

## CHAPTER NINE

### **Land use Conflicts in the Buffer Zones of Sinharaja Forest Reserve: A Case Study on the North Western Slope of the Sinharaja Forest Reserve**

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#### **Abstract**

Sinharaja is a rainforest located in Sri Lanka between 6° 21' - 6° 26' Northern longitudes and 80° 30' - 80° 34' Eastern latitudes. It covers an area of 11,187 hectares spread over the Galle, Matara and Rathnapura Districts. Relative to the various land use patterns in the Sinharaja forest periphery - identified as tea (75.8%), rubber (7.6%), cinnamon (4.5%), coconut (7.6%), paddy (1.5%) and mixed crops (3.03%) - numerous land use conflicts between children and parents, siblings and neighbours are reported from the 20% of the households surveyed. While the lands included in the study area are on the whole identified as 58% private and 42% state, the results showed that the land utilisation by 54% of the sample families was illegal. Harmful effects of land use activities have made river and forest reservations of the North-western (NW) slope of the Sinharaja susceptible to natural disasters. Against this background, the main objective of this study was to familiarise the nature of the land use conflicts in the Northern buffers of the Sinharaja forest reserve. The other objectives were to study the types of land use patterns, time periods of land use activities, ownership of the

lands in the study area and effects of the land use activities that lead to an increase in natural hazards. The study concentrated on a stratified sample of 20% of the total population of 300 families in five villages - Kudawa, Pethiyakanda, Buthkanda, Pitakele and Ketalapaththala – in the Kudawa Grama Niladhari Division in the Kalawana DS Division of the Rathnapura District that represents the NW slope of the Sinharaja forest periphery. The methods adopted for the data collection in the study were a house-to-house questionnaire survey, interviews and field observations, and the results were analysed using simple statistics such as percentages, SPSS and Chi-square test.

**Key words:** *Land use conflicts, land use activities, sinharaja forest periphery, ownership of land*

## **9.1 Introduction**

Land use conflicts all over the globe are precipitated by the scarcity of land resources. The conflict between land utilisation patterns in the agricultural and conservation sectors in the buffer zones of Sinharaja is no exception. The perception regarding this is that while the booming tea smallholder industry remains the driving force behind the rampant expansion of agricultural use of land to conservation areas, the situation is so complex that there could be other crucial reasons that need to be researched. The study was carried out in the five villages - Kudawa, Pethiyakanda, Buthkanda, Pitakele and Ketalapaththala – under the Kudawa Grama Niladhari Division in the Kalawana Divisional Secretariat Division of the Rathnapura District. All the villages selected for the study are in the North-Western slope of the Sinharaja Forest periphery.

## 9.2 Literature review

Land use conflicts are a global phenomenon, and as such there have been many studies and much research conducted on this subject in many countries. The amount of literature produced hitherto is an indication of the gravity of the issue and this study covered only a small fraction of it. Firstly, the study surveyed how professionals and planners view the land use conflicts and the strategies they have adopted to resolve them. The Australian Rural Planning Journal examined the issue from the point of view of some actors who had been involved in land use conflicts and some planners who were engaged in resolving them. According to the aforementioned study, the “activities associated with one activity sometimes make conflicts among land uses worse. The attitudes and perception of players involved in the conflict play a major role in the resolution of conflicts” (as cited in Balasooriya, 1991, p.7). They demonstrate that the land use conflicts have been thoroughly understood by planners and local authorities who had been equipped with a comprehensive plan to mitigate the situation. In a case study carried out in peri-urban Switzerland a typology of six mutually exclusive types of land use conflicts was presented for planners to understand the conflicts and the strategies developed for their management (Benjamin, 2007, p.15). It is reported that in Tanzania land use conflicts between herders and tillers in the Tanzanian Districts and divisions have been resolved through the implementation of land use plans by professionals with the participation of stakeholders. Likewise, this study shows the involvement of professionals from a developed country in resolving land use conflicts in developing countries (Balasooriya, 1991, p.12). There, attention has been paid to land use conflicts from an international perspective. This idea was also at the core of a decision taken by the former U.S.

