ABSTRACT: Various organizations have documented significant problems developing in The Lurin Valley in Lima. Specifically, the likelihood of The Valley’s complete disappearance. There are several small settlements known as Centro Poblados Rurales (CPR), that have been forming within the valley during recent years. CPRs are located at the outskirts of Lima city and host between 200 to 500 underprivileged families. Despite its proximity to the city, these families live in a rural environment. The focus of this research will explore the contrast between urban and rural areas in the hope that these settlements may be replicated in order to generate political action in the Valley.

By exploring the contrast between urban and rural areas, our hope is that people will understand the gravity of the problems that settlers of the Lurin Valley face. This information could be useful to write proposals for these urban communities. Among them is the sustainable development plan which could be replicated at a larger scope in the long run. This research reflects on the advance of urban growth in areas of high ecological value, such as the valley of Lurin, and what policies should be implemented to prevent its complete degradation and subsequent disappearance.

KEYWORDS: Rural, urban, sustainable, environment, settlements

1. CURRENT SITUACION

Figure 1 Detailed location map of tourist attractions of the Lower Basin of the Lurin River. Source Lurin River Valley Tourist Brochure.
1.1. Low basin Lurin river

The lower basin of Lurin River consists of Lurin, Pachacamac and Cieneguilla districts. The main activities consist of agricultural and recreational. Although in recent years, an intense urbanization process is endangering the valley with pressure of the new edifications. In response to this, some organizations are taking actions to prevent urban expansion into this area. The Strategic Plan for Sustainable Development of the Valley of Lurin and the Plan for a Green Lima and Callao, are safeguarding the ground of the valley basin. The activities planned are to create a system of metropolitan areas that integrate green agricultural valleys, hills, wetlands, parks and gardens. Part (“some”) of the main objectives are:

1. Promote a policy of public spaces
2. Recognize the Watershed environmental services
3. Ensure the preservation of farmland in the valleys

There are a variety of civic organizations and public agencies concerned with the conservation of the Lurin Valley. These organizations are conducting joint activities to promote awareness of metropolitan Lima residents and the importance of environmental services that the valley offers. For this reason, we have built campaigns that promote awareness of eco tourism found a few minutes from the city. Over time, there has been significant progress in this area. The partnership between Prom Peru, Mincetur and the NGO GEA, will help to achieve these objectives. The availability of information and tourist circuits have allowed the growth of tourism. However, these organizations promote responsible tourism which should help to spread the importance of preserving the Valley later.

1.2. Centros Poblados Rurales

The resolution No. 915 Chapter IX “General Zoning Regulations of metropolitan Lima”, created Centros Poblados Rurales (CPR) on 20 April 1985. This established the legal framework and lead to the regularization of tenure of the area occupied by the settlers.

“Quebrada Verde”, “Guayabo” and “Picapiedra”, the CPR that are the focus of this study belongs to the Pachacamac district. These settlements have been established in uncultivated slopes without affecting the area of agricultural land. Agriculture was the main economic activity at the beginning of the settlement. The CPRs are in a privileged position due to their direct contact with the ecotourism trail of “Lomas de Lúculo”. This Ecotourism trail has a cyclical ecosystem creates mist in the low hills and the slopes oriented to the sea. During the months between June and December, the vegetation reboots attracting wildlife. The area is accessible by the Panamericana Highway.

Figure 2 Picapiedra View.
1.3. CPR Quebrada Verde

This CPR is close to Pachacamac with a population of approximately 2,400 inhabitants and 600 families. It has electricity, public lighting and potable water which is restricted for hours without a sewerage system. The population is engaged in various economic activities originating from early settlers. Among these are: agriculture, livestock, construction with a high percentage working in the textile industries and on farms near the site. Livestock include: goats, sheep and beef. Through the support of some organizations, the settlers have implemented small industries of dairy products.

The Board of Water Users for Irrigation is one of the most important among the various local organizations. This is made of 17 people who own an average of 2.5 hectares per plot. The agricultural products which are exported from the area are: pepper, peas, beans, alfalfa and sweet potatoes. Therefore, their most important business is the factory belonging to Santa Natura, a company dedicated to the development of natural health products.

This CPR Health Center lacks equipment and operates only Monday to Friday mornings. Consequently, the population of the area prefers to go to Pachacamac for health treatment. The community has a pre-school ("Reina de los Angeles' No. 662) with approximately 40 students, as well as an elementary school (No. 6100) with an estimate of 80 students. It is noteworthy that part of the school age population is enrolled at schools in Pachacamac (main urban settlement and capital of the district).

