



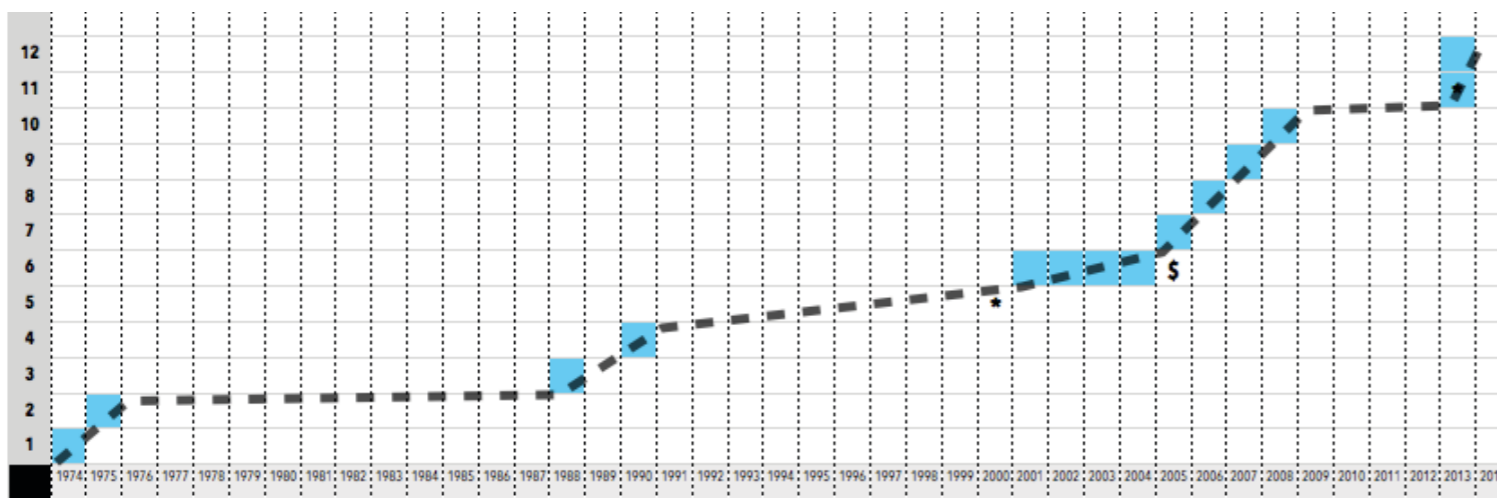
APPENDIX  
QUICK GUIDE TO CASE STUDIES



**CASE STUDY'S TIMELINES - PHOTOS FROM DWELLINGS AND THE FROM LOCAL URBAN ENVIRONMENT<sup>12</sup>**

**FLAVIA**

1	1974	Arrival and purchase of plot with single-room hut and detached toilet
2	1975	Installation of fence made of mattress springs and a metallic roof
3	1988	Construction of toilet attached the house
4	1990	Construction of concrete slab on the top of a ravine
5	1997	Construction of a new kitchen
6	2000	Purchase of land besides and demolition of existent house
7	2001	Start new construction (ground floor): 2 rooms, toilet, open kitchen, stairs (5months)
8	2002	Start construction upper floor
9	2004	Finish construction ground- and upper floor
10	2005	Construction of chicken stall
11	2006	Montage of <i>varanda colonial</i> at the back
12	2007	Construction of garage
13	2008	Construction additional bedroom
14	2013	Purchase another land besides and demolition existent house
15	2013	Construction of pizzeria and external stairs to access rooftop



<sup>1</sup> Tables and graphics elaborated by the author. Photos taken by the author.

