The next discussion relates to the total score for the impact of urban sprawl on the population's economic condition. The total score was determined by the number of answers from each respondent. The categories of urban sprawl impact are shown in Table 4.

It can be seen from Table 4 that the impact of urban sprawl on the economic conditions of the population in the study area is mostly in the 'high' category (40%). The previous discussion revealed that the symptoms of urban sprawl improve not only the prospects of the land or houses for business investment and economic welfare but also the quality of the owned houses, house facilities, vehicles, kitchen appliances/cookware, electronics, and communication devices (i.e. mobile phones).

The impact of urban sprawl on the technological conditions of the population

This study used several variables to describe the impact of urban sprawl on the technological conditions of the population, namely the intensity of shopping in traditional markets, modern markets, and the mall (including window shopping), as well as the use of mobile phones, the internet, banking services, traditional health facilities, modern health facilities, traditional medicines, and modern medicines. The impact is apparent from the changes in each variable from before 1980 to 2021, as shown in Table 5. The following paragraphs explain the impact of urban sprawl on technological conditions in the context of each variable.

Compared with the condition before 1980, more than half of the population (52.5%) shopped less frequently in traditional markets in 2021 (Table 5). The introduction of

urban technological values into the study area as a result of urban sprawl has prompted a decline in residents' interest in shopping in traditional markets. Before 1980, to buy clothes, residents would go to the traditional Bantul or Beringharjo Markets. Very few people would visit modern markets due to their distant locations in Yogyakarta City; for example, the Ramai and Samijaya shops on Malioboro Street and Gardena Shop on the famous Solo Street. Nowadays, however, many residents prefer to meet their daily needs by visiting modern markets more frequently (80%) (Table 5). Yogyakarta City and its outskirts, i.e. Sleman Regency, have modern shopping centres, namely Saphir Square, Ambarrukmo Plaza, Malioboro Mall, Jogja City Mall, and Hartono Mall. The study area is administratively located in Bantul Regency. It contains no modern markets due to local government bans on their establishment. Nevertheless, due to the accessibility of the modern markets and malls in Yogyakarta City and Sleman Regency, many residents can easily shop there.

Although the intensity of shopping activities in modern markets has increased, this trend is not replicated for shopping and window shopping in the mall. A majority of the population (90%) claimed that they visited the mall with the same frequency in 2021 as they did before 1980 (Table 5). In other words, urban sprawl has had no effect on this activity.

The impact of urban sprawl on the technological condition is obvious in the use of mobile phones and the internet. All residents reported using both mobile phones and the internet more frequently in 2021 (Table 5). The results of this study align with the findings of research conducted by Bagheri and Tousi (2018) in Shiraz, Iran, which found that urban sprawl has led to improvements in the economy and ICT facilities.

Unlike the condition before 1980, almost all residents at the time of the study could easily access the internet through their smartphones at a relatively low cost. The expression conveyed by the following informant clarifies the shift in the intensity of internet use in the study area.

Table 5. Changes in the Population's Technological Conditions as the Impact of Urban Sprawl in Tamanan Village, 1980–2021

Variables	Intensities (%)		
	More Often	Equally Often	Less Often
Shopping activities in traditional markets	42.5	52.5	5
Shopping activities in modern markets	80.0	5.0	15.0
Shopping/window shopping in the mall	10.0	90.0	0
The use of mobile phones	100	0	0
Internet use	100	0	0
The use of banking services	67.5	20.0	12.5
The use of traditional health facilities	0	0	100.0
The use of modern health facilities	100.0	0	0
The use of traditional medicines	7.5	22.5	70.0
The use of modern medicines	97.5	0	2.5

'Nowadays, who is not familiar with the internet? The internet is easy and cheap. Now, you can use your cell phones to access the internet. I like using the OLX app [an online shopping site]. It is very different from the old day when no residents in Tamanan knew about the internet.' (Interview with Informant 4 on 25 September 2021)

The use of banking services is another variable used to represent the technological conditions of the population. The results show that, compared with the situation before 1980, most of the population (67.5%) used banking services more often in 2021 (Table 5). In other words, urban sprawl has led to an increase in the intensity with which banking services are used in the community. Before 1980, residents would send money to family members through postal money orders. They would rarely visit the bank or use banking services for transactions. For example, many residents did not save their money at the bank but instead kept it at home or invested in gold as a form of saving. Today, almost all residents have used banking services for transaction purposes.

The impact of urban sprawl on the technological condition is also apparent in the use of traditional and modern health facilities. Table 5 shows that all residents have experienced changes in the intensity of their visits to traditional health facilities. The phenomenon of urban sprawl has resulted in all residents using modern health facilities more often nowadays than before 1980. Instead of seeking traditional treatments from a shaman, modern health facilities, such as private practice (doctors and midwives), health centres, polyclinics, and hospitals, are now preferred. Informant 5 confirmed this preference.