Vice President Al Gore, winner of the 2007 Nobel Peace Prize, at the Intergovernmental Panel on Climate Change (IPCC). It was also observed that the Sahel belt had already seen the first 'climate war', referring in particular, to the clashes between herders and sedentary farmers. Herders practice pastoralism and need larger areas compared to sedentary farmers. The different interests of the two players lead to land use conflicts (von der dunk, 2011, p.19).

The literature further reveals that land use conflicts have become a social issue. It is stated in an Indian Land Use Planning Project Report that India has seen conspicuous conflicts between industrial land use and agricultural land uses (Berugoda, 1991,p.15). It further states that there is an upsurge of protest from the Indian farming community to allay the widespread expansion of agricultural lands to industrial uses. This fact has been substantiated with many cases from all over India (Berugoda, 1991,p.17).

The court cases related to land conflicts in Mopti Sahel reveal the correlation between climate change and land use conflicts. The inland delta of the River Niger in the Mopti region of Mali is very small. Further research land scarcity was found to be the plausible reason for land use conflict. The Swiss Federal Institute of Forest, Snow and Landscape Resources points out that the claim of different areas of space may lead to conflicts between different uses (Benjamin, 2007, p.15).

The aim of this study is to recognise competition between spatial claims and develop strategies for early recognition. In Sri Lanka, the human-elephant conflict is very much associated with land use conflicts. The human-elephant conflicts in the human dominated habitats in the Sigiriya wildlife sanctuary have

become a major issue, where residential use and wildlife uses clash. The Forestry and Science Society of the University of Sri Jayawadenapura claims that many poor and landless people clear natural forestry for agricultural use while farmers of such agricultural crops as sugarcane, rubber and oil palm replace most of the wildlife habitats that once supported the wild elephants. Attention has also been paid to the impacts of the land use conflicts in the U.S.A. The land use conflicts crop up from the urban sprawl into the rural areas. The issues of noise and odour occur due to conflicting land use patterns. In an article in the Washington Post in 2007 the United Nations Secretary General Banki Moon claimed that there is a connection between global warming and the Dafur conflict (as cited in Benjamin, 2007, p.17).

### **9.3 Statement of the research problem**

This study researched the problem of land use conflicts experienced in the North-Western (NW) slope of the Sinharaja Forest emerging from the limited area of land available, the environmentally harmful activities of the people who increasingly encroach onto the land for agricultural and residential purposes, and the administrative and managerial challenges faced by the state institutions committed to the conservation of land.

### **9.4 Significance of the study**

The significance of the research was gauged under two points: 1) the NW slope of the Sinharaja rainforest consists of water sheds situated in the wet zone of Sri Lanka and is environmentally sensitive; and 2) the increasing population of the encroachers and their harmful land use activities and their effect on those sensitive areas.

## **9.5 Objective**

The main objective of this study was to investigate the nature of the land use conflicts on the Northern buffers of the Sinharaja Forest Reserve and the complexity of the administrative and managerial challenges they pose to the state institutions concerned with land conservation.

## **9.6 Methodology**

The methodology involved the following steps: 1) selecting the study area; 2) mapping the conflict area within the buffers of the Sinharaja Forest Reserve; 3) verifying the accuracy of the 1:10000 scale map by means of remote sensing and GIS software; 4) identifying a 20% group of the total population of occupants in the Buffer Zone of the Sinharaja Forest through the application of the stratified sampling method; 5) collecting data by means of a pre-tested structured questionnaire; 6) interviewing key informants and key persons in the area; 7) analysing data by means of a relevant statistical method of correlation, Spearman's Rank Correlation, Kendall's Rank Correlation Coefficient, etc.; and 8) writing the report.