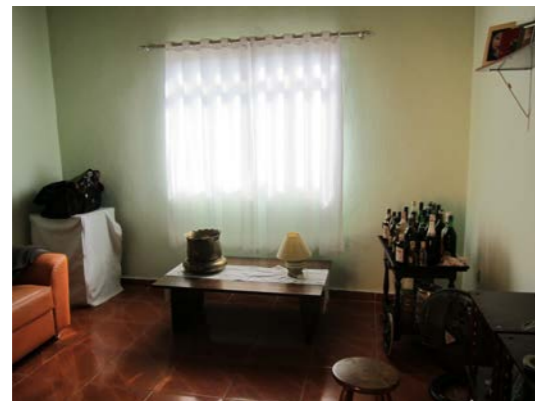
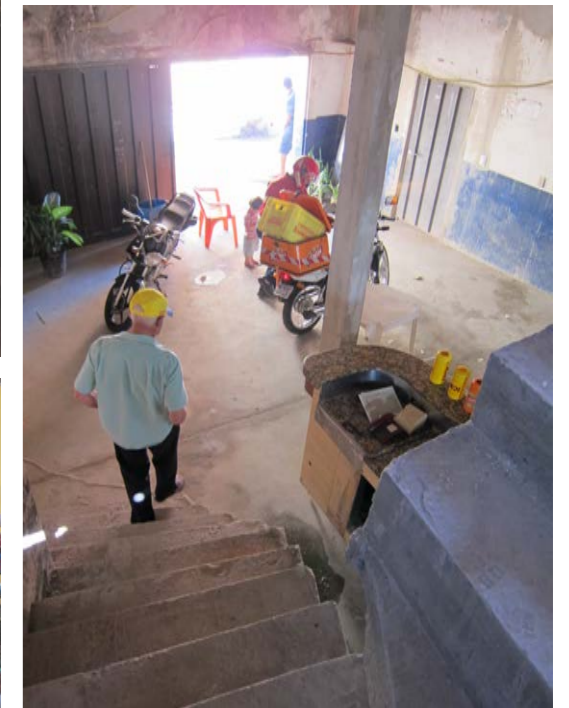
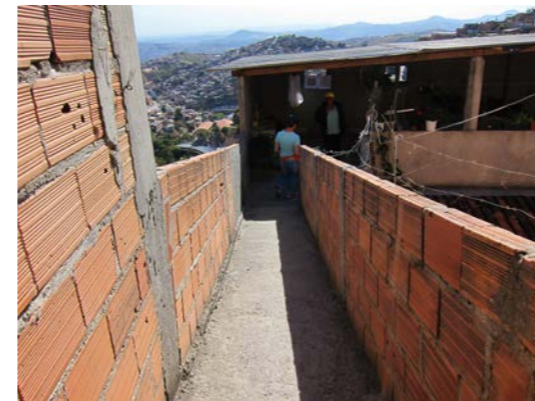
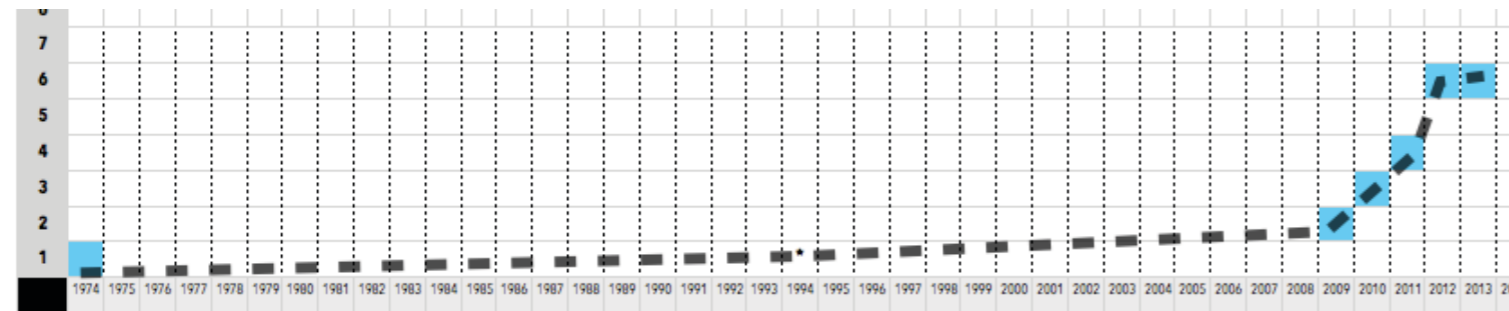
<sup>2</sup> Each case study provides different amounts of information.





