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■ 1. LAND TENURE CHARACTERISTICS AND VULNERABILITY TO NATURAL DISASTERS IN ECUADOR ■

Natural disasters have increased in frequency and intensity on a global scale, and have affected a large part of the world's population, with consequent human and economic loss, and deterioration in quality of life.

Countries in Latin America and the Caribbean have also been increasingly affected by natural phenomena such as earthquakes, volcanic eruptions, tsunamis, and hurricanes, amongst others. The El Niño phenomenon has been the principal natural cause of large-scale damage in Andean countries, producing disasters such as floods, droughts and landslides, amongst others.

CEPAL has estimated that in a typical year, these phenomena cause damage to the value of 1.500 million dollars and the loss of more than 6000 human lives, both of which result in stagnation of economic development and in the living conditions of the population of the countries where such events occur¹.

In particular, the people in developing countries that are most vulnerable when disasters occur are poor population living in rural areas or on the edge of cities, because they are settled in the areas of greatest risk and they do not benefit from the infrastructure or resources required to mitigate the effects of natural phenomena, or indeed phenomena that are man-made.



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¹ CAF – The El Niño Phenomenon 1997–98: Memories, Challenges and Solutions – Ecuador.

As far as the security of land access and tenure is concerned, the negative impact of natural disasters on the poorest and most vulnerable population groups should be given form and publicised in order to create a greater conscience in governmental authorities and in the international community. The aim is that these authorities will act to improve security of access to, and tenure of, the land, given that land is an asset which facilitates production processes, sustainability, and the self-esteem of rural communities.

1.1 Ecuador, its characteristics

Continental Ecuador is in the extreme northwest of South America, bathed by the Pacific Ocean and traversed by the two principal branches of the Andes mountain range, including a series of volcanoes, some of them active. This situation – its geographical position and its geological characteristics – mean that phenomena such as earthquakes, volcanic activity and floods are all frequent.

Ecuador is bordered by Peru to the south and east, Colombia to the north, and the Pacific Ocean to the west. Geographically speaking, the country is made up of four regions: Sierra, Coast, Amazon, and the island region of the Galapagos. These cover an area 256.370 km² with a 2007 population (according to INEC) of 13.605.485 people.

The percentage of poor amongst the national population was 36.3 % in 2006, of which 61,5% were rural poor, compared with 24,9% urban poor.

THE AGRARIAN STRUCTURE

Despite more than 40 years having passed since partial agrarian reform, which occurred between 1964 and 1973, Ecuador's principal farmland is still found in few hands². According to figures from the III National Agricultural Census in 2001, there are 842.882 Agricultural Production Units (APUs) in an area of 12.355.831 hectares. Of the total APUs, 63.5%, or 535.309 hectares, relate to small producers plots with less than 5 hectares. This demonstrates that significant problems still exist in the distribution of productive land within the country: APUs of less than 5 hectares amount to no more than 6.3%, of the total national agricultural land area, whilst APUs larger than 50 hectares amount to 60.7% of such land area.

The agricultural reform process begun in 1964 did not improve distribution of the land, but rather maintained the concentrated structure whereby the best land was held in just a few hands. Smallholders in the Sierra where obliged to occupy the higher lands, whose low quality soils and susceptibility to erosion cause degradation of the high plateaus, misty forests and water sources³.

The Law on Agricultural Development was promulgated in 1994 with the purpose of driving agricultural modernisation and consolidating a new concentrated structure, supported by the private sector. In this sense productive economic variables became important, whilst social, cultural and ecological ones were sidelined. A market for land was promoted as a strategy for the improvement of efficiency and the levels of production and productivity in the countryside, limiting small peasants' access to the land. Consequently small farmers were forced to move and occupy the highlands with low fertility and high erosion soils.

According to figures from the III National Agricultural Census (MAG – SICA 2000), in Ecuador 68.4% of the APUs are titled, which corresponds to 71.9% of the total agricultural land area. Meanwhile 6.7% of the APUs, equivalent to 992.514 hectares, are worked without title to the land, without a leasing contract and therefore without paying rent, although they have complete use of the land and the APU's activities⁴.

In 2008 the newly adopted Constitution has addressed peasants' access to land supporting the promotion of redistributive policies to favour access to land, water and other natural resources. In article 282, the Constitution establishes by law a national land fund that will allow equal access to land to female and male peasants, and forbids land concentration and water privatisation.

VULNERABILITY IN THE FACE OF NATURAL DISASTERS

Ecuador is a country highly-vulnerable to destructive natural phenomena, situated as it is in the "Pacific Ring of Fire", and in the subduction zone of the Nazca Plate under the South American Plate. Similarly, geological fault lines separate the country's geological regions, making Ecuador highly vulnerable as a

² FEPP – International Land Coalition – IFAD 2005 – The cost of the land – could funds for land acquisition be useful to the poor?

For peasants, land is not only an essential mean of production, but also the basis and meaning of social life, given that family and community are integrated here, and identities are constructed symbolically, via direct work on the plot and the cultural assimilation of territory.

³ SENPLADES National Development Plan 2007–2010.

⁴ MAG–SICA 2003, Agricultural Producers and their Environment.

potential scenario for earthquakes and volcanic activity; this affects the country's potential for development since it is at high risk of natural disasters.

As a consequence of climate change and environmental degradation, Ecuador has experienced sustained increases in temperature, changes in the frequency and intensity of extreme events (droughts, floods, frosts), changes to the water cycle, and the retreat of glaciers.

Various geographical characteristics of the country – such as the presence of the western, central and eastern cordilleras of the Andes mountain system, and the highly-variable climate – contribute to floods, heavy seas, lack of rain, and landslides.

The pattern of natural disasters in Ecuador is characterised by a steady increase in the number of events and also their impact, principally those associated with floods, droughts and extreme temperatures. According to the worldwide EM-DAT (2007) database, between 1990 and 2006 there were a total of 29 large-scale natural disasters, 59% of which were of climactic origin. Although there has been a progressive decrease in the number of deaths caused by such disasters, there still exists a significant increase in the number of victims, mainly amongst the poor.

In recent years Ecuador has experienced a variety of natural phenomena of significant magnitude and extension, resulting in certain catastrophic events causing grave socioeconomic and environmental imbalances, and adversely affecting the development of the nation and the national economy.

1.2 Land tenure legislation and risk management

LAND TENURE

The Law on Agricultural Development, promulgated in 1994, establishes a policy to foment, develop and protect the agricultural sector, guaranteeing individual and collective land tenure security. In a special way it also facilitates the right of access to land titling.