There are several civic organizations. The most notable is the Tourism Commission Quebrada Verde, which is responsible for the administration of the ecotourism circuit of “Lomas de Lúcumo”. Here one can visit the natural attractions and wildlife (vizcachas, gray foxes, eagles and other small animals); and the local flora (the flower of Amancae, tara and lucumo). One could also observe pre-Hispanic rock paintings and platforms. The whole circuit could take from 2 to 4 hours. Over the years, the number of visitors during the months of June throw November, the wet season, has increased.
1.4. CPR Guayabo
The CPR Guayabo has a population of approximately 2,140 inhabitants and 510 families. It has electricity, public lighting and potable water. The water is extracted from a “puquial” in an area near the river but it lacks a sewer system. The main economic activity is agriculture. Another important historical activity in CPR Guayabo is to herd cattle and goat, which over time, has reduced due to urban growth. There are 4 families that raise goats and 2 families that raise cattle, which produce goat cheese and milk. Moreover, there are also some small farms that cover large market and take up small physical space. The rest of the population participates in several activities or are unemployed.

The CPR has a medical center that operates Monday through Friday mornings. Once again when health problems occur, many residents prefer to travel to Pachacamac. The area includes a pre-school and an Elementary school, which teach 40 and 80 students correspondingly. Nonetheless, the scarce amount of teachers is a problem. As a result, the largest school-age population group, about 230 students, prefers to go to Pachacamac. The rest of school age population goes to Picapiedra.

The existence of cave paintings in the area of the hillside adjacent to this CPR, has potential for tourist activity. Unfortunately, no research has been done by the National Institute of Culture (INC). Shamefully, environmental erosion and vandalism are causing its destruction. In the area, there are also vestiges of pre-Columbian cultures such as pottery shards that have been destroyed by organizations that extract sand.

The bank of the river has become a seasonal public recreational space where one could observe families from different places who come to enjoy the landscape. This is because the ground provides a flat area with easy access to the river from Paul Poblet Avenue. Close to this area, one can find food retailing establishments. The importance of this place is reinforced by the future construction of a pedestrian bridge of 53 meters which would cross the river without going to the vehicular bridge Quebrada Verde.

1.5. CPR Picapiedra
CPR Picapiedra has a population of approximately 1,500 inhabitants and 253 families. It has electrical service, street lighting and potable water which is restricted by schedules and lack of a sewer system just like the other CPR. The main economic activities of the population are to farming and the industries that develop in places nearby, such as the textile industry and plastics. A percentage of the population engages in businesses such as wineries and restaurants that are located along Avenue Paul Poblet route between Pachacamac and Cieneguilla. A small percentage is dedicated to the poultry business.

Picapiedra has a school that teaches elementary, middle and high school levels. Elementary students are approximately 250 and high school students are 130. Some of them come from the villages of Guayabo and Manchay. A significant percentage of children and adolescents of go to Pachacamac because of the schools are much better equipped. This CPR has sport facilities for the population.

2. SETTLEMENT PATERNs
Figure 4 Urban settlement from 1910 to 1925.

Figure 5 Urban settlement from 1970 to 1990.
By analyzing the patterns of occupation of these three rural towns, there are a number of factors that determine their growth and their interconnections. The research established a temporary cut to generate a snapshot of each moment and to compare the logic of occupation from population centers.

In the initial stage of occupation, we can see that the first people settled in the CPRs between the late nineteenth and early last century. In the case of Quebrada Verde, the settled in the highlands and near the site where spring hills permit natural pastures and plants. This is because the first inhabitants were engaged in grazing livestock, mainly goats. In the case of Picapiedra and Guayabo, the initial occupancy of population takes place on the border of the agricultural area. Significantly, these areas also were used by pastoralists seasonally that were located on hills. As well as times of the settlements described in the work related to permanent settlements population.

The construction of the train Lima-Lurin was significant to promote employment starting in 1918. The possibility of being able to transport agricultural products to the city of Lima, energized all economic activity, attracting population to towns that are built to perform various jobs. By 1925, we can see that in Quebrada Verde there is a greater population density due to two factors: the train station and the cotton gin. Additional shops in relation to these activities are located mainly along the railway line and the area near the gin. Guayabo population increases focusing mainly on livestock. The Picapiedra population settles in along the way but with less intensity than in the other villages.