## **9.7 Key findings**

The research found four main types of land use conflicts on the NW slopes of the Sinharaja Forest Reserve: 1) conflicts of ownership of private lands; 2) conflicts of ownership of state lands; 3) conflicts between human-made land uses, stream reservations and forest reserves; and 4) conflicts of wildlife intrusion into villages. It was observed that non-subdivision of original lands among family members and disputes in land conveyance have attributed to private land conflicts. The non-availability of land permits to encroached lands and delays in the permit issuance process were the main reasons for conflicts

concerning state lands. Most of the human-made land uses were located within a 100 m distance from stream reservation and forest reserve. This situation has resulted in conflicts among land uses and stream and forest reservation. In the study area, the rapid expansion of human made land uses has caused wild life intrusion into villages making the conflicts between human land uses and wild life worse.

### 9.8 Discussion and Analysis

The data collected in this research was analysed in a few ways with a focus on the following variables: 1) land disputes; 2) unauthorised land utilisation; 3) cultivation of lands and present land use pattern; 4) land ownership; 5) land tenure; 6) distance to the forest reserve from cultivated lands; 7) distance to the stream reservation from cultivated lands; and 8) environmental disasters.

**Table 9.1: Land Disputes among Family Members**

Village	Number of families with land disputes	Number of families without land disputes
Pethiyakanda	04	09
Kudawa	03	14
Buthkanda	00	08
Pitakele	01	07
Ketalapannala	02	02
Total	10	40
%	20.0%	80%

Source: Questionnaire Survey 2015

It is understood from Table 9.1 that about 10 families, or about 20% of surveyed households, had among the family members land disputes concerning factors such as land encroachment, presence of a high number of family members, and non-subdivision of the original plot among family members.

**Table 9.2: Illegal use of lands in the study area**

Village	Number of encroachers	Other land owners
Pethiyakanda	04	09
Kudawa	05	12
Buthkanda	06	02
Pitakele	04	04
Ketalapptala	02	02
Total	21	29
%	42	58

Source: Questionnaire Survey 2015

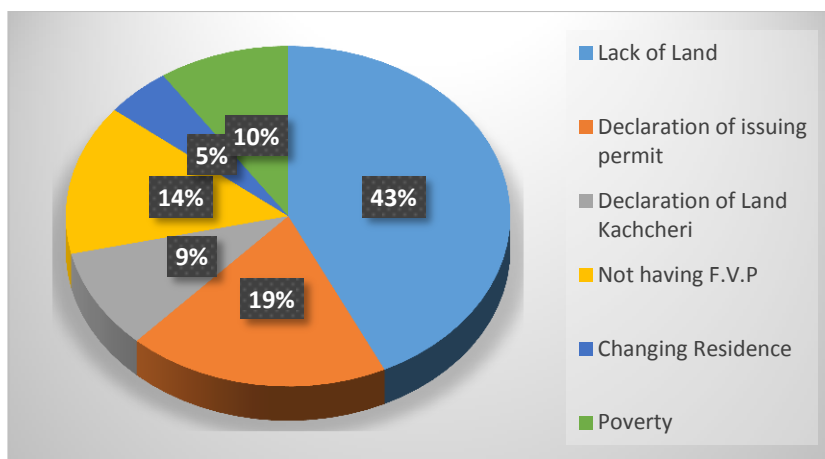
As shown in Table 9.2, 42% of the households surveyed were utilising lands that belonged directly to the state or another state institution. This situation leads to land use disputes among villagers.

**9.8.1 Reasons for Land Encroachments.**

As shown in Table 9.2 a considerably large number of households have encroached upon lands. This encroachment has taken place due to a variety of reasons (as depicted in Figure 9.1).