**CINTIA**

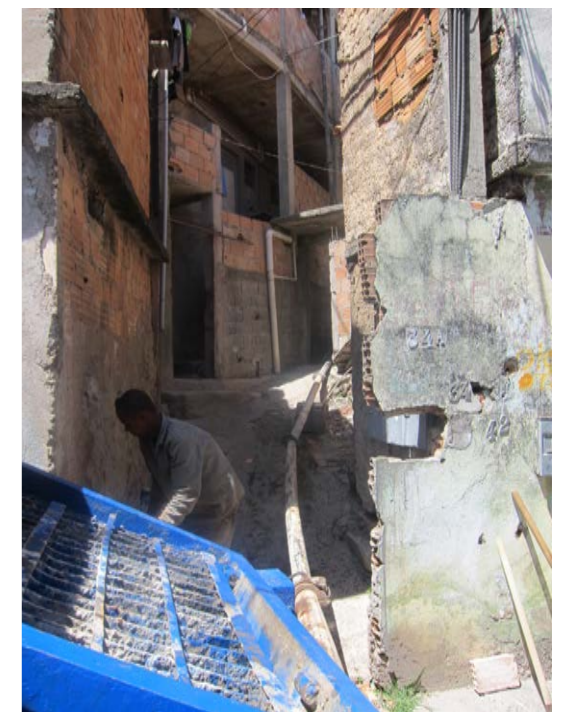
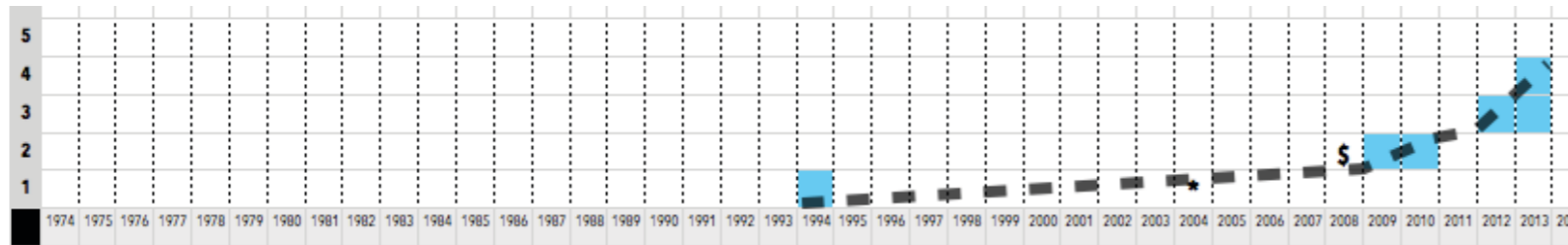
1	1975	Arrival, purchase of land and construction of single-room with kitchen (another spot), repeated improvements, turned to be a three-floor building
2	1994	Purchase of another plot (current location)
3	2001-2004	Construction of three-floor building
4	2009	Removal, construction of another small hut and moving in
5	2009-2012	Improvement of hut, construction of two houses and a bar
6	2013-2014	Construction of two housing units (underground- and upper floor)





**LEVI**

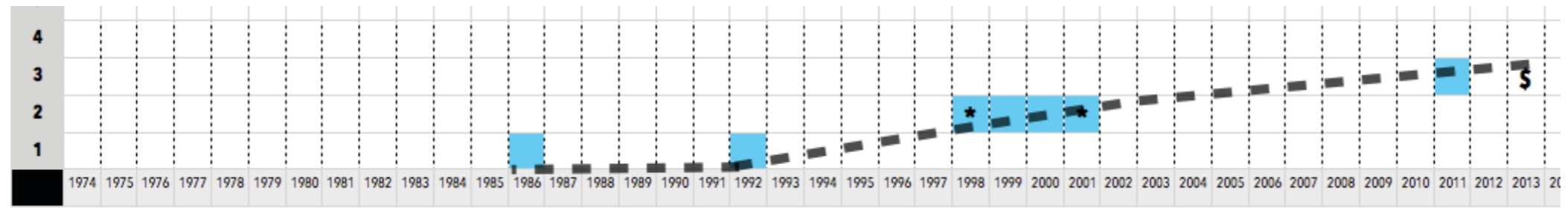
1	1994	Arrival. Lives with his sister (cohabitation)
2	2004	Purchase of the land
3	2009-2010	Construction first floor, without external finishings
4	2012-2013	Construction second floor, without external finishings
5	2013-2014	Construction third floor, without external finishings