'Nowadays, all residents go to the health centres, the doctors, or the hospitals if they are sick. In the past, they went to the shaman.' (Interview with Informant 6 on 25 September 2021)

A similar trend was identified concerning the use of traditional and modern medicines. Compared with the condition before 1980, most of the population (70%) in 2021 took traditional medicines less frequently (Table 5). Informant 4 explained the change in the usage intensity of traditional medicines in the study area.

'In the past, if the children had a fever, they would be treated with the leaves of the sunshine tree. If they caught a cold, they would be treated with grated onions. If they had diarrhoea, they would be treated with guava leaves. But, today, these treatments have been replaced with drugs purchased at stalls or pharmacies, such as [mentioning the brand names of the drugs] Bodrex, Ultraflu, Tolak Angin, and others.' (Interview with Informant 4 on 22 September 2021)

Before 1980, many residents relied on traditional herbs to treat mild diseases; for instance, the leaves of the sunshine tree for fever, guava leaves for diarrhoea, red onions for cold, the sap of the Indian ash tree as a wound treatment, and the leaves of Doctorbush plants for burns. In line with the decreased

use of traditional medicines, most of the population (97.5%) took modern medicines more frequently in 2021 (Table 5). Nowadays, many residents have abandoned the traditional concoctions that were used by the population before 1980. They prefer to buy modern medicines that are sold freely at the market, such as the brands Ultraflu for colds, Bodrex for headaches, Conidine for coughs, and Antangin for colds. No one goes to the effort of concocting traditional medicines today. These findings indicate that urban sprawl has led to the introduction of urban technological values that have reduced the usage intensity of traditional medicines and increased the use of modern medicines in Tamanan Village.

The next discussion relates to the total score of the impact of urban sprawl on the technological conditions of the population. The total score was determined by the number of answers from each respondent. Table 6 presents the categories of the impact of urban sprawl.

Table 6 shows that the impact of urban sprawl on the technological conditions of the population in the study area falls mostly within the 'medium' category (47.5%). The previous discussion revealed that urban sprawl has affected the intensities of shopping activities in traditional markets and modern markets, as well as the usage intensities of mobile phones, the internet, banking services, modern health facilities, traditional medicines, and modern medicines. One example is how urban sprawl has led to an increase in the intensity of using modern health facilities, whereby more residents now use hospitals, polyclinics, health centres, practising doctors, and midwives for health services as opposed to seeking treatment from traditional healers (*dukun/tabib*) or paranormal activists. However, urban sprawl has had little to no effect on the intensity of shopping or window shopping in the mall.

4. Conclusion

This study concludes that the impact of urban sprawl on the social conditions of the population is mostly 'high' (37.5%). Urban sprawl has led to a decrease in the intensities of night patrols, gatherings of men, gatherings of women, communal work for constructing or improving the socioeconomic facilities, reciprocity in house construction and reparation in the neighbourhood, and the provision of labour and goods to neighbours who host a celebration. However, it has also increased the activities of giving financial assistance to neighbours who hold a celebration and ordering meals from catering services for parties. These phenomena are attributable to the introduction of urban social values into the research area. Meanwhile, the symptoms of urban sprawl have not altered the intensity of communal work for cleaning the village roads.

The study also concludes that the impact of urban sprawl on the economic conditions of the population in the study area is mostly 'high' (40%). Urban sprawl has not only increased economic welfare and the prospects of the land or houses for

Table 6. The Impact of Urban Sprawl on the Population's Technological Conditions in Tamanan Village in 2021

Impact of Urban Sprawl on Economic Conditions	Number of Respondents	Percentage
Low	11	27.5
Medium	19	47.5
High	10	25.0
Total	40	100

business investment but has also improved the qualities of the owned house buildings, house facilities, vehicles, kitchen appliances or cookware, electronics, and communication devices (i.e. mobile phones).

Another conclusion is that the impact of urban sprawl on the technological conditions of the population in the study area is mostly in the 'medium' category (47.5%). Urban sprawl has affected the intensity of shopping activities in traditional markets and modern markets, as well as the usage intensity of mobile phones, the internet, banking services, modern health facilities, and modern and traditional medicines. However, it has not induced any changes in shopping or window shopping in the mall. Based on the conclusions, the researcher recommends that the government should seek to reduce the negative impact of urban sprawl through spatial planning policies. In addition, the government is recommended to be more stringent in granting permits for the conversion of agricultural land to non-agricultural land to reduce the negative impact of urban sprawl on the food security system. In terms of further research, the researcher recommends the use of more variables to analyse the impact of urban sprawl on various aspects of the lives of residents in suburban areas.

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