Similarly, and in accordance with the laws established in articles 282 and 321 of the 2008 Republic's Political Constitution, the State should rule the equal access to land to female and male peasants and guarantee land ownership. This establishes that work on and use of the land can be carried out individually, in cooperatives, in associations, communally, or within a family or limited company, so long as its social and environmental purpose is achieved.

According to the law, the land meets its social function when it is exploited productively, when its renewable natural resources are adequately preserved, when the ecosystem is protected, when all Ecuadorians' nutritional needs are guaranteed, and when surpluses are available for export. The land's social function should translate into an increase and redistribution of income, so that the whole population shares the benefits of development and the profit that comes from this.

Land policy in Ecuador is the responsibility of a complex institutional framework within two branches of the State: the executive (MAGAP–INDA, MAE,



MIDUVI) and the judicial (Notaries and the Property Register). This fragmentation means that no single entity assumes the leadership role in the formulation and application of land policies that support sustainable development processes.

Responsibility for land administration is the ambit of the Ministry of Agriculture, Livestock, Aquaculture and Fishing (MAGAP), via the National Institute for Agrarian Development (INDA), which is responsible for land legalisation processes and the maintenance of the rural land cadastre.

RISK MANAGEMENT

Until 2008, the responsibility to prevent, reduce and overcome the effects of catastrophes of whatever origin was exercised by the National Civil Defence Body via the Civil Defence System. These were combined public and private sector bodies that, through coordinated integration, executed actions designed to protect the population and its property, from the effects of disasters derived either from a natural phenomenon or from human activity. The approach of this system was mainly of a reactive type after the disaster had occurred, dealing with the aftermath effects through reconstruction and rehabilitation programmes and without an integrated approach to risk management, this approach was delegated on an ad-hoc basis to organisations created for that purpose like CORPECUADOR, COPEFEN and CPOE dealing with El Niño phenomenon (1997-1998) and the Josefina landslide (1993).

Since 2008 important advances in Risk Management have been made at the sectoral level with the incorporation of risk management variables in judicial regulations, such as the Law on Environmental Management, the Law on Forests and Conservation of Protected Areas, the Public Health System Organic Law, and similarly in the National Planning System as managed by SENPLADES. Moreover, as opposed to a reactive approach to natural disasters impacts, the 2008 new national Constitution has included in its Chapter VIII the concepts of prevention and mitigation for natural disasters risk management, as well as the need to deal with the management of risks on a decentralised and local basis. The Constitution states explicitly the need to establish a national system for the prevention and management of natural disasters.

In agreement with this approach to address risk management, and as a result of initiatives that had taken place at regional level within the whole Andean Community, in which Ecuador actively participated⁵, in May 2008 the Ecuadorian government via Executive Decree reorganised the Civil Defence responsibilities towards risk management so as to be part of The Risk Management Technical Secretariat attached to the Ministry for the Coordination of Internal and External Security. Presently the Secretariat is working to include an integrated approach to the management of risks in a cross-sectoral and decentralised manner, through the development of a national policy for disaster risk management, as well as other tools that will reinforce the disaster management work in the country. In particular the policy will support and strengthened an integrated approach to disaster risk management considering development as the framework of DRM for the reduction of peoples' vulnerability against disasters. The policy will foster the participation of all public and private sectors within a decentralised manner with the involvement of national, regional and local level institutions and organisations.

In this framework the aim of this Ecuador country study is to extract lessons from the way the impact of natural disasters was managed in selected experiences before 2008, especially with regards to land tenure issues. The authors wish these lessons can be of use for raising awareness both in Ecuador and other countries, on the importance to consider land tenure access and security as key factors in the reduction of household and country vulnerability against the impacts of natural disasters.

■ 2. NATURAL DISASTERS IN ECUADOR (1997–2008) AND THEIR EFFECT ON LAND ACCESS AND LAND TENURE ■

In the last 15 years, Ecuador has suffered a variety of natural disasters of different magnitudes and intensity, which have affected the most vulnerable parts of the population to varying degrees; this population is generally found in rural areas and does not have sufficient resources to deal with the effects of natural phenomena.

The main natural disasters in Ecuador over the last 15 years, and their social and economic effects, are described in the table 1.

⁵ Ecuador is an active member of the Andean Committee for Disasters Prevention (Comité Andino para la Prevención y Atención de Desastres), and has been in charge of the Committee presidency twice (2003-2004; 2008-2009)

TABLE 1 – Main natural disaster in Ecuador

EVENTS	YEAR(S)	MAIN SOCIAL AND ECONOMIC EFFECTS
Amazonian region earthquake	1987	3,500 dead, oil pipeline breakage and 890 million dollars in losses.
La Josefina landslide	1993	100 dead, 5,631 people affected, and 741 households; 148 million dollars of direct damage.
El Niño phenomenon	1997–98	293 dead, 13,374 directly affected families and 2.882 million dollars in losses.
Caráquez Bay earthquake	1998	3 dead, 40 injured, 750 homeless people, 150 houses destroyed and 250 damaged.
Eruption of the Guagua Pichincha volcano	1999	2,000 people displaced from Lloa y Mindo, health side effects and closure of Quito airport.
Eruption of the Tungurahua volcano	1999–2008	20,000 people evacuated, 17 million dollars in losses in the agricultural sector and 12 million in tourism. In 2001, 50,000 people were evacuated and 39,455 were affected.
Floods in large parts of the country	2008	62 dead, 9 disappeared, 90,310 affected families and 150,000 hectares of crops lost.

Source: DIPECHO Project – 2005 and Civil Defence.

A brief description of the most important natural phenomena that have occurred in the last 15 years will serve as a reference to analyse their effects on land access and land tenure amongst the affected population. It will also help to identify the main lessons learned, and establish certain strategic lines when considering the subject of land tenure within a national strategy for risk management.

2.1 The El Niño phenomenon, 1997–1998

The El Niño phenomenon of 1997 to 1998 caused significant social and economic losses in Ecuador. This natural event was characterised by heavy rains in the Costa region, with floods causing damage to cities, small population groups, roads, houses, farms and plantations; the major incidents took place in the centre of the Ecuadorian coast. This event is considered to have been extremely severe: the event of the greatest magnitude amongst the 28 El Niño events of the last 100 years, causing even greater damage than that caused by the phenomenon of 1982–1983.