**LOUIS**

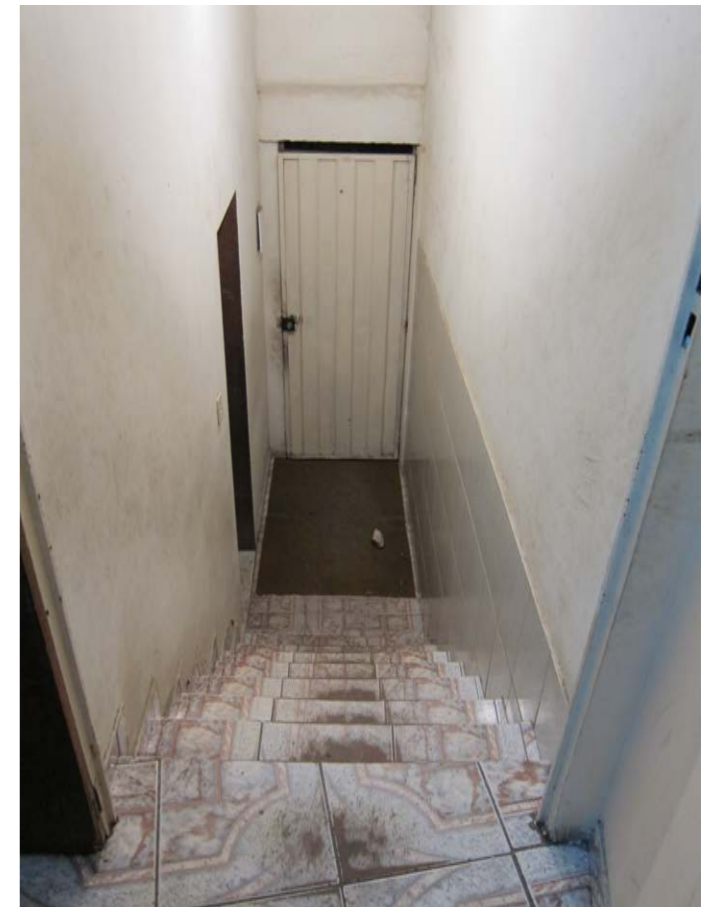
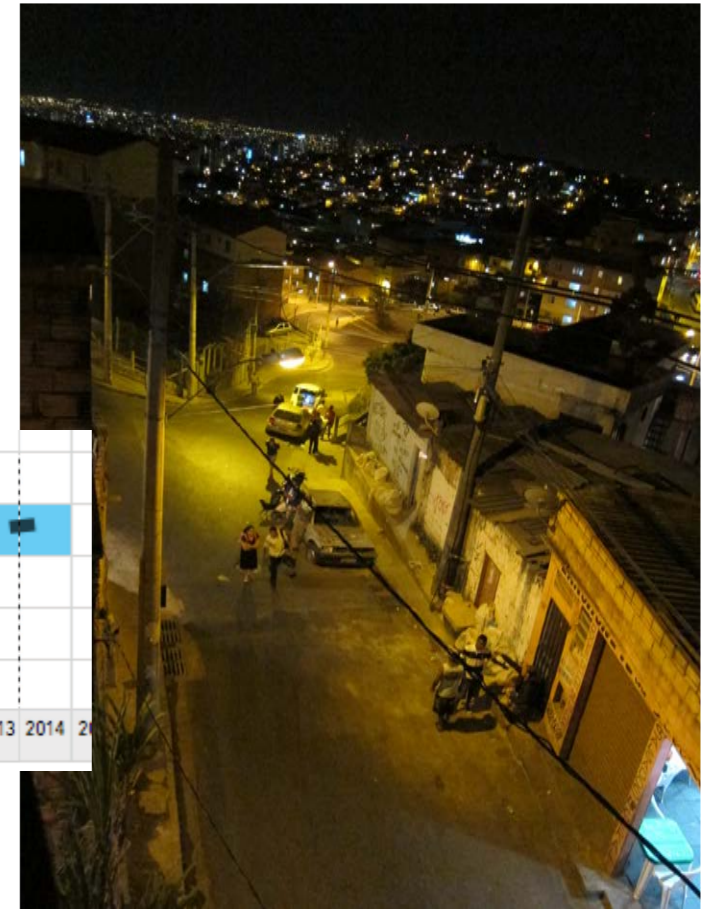
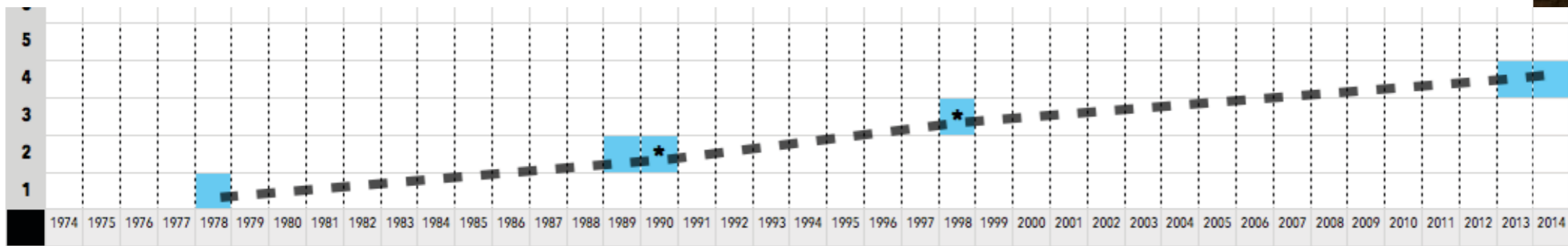
1	1978	Arrival. Family lives by rent
2	1990	Purchase of a house in another plot
3	1998	Purchase of the current plot, starts and finishes
4	2013	Initiate the construction of a new kitchen outside and a new bedroom and toilet on the second floor