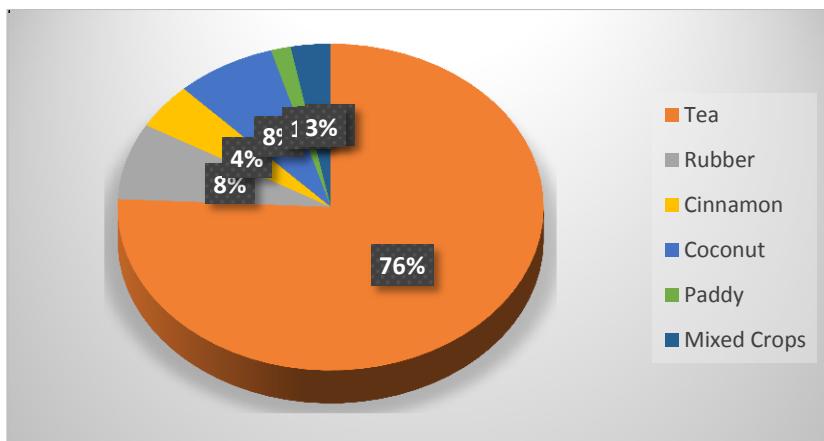
**Figure 9.1 : Reasons for Land Encroachments**



Source: Questionnaire Survey, 2015

According to Figure 9.1, landlessness is the reason for 42.86% of encroachments, whereas the reason for 19.05% of them is a delay in the issuance of land grants. For approximately 14.28% of respondents land encroachment was due to the non-availability of Final Village Plans, while for 9.52% of them it was due to a delay in holding land Kacheries. A very small percentage, approximately 4.76%, have encroached upon lands due to a change in residence and 9.5% due to poverty. From this diagram it is surmised that landlessness is the reason for the majority of land encroachments and that change of residence is the reason for a small minority of the land encroachments. Further analysis of encroachments in the study area also revealed land tenure by other encroachers.

**Figure 9.2: Land use patterns in the study area**



Source: Questionnaire Survey, 2015.

Thus, 75.76% of the land area was cultivated with tea. Followed by rubber and coconut equally with 7.57% accounted for by each crop. Cinnamon shares a smaller percentage of 4.54%. The land area cultivated with mixed crop was comparatively low with 3.03%. The area with paddy was very minimal, with a percentage of only 1.51%.

### **9.8.3 Land ownership and Land Tenure**

The land ownership in the study area consisted of two types, namely private land and state land.

**Table 9.4: Land ownership in the study area**

Name	Private lands	State lands
Petiyakanda	09	04
Kudawa	12	05
Buthkanda	02	06
Pitakele	04	04
Ketalapththala	02	02
Total	29	21
%	58	42

Source: Questionnaire survey, 2015

Table 9.4 reveals that 58% of the households own private lands and the balance 42% have encroached upon state lands. Table 9.5 shows how the private lands in the study area are distributed among the family members.

**Table 9.5 Private lands distribution among family members**

Village	Parents	Siblings	Self owned
Pethiyakanda	00	00	09
Kudawa	01	01	10
Buthkanda	01	00	01
Pitakele	03	00	01
Ketalapptala	01	00	01
Total	06	01	22
%	26.69	3.45	75.86

Source: Questionnaire survey,2015

As shown in Table 9.5, 26.69% of the private lands in the study area were distributed among parents and the percentage owned by siblings was 3.45%. Of the lands in the study area, the percentage of self-owned land was 75.86%.

The lands encroached by the dwellers in the study area belong to three government institutions, namely, the Central Government, the Department of Forest Conservation (DFC) and the Land Reform Commission (LRC). The following table provides the village-wise distribution of lands among these institutions.

**Table 9.6: Distribution of state lands among institutions**

Village	State	Department of Forest Conservation	Land Reform Commission
Pethiyakanda	03	01	00
Kudawa	02	03	00
Buthkanda	04	02	00
Pitakele	02	01	01
Ketalapthhala	02	00	00
Total	13	07	01
%	61.90	33.33	4.76