On the Ecuadorian coast the provinces most affected by the overflow of rivers and floods in most of their boroughs were Guayas, Manabí, Esmeraldas, Los Ríos and El Oro; to a lesser degree, various urban and rural areas in the cities of Puyo, Tena and Francisco de Orellana in the Amazon region, were also affected.

The El Niño phenomenon of 1997–1998 had significant social effects, causing 293 dead, 162 injured and 6278 families otherwise adversely affected and evacuated, having lost their homes and land. In total, there were 13,374 affected families⁶.

The total material damage originating from the El Niño phenomenon of 1997–1998 was 2.882 million dollars, of which 846 million dollars (29% of the total) corresponded to direct damage and 2.036 million additional dollars (71%) corresponded to indirect losses. The total damages represent about 15% of Ecuador's GDP in 1997⁷.

Economic losses principally affected the productive sectors, with losses of 1,515.7 million dollars (53% of the total losses), given that the floods mainly caused damage to agricultural production. Damage to the transport industry amounted to around 794.6 million dollars, of which the major part (28%) corresponded to roads and bridges that were mostly destroyed along the coast. Losses in the social sector amounted to 204.7 million dollars, and in the service sector, 35.6 million dollars.

The area of crops lost or otherwise affected amounted to 843.873 hectares, of which 683.630 hectares were losses along the coast and part of the Sierra, affecting more than 100,000 agricultural workers in the regions that suffered damages. Traditional crops such as rice, maize and soy beans were amongst the most affected.

El Niño produced large negative effects on production in the country, causing a reduction in agricultural production, fishing, industrial production and commercial services, with negative impacts on employment and the income of those population groups that have few resources, and whose vulnerability in the face of disasters is very high. These groups also had to deal with significant losses in income, including being left without basic means of

⁶ National Civil Defence Division – Final Report on the El Niño Event 97–98.

⁷ CAF, The Lessons of El Niño, Ecuador. Source: Memories of the El Niño Phenomenon 1997–1998, Challenges and proposals for the Andean Region Orellana H, 1997. Ecuador, high vulnerability to natural and technological disasters. Source: Memories I Engineering Day Sessions in Pichincha.

subsistence. This resulted in emigration to urban centres in search of work. In this context it was women who assumed the temporary role of head of household whilst their husbands looked for work in other parts of the country, in order to generate income that would allow them to rebuild their homes or their means of production.

2.2 The “Damming” of the Paute River (La Josefina)

On 29 March 1993 approximately 20 kilometres northeast of Cuenca city, an enormous landslide amounting to 20 million cubic metres of rock and earth blocked the Paute river for 32 days, forming a large dam 100 metres high and one kilometre in length, containing 200 million cubic metres of water. The Government dealt with the event as a National Emergency, given that the Paute Hydroelectric Plant is situated 50 kilometres further down the river: this plant generates 65% of Ecuador’s electricity.

As a result of the landslide and the subsequent rupturing of the natural dam, nearly 170 million cubic metres of water were released, flooding large areas

of agricultural land and inhabited zones, and inundating population centres such as Paute, Gualaceo, Burgay, as well as farmhouses on the shores of the Paute river. More than 5.000 people sought refuge in 20 camps and shelters, remaining there for around two months whilst the emergency was being dealt with.

It is estimated that around 100 people lost their lives, and that 5.631 people were directly affected by the loss of their homes, land and employment; around 582.000 people were indirectly affected by isolation, destruction of road communications, problems of marketing, etc⁸.

A total of 741 households were affected, of which 76% were completely destroyed. A total of 2.473 hectares of farmland were also affected in the provinces of Azuay, Cañar and Morona Santiago. Water above the dam inundated 940 hectares of agricultural land, houses, vacation homes and farmhouses, a 30.000 watt electricity plant, part of the Panamerican highway, and also the railroad. Meanwhile waters below the dam destroyed 1.533 hectares of farmland, 24 kilometres of watering channels, 5 bridges, the road to the tourist centres



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⁸ No Place for Hope, Report on the Josefina Disaster – Ecuador 1993. National Polytechnic School.

at Paute and Gualaceo, important agroindustrial installations such as a liquor factory and a flower producer, and an agricultural college. 50 percent of the city of Paute was destroyed, affecting houses, public buildings, electricity and telephone networks, sewage systems and road networks.

A total of 40 kilometres of asphalted roads were damaged. The blocking of the Panamerican highway cut off a number of important population centres, creating a genuine road communication emergency, which affected the economy and the mobility of the population. The effects on the economy were very large, with direct losses of 148.85 million dollars, equivalent to 1 percent of GDP⁹.

A preliminary evaluation carried out by the Civil Defence (Cruz, 1993) of the direct losses is summarised in Table 2.

SECTORS	VALUE
Houses (716)	7.13
Agricultural sector (1,800 Hectares)	22.17
Land and assets	26.06
Agroindustrial companies (15)	8.83
Road infrastructure, irrigation, railroads, electricity plants, networks, etc.	73.56
Bridges (8)	2.56
Educational infrastructure, public works (schools, coliseums, markets, playing fields, abattoirs, potable water systems (?), churches, etc.)	0.69
Other damages	7.85
Total (in millions of dollars)	148.85