**NELY**

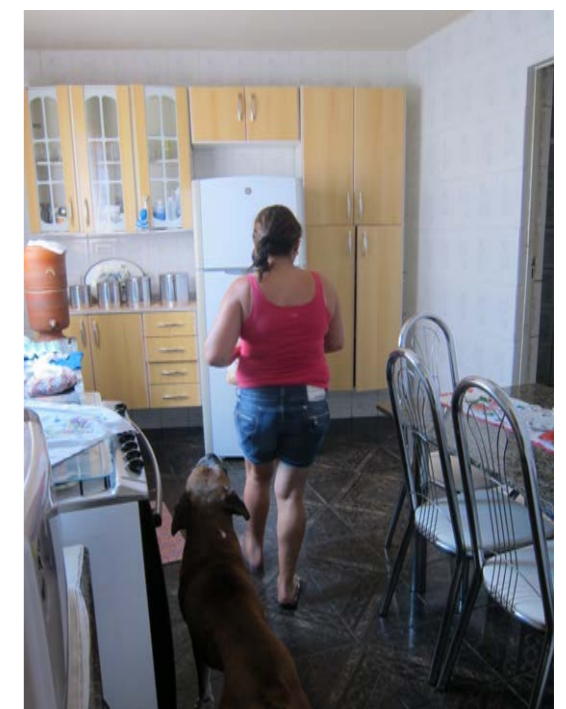
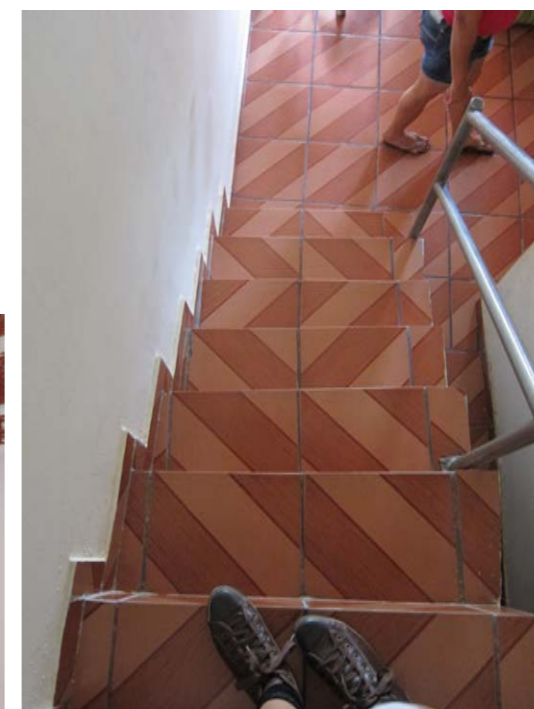
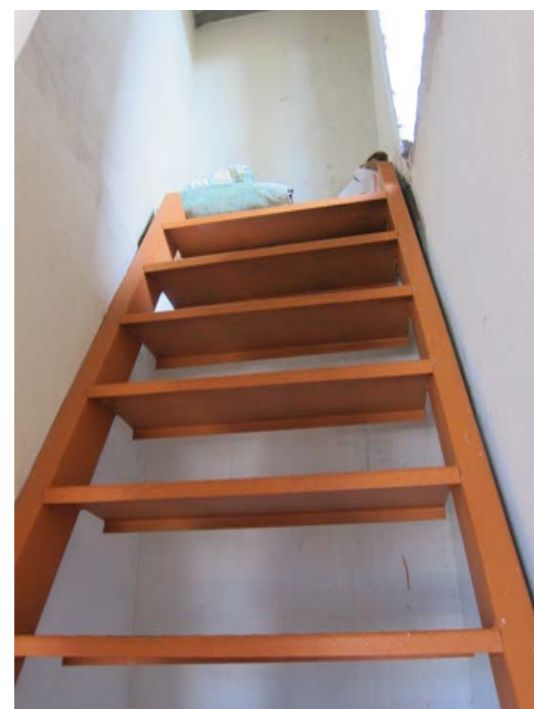
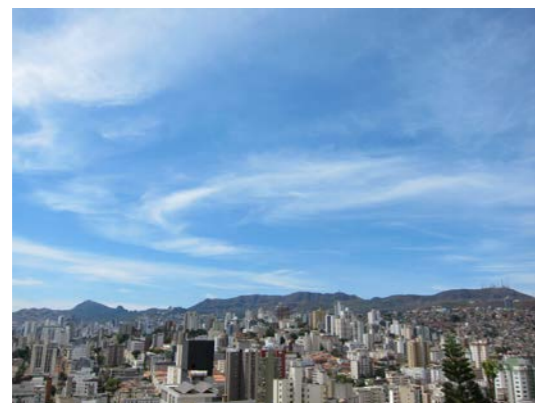