In 1963, the train Lima-Lurin stopped working which was felt by the village of Quebrada Verde, which caused the closure of the cotton gin. Moreover, it promoted the migration of some families who sought better employment opportunities. In the mean time, Guayabo and Picapiedra were less affected because most of the population was engaged in farming activities. After the agrarian reform of 1969, which recognized the existence of these settlements, the residents began their urban planning.

The legal recognition of the City council (1985) of the three CPRs, allowed reorganization and the improvement of the physical urban infrastructure in them. This reflected the increase of the occupation in three CPRs in the 1990’s.

We can see that the general growth pattern has been from the agricultural zone boundary. Around the mid-nineties, the company “Cementos Lima” built a concrete wall at the top of the hills. This construction has been done in Guayabo and Picapiedra. The population Quebrada Verde managed to avoid the
construction of the wall that restricts access to the circuit to drive the ecosystem of coastal Lomas tourism potential.

Cementos Lima wall became the limit for growth at the tops of the villages of Picapiedra and Guayabo. Today, Quebrada Verde is the only one out of the three CPRs that has the potential to continue to expand primarily by the morphological configuration of the hills that border it. It has not reached the physical boundaries facing the other two CPRs. This has resulted Guayabo to enable residential use in the area reserved for sports equipment. Picapiedra reserved an area for sport facilities located on the edge of hill but later it became a housing area. The urban communal areas are taken to be privatized and handed to the relatives of local people. With regard to changing the dimensions of the lots, we can refine a feature that is repeated in the three villages which is the gradual and steady decrease in surface dimensions of a typical lot.

Thus, Quebrada Verde at an early stage has lots of 500 m$^2$, as opposed to the 200 m$^2$ lots of new areas of urban sprawl. In Guayabo, initial blocks were divided into lots of 1500 m$^2$, and then the population subdivides in lots of 500 m$^2$. The latest urban lots have areas of 100 m$^2$. One could clearly note the differences in morphology and density of their surfaces. Picapiedra is no exception. Initially, it had the layout of a typical lot of 450 m$^2$ and with each new expansion has been decreasing its size to the 120 m$^2$ area.

It is important to note that this is a critical point at the evolution of these urban centers for rural. The reason for that is the rapid population growth which is demanding the residential occupation of areas designated for public. Ultimately, this could generate a greater social conflict and environmental degradation in the quality of life in these towns. Until the now, these towns have opted for the strategy of increased population as a means of livelihood and their ability to pressure the state. But this growth without adequate planning can ultimately be counterproductive and follow the logic of privatization of spaces for community. Public places are very important for the construction of identity and generate the sense of belonging of a community.

3. COMMON PROBLEMS

There are a number of common problems to the 3 CPRs who are present with varying degrees of intensity. Historically, the populations of these settlements have been engaged in farming and depend on the water supply to develop their activities. In the case of the livestock, it’s depend on the coastal hills microclimate that allows the growth of natural vegetation. The morphological conformations of the hills permit the moisture retention. Agricultural activity depends on the surface and groundwater of the Lurin River. The irrigation canals and proper water management through the Board of Irrigation is essential. Unfortunately through the years farmers express the decrease of water resources. A fact that causes concern for the local population is the construction of water wells of 60 to 100 meters deep for the extraction of groundwater to supply the population of the Manchay. Such infrastructure competes with artesian wells built by farmers. Besides CPRs populations depend on groundwater for carrying out their daily activities. The new infrastructure will create a major conflict for the use of this water resource. The problem is compounded by regulations of SEDAPAL (National Water Supply company) cannot do work for the implementation of a water supply system and drainage in rural population centers increasing social tension between the towns of the valley and Manchay (new settlement near the area).

Figure 7 Lurin River View.
Also one problem that has been expressed by the inhabitants is the poor conditions of health facilities and the limited hours of operation. Therefore, the population prefers to move toward Pachacamac (the principal settlement in the valley). Another important issue to improve is education. Despite the existence of schools in the three CPRs, a large percentage of school-age population go daily to attend classes in Pachacamac with the consequent problem of generating a large flow of students who struggle to go to their school in the mornings. The deficient infrastructure and equipment of schools have created a lack of interest in attending to local schools closest to their place of residence.

Public transport services which cover the route from Lurin to Cieneguilla are used by the population. 40 vehicles operate from 7:00 am to 9:00 p.m. There are also motorbike taxis companies that have established rates based on distance and number of people using the service. These two modes of public transport have allowed greater accessibility to the area and a higher frequency of travel between villages. However, the infrastructure conditions of the Paul Poblet Avenue (road that connect the CPRs) are not the most appropriate. It has deteriorated asphalt increasing the risk of accidents.