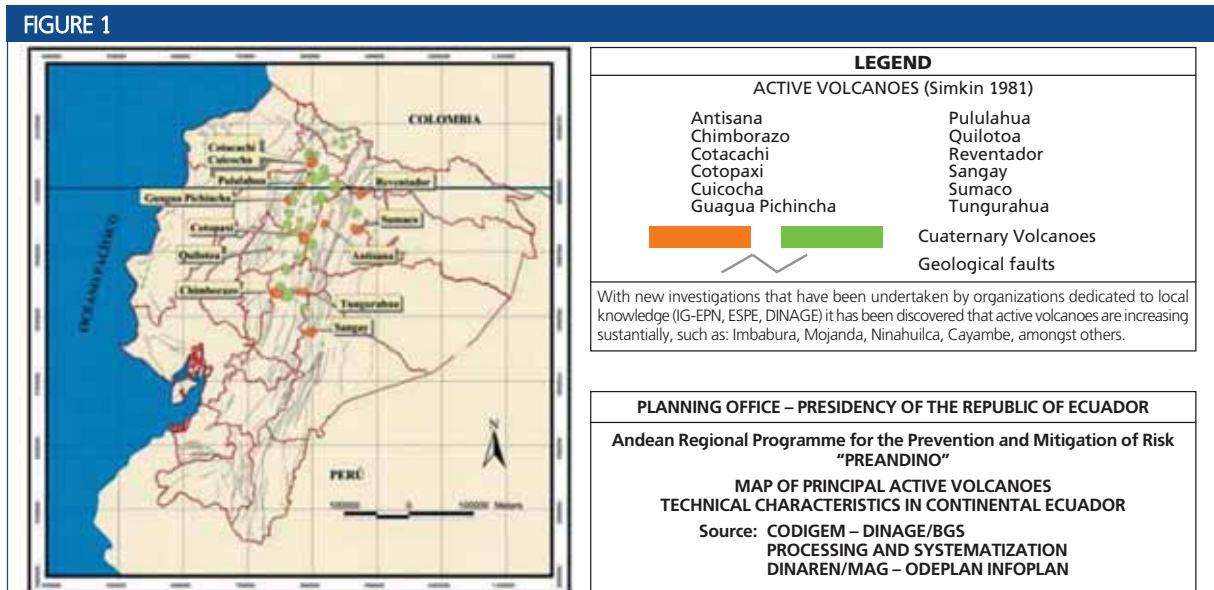
2.3 The Tungurahua volcano eruption

The Tungurahua volcano is 5.023 metres above sea level and is situated in Ecuador’s Central Andean cordillera, 140 kilometres south of Quito, the country’s capital. It is one of the country’s six active or potentially active volcanoes. Amongst these are the Cayambe Antizana, Tungurahua, Cotopaxi, Sangay, and Chimborazo (see Figure 1).

The Tungurahua volcano began erupting in 1999 and since that date remains active, including periods of great activity and others of relative calm. The direct effects of the eruption, such as pyroclastic flows, mudflows and landslides, are felt in 9 boroughs of Tungurahua’s and Chimborazo’s provinces (Tisaleo, Pelileo, Baños, Cevallos, Patate, Mocha, Quero, Guano and Penipe); indirect effects such as falling volcanic ash are felt in Pastaza, Bolívar and Los Ríos provinces.

This permanent emergency situation has generated human, material and environmental losses in the region, significantly affecting the lives, health infrastructure, roads, houses, means of production, and other factors that help to maintain the activities of the local populations in the affected zones.

The October 1999 eruption resulted in the evacuation of more than 20.000 people from Baños city, one of the main tourist centres in the Andean region (situated as it is on the slopes of the volcano, approximately 5 kilometres to the north). This provoked thousands of dollars in losses given that all activity in the city ceased; agricultural losses were



⁹ Orellana H, 1997. Ecuador, high vulnerability to natural and technological disasters. Source: Memories I Engineering Day Sessions in Pichincha.



estimated at 17 million dollars and losses in tourism were estimated at 12 million dollars.

Since 2001 the Tungurahua eruption process has continued with frequent emissions of ash, principally affecting the Tungurahua and Chimborazo provinces, and causing enormous losses to smallholders, as well as affecting the health of those exposed to the ash. It has also been necessary to evacuate more than 50,000 people from Quero, Mocha and other population centres limiting the volcano. According to estimates from the Ministry of Agriculture and Livestock¹⁰, around 28,500 hectares of potato, maize, onion and other food crops were lost, equivalent to 15 million dollars. Civil Defence reported that 39,455 people were affected.

In 2002 the greatest losses occurred in the provinces of Tungurahua and Chimborazo, especially in the towns of Quero, Mocha, Tisaleo and Huambaló, with 50,188 people affected and sometimes displaced. Agricultural land was covered in ash, meaning that it was impossible to feed the animals. Farmers were therefore obliged to sell their livestock at prices far below normal market value, resulting in increased difficulties for family incomes.

In July 2006 the activity of the Tungurahua volcano was reactivated, and its most violent eruption since 1999 began, coupled with continuous earthquakes, explosions, and emissions of ash, vapour and rocks; lava flows also damaged the road between Baños and Penipe, and pyroclastic flows affected the

Cusúa community and the Juntas bridge. Falling ash and rocks affected a large part of Tungurahua province, mainly the cities of Ambato, Pelileo and Baños, and the province of Chimborazo in Riobamba and Penipe. The population of several cities was evacuated along with settlements surrounding the volcano, such as Baños, Juive, Paligtagua, Bilbao and Cusúa. At least 5 dead were reported, 3 injured and more than 60 disappeared; additionally thousands of hectares of cultivated land were lost due to fallen ash.

On 6 February 2008 the Tungurahua once again began to emit ash and hot rocks, obliging the authorities to forcibly evacuate local populations and declare a maximum state of alert.

In summary, the eruptive activity of the Tungurahua volcano that began in 1999 continues to be latent, with periods of great activity and others of relative calm; this has significantly affected the economy and lives of local populations.

2.4 The 2008 floods

The heavy rains that fell in the first few days of 2008, and which are considered the most significant of the last 10 years, affected at least 13 coastal and sierra provinces in Ecuador: Esmeraldas, Manabí, Guayas, El Oro, Los Ríos, Santa Elena, Cotopaxi, Bolívar, Cañar, Chimborazo, Loja, Azuay and Pichincha. As a result of this the National Government, via executive decree on 31 January 2008, declared a state of emergency in various coastal provinces; later and given that the rains continued with even greater intensity in all parts of the country, a state of emergency at national level was also declared.

Although the effects of the floods and heavy rains have not been quantified exactly, the provisional figures concerning losses in various sectors (presented by Civil Defence in a report published in the *Telégrafo* newspaper, 7 May 2008), suggest that at least 62 people died, a further 9 disappeared and 90,310 families were affected; additionally 12,490 families were evacuated, 3,298 of which are in temporary shelter; 22,450 houses were affected, of which 401 are completely destroyed; 185 roads were also affected and 41 were completely destroyed. The crops affected by the rains amounted to 166,174 hectares, whilst 150,956 hectares were completely destroyed.

According to the study of agricultural losses carried out by FAO, the APUs affected were mainly concerned

¹⁰ Department of Operations, National Civil Defence Body. Report on the dangers of falling ash from the Tungurahua volcano.

with the cultivation of seasonal crops, especially rice and maize; in Guayas and Los Ríos a total of 78.881 hectares of rice was lost, which in 2007 terms amounted to about 19.3% of the total cultivated land at national level.

The same study establishes that approximately 62% of the most vulnerable households relied on these affected crops as the principal source of their living wage.