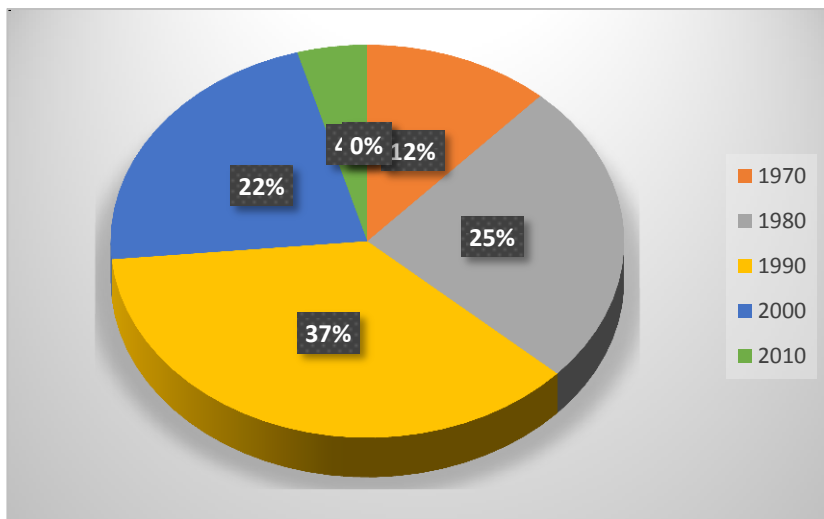
Source: Questionnaire survey, 2015

Of the lands used by villagers in the study area 21% belongs to the state. Of that amount 61.9% belong to the state, 33.33% to the DFC and the balance 4.76% to the LRC.

**9.8.4 Chronology of the establishment of different land use types**

The main land uses in the study area were for the cultivation of tea, rubber, coconut and cinnamon.

**Figure 9.3: Chronology of the establishment of different land use types**



Source: Questionnaire survey, 2015

Figure 9.3 shows that 11.76% of that land uses took place during the decade of 1970, and that increased by 25% in the 1980s. The decade of 1990 saw a further increase in land use by 36.76%, and an increase of 22.06% in the decade of 2000 and 4.4 % in since 2010.

### **9.8.5 The effects of land utilisation type on forest reserves**

The study area is very sensitive and adjacent to the Sinharaja Forest Reserve. Hence the study examined if the present land use has had any effects on the forest reserve.

**Table 9.7: The distance from cultivated lands to forest reserve**

Village	<10 m	>10 m	>100 m	>200 m	>500 m	>1,000 m
Pethiyakanda	04	03	04	01	01	00
Kudawa	09	04	00	00	03	01
Buthkanda	05	00	01	01	01	00
Pitakele	03	04	00	01	00	00
Ketalapththal a	00	02	02	00	00	00
Total	21	13	07	03	05	01
%	42	26	14	6.0	10.0	2.1

Source: Questionnaire survey, 2015

Table 9.7 shows that: on 42% of the surveyed lands the cultivated land was located within a distance of less than 10m; 26%, within a distance of more than 10m; 14%, within a distance of more than 100 meters; 6%, within a distance of more than 200 meters; 10 %, within a distance of more than 500m; and 2%, within a distance of more than 1,000 meters.

On using SPSS software to analyse the difference in distances from cultivated lands in all five villages, the following hypotheses were built for analysing this data:

**Ho** There is no difference in distance from villages to the forest reserve.

**H1** There is a difference in distance from villages to the forest reserve.

**Table 9.8: The analysis of distance from villages to the forest reserve**

Coefficient	Values	Significance
Peasons chi square	24.745	0.211
Contingency coefficient	0.575	0.211
Peasons R	-0.058	0.691c
Spearman correlation	-0.039	0788c

Source: SPSS analysis, 2015

It was found that there is a significant difference in distance from lands to the forest reserve. While H1 is nearly 80% hypothesis, Ho could be rejected with 80%.

### **9.8.6 The effects of land uses in the study area on stream reservation**

Two stream reservations are located in the study area known as Kudawa River and Pitakele River. The effects of the present land uses on stream reservation are represented in Table 9.9.