The pressure to urban growth promotes expansion in areas close to the hillsides and the change in land use for agricultural parcels to individual houses. The most common form of allotments provides lots of approximately 1,000 m² in private condominiums. The average price per square meter is between 13 to 20 American dollars. In other cases some private investors bought agricultural parcels waiting for the possibility of changing the land use to urban. This change in property ownership has resulted in the decrease of the agricultural activity in the area affecting local people who work there. Also, the new owners of agricultural parcels are not interested in increasing productivity because they are waiting for the change of land use. Thus, the valley is losing its role as a food producer needed to Lima, and becomes a new urban expansion area of the city. Therefore, a significant percentage of the population is engaged to work in nearby industries, whose have growth in recent years.

4. COMPARISON BETWEEN THE 3 CPR

To compare land use we have made two considerations: First, compare the percentages of each land use with respect to its own total area. This allows us to compare the percentages of each use relate specifically to their own area. The second is to take all surfaces of the area occupied by the 3 CPRs and define what percentage uses on the total availability in the sum for each use established.

Regarding the first case, when comparing the area for housing, it appears that the largest percentage intended for this use is Guayabo with 52.50%, with similar percentages in the other two CPRs. When we analyzed the public equipment, Picapiedra has the smaller percentage, affected by the change of use of community recreation center to housing. In the case of the areas earmarked for education is quite marked difference between the 3 villages. Quebrada Verde uses 7.58% of its area for education, while Picapiedra 3.51% and Guayabo 1.42%. Picapiedra provides more area for green spaces and recreation facilities.

When we made the comparison referred to the sum of the total area available between the 3 CPRs, we found that the area occupied by Quebrada Verde is almost 3 times higher than the other two CPRs. This size difference is manifested proportionally in the comparison of all land uses. Quebrada Verde reserves an area for higher education, which is the 82.32% of education land availability.

| Table 1 | Land uses comparison between 3 CPR. |
5. CONCLUSIONS

Activities in the three CPRs have a distinctive common characteristics depend more on the system which are embedded, which in this case is the Lurin Valley. Policies that arise on the CPR should not only consider isolated activities. They must take the interdependence of these rural settlements. Historically Quebrada Verde, Guayabo and Picapedra have had a relationship of cooperation and exchanges that currently is losing strength because they begin to operate autonomously. It has increased the dependence to Pachacamac that is where all services are. Besides local people stop working in occupations related to agricultural activities to seek work in the factories that were beginning to set in the valley, running the risk that the CPRs are becoming "dormitory towns". Despite the persistence of Livestock and agriculture, the available spaces for these economic activities are disappearing. Among the biggest problems, you can highlight the scarcity of water resources which affect local farmers and populations of the CPRs, who has increased in recent years.

In the settlement patterns of the three villages we can learn a good example of good practice because they settle in the uncultivated hillsides. They established in the agricultural border, allowing that urban and agricultural areas can coexist without any major impact. This harmonious relationship is related to the fact that they depended economically of the valleys. In recent years, and from the legal reorganization of the villages, there has been a notable increase of population that has exceeded the limits of growth of the model established by the original urban layout. This has resulted in a second process of densification from the original batch subdivision and development. Nowadays we can see the privatization of the areas reserved for community use to create more housing areas. The densification, without specific planning, brings the loss of quality of life in these villages.

Finally we conclude that we are at a key moment in the urban history of the CPRs Quebrada Verde, Guayabo and Picapedra, because they have reached their limits of growth and the pressure housing for the population will remain. This calls for coordinated actions taken and planned with the residents of communities to define their vision and try to assume certain commitments to achieve them. Furthermore, we have to seize the potential to work cooperatively with other CPR to reach joint solutions that strengthen the economic activities, acting responsibly with the environment.

It is essential to understand the importance of CPRs and settlements inserts into the last valley that Lima has. The coexistence of populations located there and the economic activities taking place are required to ensure a high quality of life, respecting the existing environment. The logic of settlement on the slopes can be a model of future population growth in the area, preventing the expansion of agricultural production land. This research is a first attempt to understand the problems of the Lurin Valley, from recent urban developments. It needs to continue with other CPRs to have a broader picture for analysis. These studies should be accompanied with future proposals to have a real impact on the inhabitants of the area and work with them to ensure the continuity of the rural within this increasingly urban world.

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