For its part the Government has estimated that around 1000 million dollars are required to repair the damage to social and productive infrastructures, and to help the victims resume their productive activities.

■ 3. THE EXPERIENCES AND LESSONS LEARNED IN RELATION TO LAND TENURE (1997-2008) ■

REACTIVE RESPONSES IN THE FACE OF NATURAL DISASTERS

In general terms the intervention of the State in response to the effects of the described disasters resulting from adverse natural phenomena can be characterised as reactive: priority was given to mitigation post the adverse

event, and to rehabilitative and reconstructive action. Over the 1997-2008 decade this type of response was increasingly reiterated when attending to crises caused by natural disasters in Ecuador.

During the El Niño event of 1997-98 the priorities of the National Government centred on the reconstruction of physical infrastructures – mainly roads, bridges, educational institutions and health centres – as well as the installation of shelters and the delivery of food rations, victuals and sanitary teams. Action was coordinated by the Emergency Operations Committees (COE) at provincial level and implemented by Civil Defence, with the support of bodies created by presidential decree such as COPEFEN¹¹ and CORPECUADOR¹², these being charged with the task of reconstruction.

After the Josefina disaster attention was centred on reconstruction further to the damage caused by the release of dammed water: the construction and reconstruction of housing; building new roads and a new alternative ring road; recuperation and rehabilitation of land and crops; formulation of local development plans. To move forward with these activities, the National Government created an



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¹¹ COPEFEN is the entity assigned to the Presidency of the Republic, and whose objective is to coordinate technological, economic, administrative, financial and operative aspects of natural phenomena.

¹² CORPECUADOR is the autonomous entity for public law charged with the rehabilitation and reconstruction of zones affected by the El Niño phenomenon.

organism called the Emergency Work Programmes Council (CPOE), which was charged with planning and contracting the necessary studies and public works.

During periods of crisis resulting from the eruptive activity of the Tungurahua volcano since 1999, public interventions have prioritised organised responses and attention to emergencies.

Within this general framework and approach, the actions carried out by the National Government and designed to guarantee access to and legalisation of land tenure have not been of priority character. The little action that has occurred to this end has been undertaken by NGOs and the church, occasionally supported by international cooperation, civil society and the public sector.

The church took responsibility for solving the problems of people who lost their homes; to this end it established the Programme known as “Reconstruction of Hope”, which involved building 419 homes and reconstructing 217 others in 13 new settlements. The required land was purchased in advance. Funds came from local and foreign donations and also government handouts, amounting to a total investment of 2 million dollars.

Source: “Hoy” newspaper, 7 January 1994.

AFFINITY WITH THE LAND

The voluntary movement and evacuation of populations found in high-risk zones is in itself a complicated and difficult undertaking. However, if the feeling of affinity to the land and domestic animals that rural people possess is added to this, then the challenge of overcoming their resistance to abandoning these is even greater, given that they are often the only assets and livelihood that rural families possess.

Uprooting and moving to temporary shelter, or even definitive settlements, will directly affect the emotions and moods of evacuated families, amongst whom children, women and the old are the most vulnerable.

After a maximum state of alert was declared during the first eruption of the Tungurahua volcano, it was decided that the populations settled in areas of highest risk should be evacuated; in many cases this required forced evacuation of families, who had to leave their plots behind and take with them just a few possessions and animals that could be transported in army vehicles and trucks.

If there was no alternative means of moving animals from the farm, rural people either abandoned them or sold them at prices well below the normal market price, critically affecting family incomes.

Once the danger had been reduced or had passed completely, families that were installed in temporary shelters normally returned to their land during the day to tend their animals and protect their assets, assuming these were not destroyed; however, if all had been lost they would emigrate to other cities or move to where other family members would welcome them, away from the danger zone.

POLITICAL WILL TO FACILITATE THE RESETTLEMENT PROCESS

The lack of political decisiveness amongst local authorities to activate land expropriation mechanisms, evidenced during the management of the crisis, meant that resettlement programmes for families affected by natural disasters had been delayed.

The commitments and interests of certain mayors in the Tungurahua volcano risk zone, added to the political management of the crisis, can be seen as a factor limiting access to land of certain characteristics that would allow appropriate economic reinsertion of the affected population.

The lack of political decisiveness on the part of local authorities in not applying the law that would allow municipalities to declare as a public good the land required for reconstruction, is evidence of failure in the land acquisition process as applied to resettlement of those peoples affected by the Tungurahua volcano eruption. Similarly, the fact that land acquisition was not exempted from tax is another negative aspect that adversely affected the possibilities of resettlement for local people.

PUBLIC–PRIVATE COOPERATION

The relationship between the public and private sectors in coordinating their roles towards a common goal in times of crises caused by natural disasters should be taken as a lesson learned for future interventions.

Two interesting examples of public–private cooperation in terms of the resettlement of populations affected by the Tungurahua volcanic eruption, are: the purchase of land by FEPP and financed by the Ministry of Agriculture, Livestock, Aquaculture and Fishing (MAGAP); and the Programme for Human Resettlement managed by the Esquel Foundation with the participation of various public and private entities.

“Cooperation between government, society, the scientific community, NGOs, is the most convenient relationship for the management of disasters.”¹³

The Penipe communities' Programme for Human Resettlement is the initiative of Esquel, a private non-profit foundation; this programme allowed for several scores of families from the Penipe borough to be resettled away from the volcano risk zone. These families came from the communities of Anabá, Choglontus, Puebla, El Tingo and Manzano. They were guaranteed dignified living conditions via an integrated development project. In its first phase the Programme delivered to the victims, via public lottery, 45 homes complete with potable water, electricity and sanitary systems; additionally, plots of land totalling 5100 m² were delivered for the purpose of starting up productive projects, 10 hectares for communal production and 3.5 hectares earmarked for an ecological protection zone.

Source: “Hoy” newspaper, 30 April 2008.

The funds earmarked by MAGAP and administered by FEPP for the acquisition of land represents an interesting example of cooperation between the public sector and NGOs linked to the church, in managing the resettlement process of families gravely affected by the eruption of the Tungurahua volcano. This has allowed interested parties to make the most of FEPP's experience and knowledge of managing the land situation, the financial resources provided by the Ecuadorian State, and the organization of community participation.

THE LACK OF AND SUBSEQUENT SPECULATION OF THE LAND

One of the collateral effects of natural disasters is the indiscriminate increase in the cost of land in areas close to where the disaster took place; this occurs as a result of the lack of availability of land and the eagerness amongst certain agricultural landowners to take advantage of the situation, on occasion sometimes supported by certain local authorities.