**Table 9.9: The distance from the cultivated lands to the stream reservation**

Village	<10m	>10m	>200m	>500m	>1000m
Pethiyakanda	02	04	03	03	01
Kudawa	04	02	05	04	02
Buthkanda	05	01	01	01	00
Pitakele	02	04	02	00	00
Ketalapththala	01	02	01	00	00
Total	14	13	12	08	03
%	28	26	24	16	6.0

Source: Questionnaire survey, 2015

The above table shows that: on 28% of the surveyed lands cultivated lands occur within less than 10 meter distance; 26% in a distance of more than 10 meters; 24% in a distance of more than 200 meters; and a comparatively small percentage, in other words, 16% in a distance more than 500 meters. The least number of plots of surveyed lands occur at a distance of more than 1,000 meters.

Furthermore, to analyse the difference among villages in cultivated land and water reservation distance SPSS software was used with following hypothesis being built.

**Ho** There is a difference at cultivated land water reservation distance among villages.

**H1** There is no difference at cultivated land water reservation distance among villages.

The results obtained through the SPSS analysis are represented in Table 9.10.

**Table 9.10: Analysis of difference among farmland water reservation distances**

Coefficient	Values	Significance
Pearson chi square	14.810	0.539
Contingency coefficient	0.478	0.539
Pearsons R	0.296	0.037c
Spearmen correlation	0.292	0.040c

Source: SPSS analysis, 2015



From the analysis it was found that there is no significant difference between farm land water reservation distances, and it is understood being of analysis nearly 50%.

### **9.8.7 The relationship between cultivation and environmental disasters**

Within the study area there are crops which have resulted in a myriad of environmental problems.

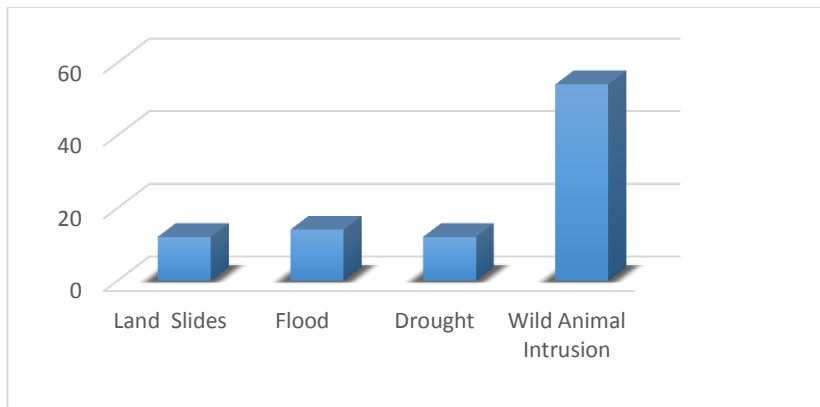
**Table 9.11 : Effects of cultivation on environmental problems**

Village	Severe effects	Marginal effects
Petiyakanda	10	03
Kudawa	17	00
Buthkanda	07	01
Pitakele	08	00
Ketalapattala	04	00
Total	40	04
%	92.0	8.0

Source: Questionnaire survey 2015

A high proportion, 92%, of the households in the study area expressed that the present environmental problems in the area have arisen due to the land uses taking place in the area.

**Figure 9.4: Environmental problems in the study area**



Source: Questionnaire survey, 2015

As represented in Figure 9.4, the environmental problems occurring in the study area are landslides, droughts, floods and wildlife intrusion into villages with a severity of 12%, 14%, and 54% respectively.

## 9.9 Conclusions

The incidence of illegal land use in the study area was very high. This was due to the land scarcity in the area. The majority of land was being used for tea cultivation. Most of these tea lands were located within a 10m distance from the stream and forest reserve. Many natural disasters have occurred due to this human-made land uses. Wildlife intrusion is one of the main disasters. The researchers enumerated the following suggestions; encroachment legalisation, expedition of land permit issuing process, establishment of buffer zones on the borders of stream and forest reservations and preventing wild life intruders into villages.

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