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¹³ National Polytechnic School – No Place for Hope: Report on the Josefina Disaster – Ecuador 1993.

THE AGREEMENT MAGAP – FEPP

In August 2007 MAGAP endorsed an agreement with FEPP, the purpose of which was to resettle farmers affected by the Tungurahua volcano eruption. These farmers came from the Bilbao, Puela and El Altar communities in the Penipe province of Chimborazo, and from Cusua and Chacauco in the Pelileo borough of Tungurahua. They were given land to help with their economic recuperation; they were also supported in recuperating their animals, crops and productive infrastructure in new settlement zones, and with restarting agricultural, marine and tourist activities by means of training, technical assistance and the strengthening of their social organization.

The agreement establishes the responsibility of the State in financing the acquisition of land. FEPP supports the process of identifying and selecting the families affected, and resettling them in areas free from danger, where conditions allow them to reactivate production as well as adequately reintegrate themselves at the socio-economic level.

A total of 166 families were resettled in 381 hectares acquired through the agreement; of these, 123 families were resettled in 169.7 hectares (Chimborazo province) and 43 were resettled in 211.3 hectares (Tungurahua province). The families that benefited were from the Palitagua, Puela and Bilbao boroughs of Chimborazo and the Cusua community of Tungurahua province. The delivery of land took place at the community level.

Source: Interview with the Director of PROTIERRAS – FEPP.

The urgency and need to acquire land so as to establish definitive resettlement for affected populations (who in the majority of cases lost their land, homes and animals as a consequence of the natural disasters), resulted in unusual demand for large areas of land. Consequently the market and price for land of certain characteristics that will allow for the reactivation of the production for the affected families was altered. These alterations were reflected in the land prices to such an extent that in many cases they quintupled those found prior to the disaster. This price increase became even more evident when the State, through its public institutions, was charged with acquiring the land.

During the process of buying land for the resettlement of the population affected by the “damming” of the Josefina and the eruption of the Tungurahua volcano, the negotiation and formalisation of land purchases failed on a number of occasions, requiring several reattempts, many of which took place in confidential circumstances.

This outcome came about as a result of a lack of planning and identification of adequate land for resettlement, and the lack of application of the legislation and mechanisms that authorize the State to expropriate land for social ends, as is the case in the face of risks caused by natural phenomena.

RESPECT FOR THE NATURAL HABITAT

Families affected by natural disasters are displaced and obliged to abandon their place of origin, their land and their homes; this fact alone amounts to a strong psychological impact on people, especially the old and children; they are moved to sub-standard temporary shelter in schools or sports buildings away from the area of risk. This situation becomes even more critical when the victims are moved to places with geographical characteristics and cultures that are completely different from those of their place of origin.

During the eruption of the Tungurahua volcano and the declaration of a red alert, the populations of Bilbao and Sucua, situated on the slopes of the volcano in a high-risk area, were evacuated and moved to the Sucuso estate in the Pallatanga borough, 100 kilometres away from their place of origin, an inter-Andean zone. As opposed to the Andean region, the Sucuso estate has an ecosystem characterised by a hot and humid sub-tropical climate, with a very different production system and cultural characteristics.

Without a doubt this fact produced a high number of desertions amongst families living in the new settlements; they returned to their places of origin for short periods or during the day, to continue with or reinitiate productive activity on their plots, on which they had developed their agricultural activities over many years.

The lack of adequate conditions in the places where the populations affected have been resettled has caused a number of family members, especially the young and males, to emigrate to other cities and countries in search of better living conditions. This is evidenced by the decreased natural death toll of the Penipe population on the slopes of the Tungurahua volcano.

This aspect of resistance and lack of adaptation to different geographical, social and cultural conditions is reflected in the housing programmes promulgated by MIDUVI for the benefit of the victims of the Tungurahua volcano eruption. These homes are generally found in urban population centres with limited space, meaning that whilst families receive this benefit, they do not inhabit the homes permanently. Children are often left to look after the homes whilst their parents return to

their land property of origin to carry on with agricultural activity, resulting in social problems and family rupture.

SECURITY OF LAND AS PROPERTY

The resettlement of the affected population requires clarity on the part of the authorities with respect to the legal status of the affected land plots, in terms of guaranteeing title to the land in the disaster zones and in the new settlements. When public institutions send contradictory and unclear messages to the population in this regard, clarity is then required in order to facilitate the resettlement processes of those affected, and to generate confidence and credibility in official institutions and authorities at the local level.

The lack of land title is an obstacle that prevents the population affected by natural disasters and situated in areas of risk, from gaining access to public and private initiatives related to the supply of credit for the acquisition of new lands, housing, and the reactivation of their agricultural production. Neither will they have the opportunity to sell or cede to the State the property of the land affected by natural disasters.

During the eruption of the Tungurahua volcano and despite the indeterminate risk, peasants evacuated to temporary shelter nevertheless returned to their plots at least on a temporary basis, as a mechanism for guaranteeing physically the tenure of their lands. Added to this the historical sense of property and affinity that these groups have to the land, it is more difficult for them to move and accept their uprooting.

On the Sucuso estate and under the direction on CONSEP, with the support of CEBYCAM–CEM, an NGO linked to the church, around 200 people were resettled, members of 43 families from the Bilbao parish of Penipe borough in the province of Chimborazo; it was this parish that was most affected by the eruption of the Tungurahua volcano in 1999. Even though 6 years have passed and the land is now in the hands of a public body, the land of the families who still remain in the area has not been given legal title as yet; such land has been assigned on a lease basis to the municipality of Penipe, in its capacity as legal representative of those affected.

Source: CEBYCAM–CEM – Interview with Father Jaime Alvarez.

INSTITUTIONAL COORDINATION AND THE MANAGEMENT OF INFORMATION

One of the weaker aspects of intervention from groups supporting reconstruction tasks during the period 1997–

2008 was the one related to the lack of institutional coordination and superposition of functions between diverse governmental organisations; this was exacerbated by the lack of a National System for Risk Management, which could regulate the different aspects of prevention and risk reduction, as well as preparation and attention to disasters and rehabilitation/reconstruction.

The military character of the post-disaster actions that were carried out by the Civil Defence, provoked a lack of effective participation on the part of the affected community; additionally there were leadership disputes amongst the local authorities, further complicating the little coordination between institutions involved in managing the effects, measures and norms applied post-disaster.

The many communication problems and the little information shared between institutions present in disaster zones was reflected in the lack of a clear and uniform message coming from the authorities responsible for the management of the crisis; this led to confusion and inadequate interpretation with respect to the judicial and economic conditions established for resettlement; in turn this meant that some of the selected beneficiaries would not accept being moved to resettlement areas, or that they could abandon them shortly after being moved. It is also necessary to point out that sometimes the structure and community culture of the affected was weak; to this end it is necessary to deepen understanding and analysis.

The creation of temporary institutions (by Executive Decree and presidential decision) for the management of emergencies – as was the case with COPEFEN and CORPECUADOR in attending to the emergency produced by the El Niño in 1998, and COPOE for the management of the Josefina crisis – did not resolve the problem of lack of institutional cooperation in the management of those emergencies.

COMMUNITY ORGANISATION

Community organisation is affected after a natural disaster when community members are evacuated to shelters found in different places; this weakens community organisation, which in many cases is the guarantee that defends the rights of the community, and influences community participation in the process of resettlement. This becomes evident when families from various communities are chosen for resettlement and the process becomes quite difficult for them in terms of adapting community life to the new circumstance, and for their participation in community decisions.

The socio-cultural characteristics of rural people affected in areas of risk, is an element that is not taken into consideration when planning action before and after disasters. As a consequence of this it is necessary to deepen knowledge in relation to the characterization of rural communities, their strengths and weaknesses, and the attributes and other specifics of the area they will leave behind.

THE RURAL FAMILY ECONOMY

The rural economy that depends on agricultural activity is seriously affected by natural disasters, given that land, homes and other assets are destroyed.

Actions post-disaster between 1997-2008 were focused on solutions to the problem of housing as a priority, leaving access to productive land as a secondary objective. In the majority of cases productive land was the only source of income for affected families. The result were that families signing up to the housing plans promulgated by MIDUVI, and who had no other means of agricultural production or any alternative employment, returned to the area of risk in order to cultivate their land, despite the danger. Whenever possible they also emigrated to other places in search of alternative subsistence for their families.

THE POLITICAL MANAGEMENT OF THE CRISIS

The political focus that different governments have applied to the management of disasters between 1997-2008, manifested during the management of the crisis, provoked delays in the implementation of programmes for resettlement of the affected families. Immediately after disasters occurred, the social communications media offered substantial information and coverage, highlighting as principal actors the governmental authorities who would provide immediate and effective attention to the needs of the affected population; by contrast the actual responses did not demonstrate the same urgency and seizing of the requested actions to deal with the reality of these tragic events.

During the period 1997-2008 the Ministry of Housing and Urban Development (MIDUVI) executed a variety of rural housing programmes aimed at populations in high risk areas affected by the Tungurahua volcano eruption, in the provinces of Tungurahua and Chimborazo. In several of these programmes the houses were not occupied completely due to problems such as: delays in the delivery of housing; lack of certain basic services; the feeling of affinity that rural people had with the land, which generated a natural resistance to easy acceptance of



The “El Comercio” newspaper reported as follows on 28 May 2008 the situation as regards plans for the construction of houses for the victims of the Tungurahua volcano.

MIDUVI financed the construction of 108 homes in the Río Blanco population near Baños, so as to resettle the people of Juive Grande; there the grass has grown quickly in abandoned homes. Only a piece of paper on the front door certifies who its owners are.

In Tungurahua, 200 houses were also built in La Paz, in the borough of Pelileo. The Ministry’s technicians last week initiated the supervision of paving and covering operations. These homes are not as yet inhabited.

The situation in the communities of Guano and Penipe in Chimborazo province is similar. Only 45 families from Palictahua, Calpi, Pungal de Puela, Puela, El Manzano, and Chonglontus decided to move to the population centre of Penipe. Three months ago these families were resettled in homes measuring 67 square metres, by technicians from the Ministry of Housing and Urban Development.

Nevertheless, these people do not feel secure. “We do not have any documentation that gives us guarantees as property holders. We do not know if they are going to resettle us or move us to another home,” says a worried Patricia Quishpe.

In Guano, a total of 55 homes were constructed for the people of La Palestina and Ilapo. The resettlement process still has not started.

Source: “El Comercio” newspaper, 28 May 2008.



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being moved to another place, where the living conditions and characteristics were very different from those these people were normally used to.

■ 4. STRATEGIC ISSUES THAT CAN GUARANTEE AND SECURE LAND TENURE FOR GROUPS VULNERABLE TO NATURAL DISASTERS ■

The experiences and lessons learned from natural disasters and their effects on Ecuador during the period 1997-2008 allow us to recognise the importance of the present Government efforts for the development of a national system, and related policy on Natural Disasters Risk Management.

Both, the system and the policy should include operational mechanisms to guarantee access to and security of land tenure for the affected population, to which end some specific guidelines are suggested below.

4.1 General strategic guidelines

Some approaches that can help favouring land tenure security for vulnerable groups follow below.

PUBLIC POLICY ON RISK MANAGEMENT

This should be designed to ensure security of land access and land tenure for those populations that are poor and vulnerable to natural disasters. The policy should be part of a much wider political effort, within the framework of a National Policy for Risk Management.

TERRITORIAL ARRANGEMENTS

Undertake a territorial planning and reordering at the local level, taking “risk maps” as the initial reference point in order to plan land use, through the conciliation of the environment with development, having human beings as focal point of development.

LAND INFORMATION SYSTEMS

Implement a geo-referenced information system

concerning rural land plots in each rural borough, with special attention given to those areas considered to be at high risk of natural phenomena; this would make available real and up-to-date information on the physical and tenure characteristics of land plots; it would also serve as a valid instrument to support municipal decision-making in the planning and use of natural resources, and the territory, as well as in the establishment of a municipal land cadastre. In this sense the PRAT¹⁴ Project executed by MAGAP has developed an information system on rural land property (SIG-TIERRAS), implemented in eight boroughs as a national pilot project; the same project would serve as a basis for widening coverage at the national level, with emphasis placed on the boroughs situated in areas threatened by natural phenomena.

TRAINING AND INFORMATION

Develop dissemination and training campaigns for vulnerable populations in areas of risk, and for local and national authorities, with respect to risk management

and access to and legalisation for land tenure in natural disaster situations. The purpose is to individuate mutual commitments and count on the local information, to which everyone should have access, to facilitate concrete responses to the needs of poor rural people.

LEGISLATION FOR THE PROTECTION OF LAND TENURE

In agreement with the new 2008 Constitution, update the legislation with respect to land tenure in natural disaster situations, in order to guarantee access to, legalisation of and registration of land rights. Current technological advances that facilitate data collection for and maintenance of land rights records should be taken into consideration, ensuring special and priority treatment for women who are heads of household, young children, and disabled people.

PROGRAMMES FOR THE LEGALISATION OF LAND TENURE

Implement a programme of land legalisation in areas of risk, with priority given to the most vulnerable



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¹⁴ Rural Land Regularization and Administration Project.



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members of the population, such as women, children, widows, orphans and indigenous communities. Promote the individual land titling processes, maintaining the communal land tenure on those lands exploited at community level.

ESTABLISHMENT OF SECURE ZONES FOR THE RESETTLEMENT OF POPULATIONS

Based on adequate territorial planning move forward identification processes of secure zones for the temporary or definitive resettlement of populations affected by floods and volcanic eruptions, in territorial spaces that combine geographical and environmental characteristics similar to the original areas of risk. The aim is to achieve conditions favourable to the easy adaptation of the affected population.

PROTECTION OF THE LAND TENURE REGISTER

INDA¹⁵, the Property Notaries and Registrars at local level, are charged by law with the responsibility and custody of registers for the legalisation and transfer of land property rights. These registers are at risk of damage from the effects of natural phenomena. For this reason they should be in digital format and accepted as support for the technical file that legalises

land tenure, and for the processes involved in asserting land property rights.

PROGRAMMES FOR LAND PURCHASE

Establishment of mechanisms that facilitate and favour the purchase of land by the State in areas of risk, so that this can be used as an asset or a natural reserve, with the aim of supporting future sustainability and access to assets in the new areas where the population will settle. These mechanisms should be backed by economic incentives for those who are either buying or selling their land to the State; additionally, technical assistance and training should be offered to support the reactivation of agricultural production of affected families.

DISASTER MANAGEMENT COMMITTEES AT LOCAL LEVEL

This involves the appointment of local risk management committees established by legal regulations that reinforce institutional structures at the territorial level, and include the participation of the beneficiary groups and communities; mechanisms of social control are used to ensure that the planning and execution processes for action taken before and after natural disasters are carried out transparently and efficiently, involving those

¹⁵ National Institute of Agrarian Development.



entities whose work is dedicated to administering land property via local experience and presence.

GENUINE ASSESSMENT OF LAND VALUE

This defines clear and transparent mechanisms for valuing land at real prices, in order to control speculation and excessive increases in the value of land in times of crises caused by natural disasters. It is also designed to facilitate and motivate the sale and expropriation of land by the State, that is, land that can be used as a place or site for definitive resettlement of affected peoples.

SINGLE STATISTICS AND REGISTERS DATABASES OF THOSE AFFECTED

This establishes a single database registering the victims and those affected, which facilitates the focusing and establishment of a coordinated response by the public and private sectors so as not to duplicate efforts and resources in the development of actions intended to mitigate the effects of natural disasters.

LAND LEGALISATION VOUCHER

This prioritises access to MIDUVI's land legalisation voucher for poor families affected by the volcanic eruptions and floods, with the aim of financing the

cost of land tenure registration in those plots destroyed by the effects of natural disasters. In this way families are given access to support programmes for the reactivation of agricultural production, and sources of credit for this production; the voucher also provides the legal tenure security that affected peoples require in order to reinitiate their productive activities.

FINANCING FOR LAND ACQUISITION

This establishes a Land Fund whose aim is the acquisition of land property identified for the definitive resettlement of victims after a natural disaster; this should be administered by local governments in conjunction with the affected community and local actors (especially NGOs, which have the accumulated experience in other acquisition and land conflicts resolution processes) which should act as social controllers during the planning and implementation resettlement processes of the affected population.

The programmes developed by public and private entities to facilitate the purchase of land – such as the FEPP's Land Purchase Credit Fund, the BNF's Programme for Land Purchase, and the MAGAP-FEPP agreement – constitute important reference points for the development of the mechanism that facilitates land acquisition.

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Abbreviations and Acronyms

CAF (ADC)	Corporación Andina de Fomento (Andean Development Corporation)
CEPAL (ECLAC)	Comisión Económica para América Latina y el Caribe (Economic Commission for Latin American and the Caribbean)
CEBYCAM – CES	Centro de Desarrollo Humano en Cultura y Economía Solidaria (Centre for Human Development in Culture and Economic Solidarity)
COPEFEN	Unidad Coordinadora del Programa de Emergencia para afrontar Fenómenos Naturales (Coordinating Unit of the Emergency Programme for Natural Phenomena)
CORPECUADOR	Corporación Ejecutiva para la Reconstrucción de las Zonas Afectadas por el Fenómeno “El Niño” (Executive Corporation for the Reconstruction of Areas Affected by the El Niño Phenomenon)
CONSEP	Consejo Nacional De Control De Sustancias Estupefacientes Y Psicotropicas (National Council for the Control of Drugs and Psychotropic Substances)
CPOE	Consejo de Programación de Obras de Emergencia (Emergency Works Programming Council)
DIPECHO	Programa de Preparación para los Desastres ECHO de la Oficina de Ayuda Humanitaria de la Comunidad Europea (Programme for Disaster Preparedness (ECHO) of the European Union’s Office for Humanitarian Aid)
FEPP	Fondo Ecuatoriano Populorum Progresso (Ecuadorian Popular Progressive Fund)
INDA	Instituto Nacional de Desarrollo Agrario (National Institute of Agricultural Development)
INEC	Instituto Nacional de Estadística y Censos (National Institute of Census and Statistics)
MAE	Ministerio del Ambiente (Ministry of the Environment)
MAGAP	Ministerio de Agricultura, Ganadería, Acuacultura y Pesca antes Ministerio de Agricultura y Ganadería (Ministry of Agriculture, Livestock, Aquaculture and Fishing)
MIDUVI	Ministerio de Desarrollo Urbano y Vivienda (Ministry of Housing and Urban Development)
ONG	Organismo No Gubernamental (Non-Governmental Organisation (NGO))
PRAT	Programa de Regularización y Administración de Tierras Rurales (Rural Land Regularisation and Administration Programme)
SENPLADES	National Planning and Development Secretariat (Secretaría Nacional de Planificación y Desarrollo)
SICA	Proyecto Servicio de Información y Censo Agropecuario (Service Project for Agricultural Information and Census)



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