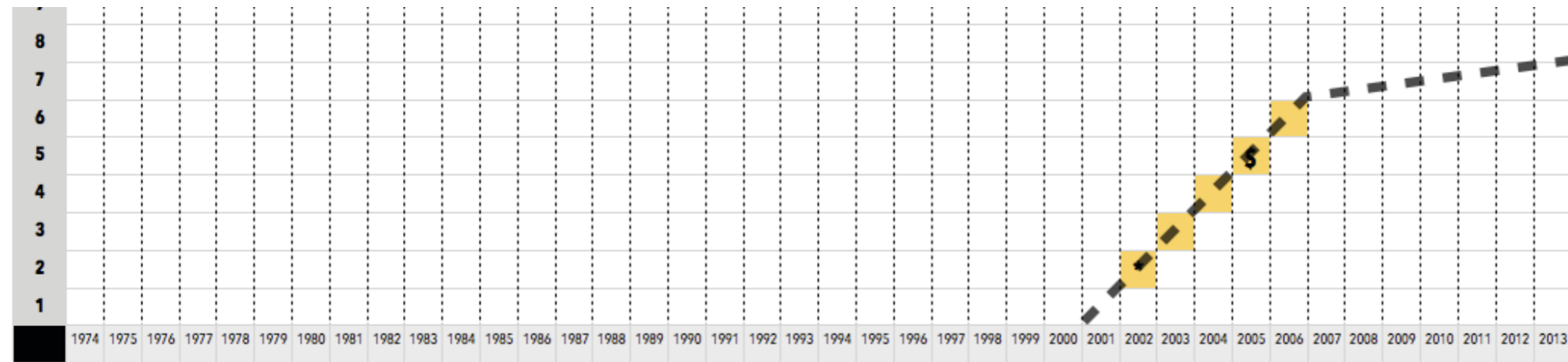
1	1986	Arrival, lives with siblings in another house
2	1992	Got married, lives with husband in another house
3	1998-2001	Purchase of land, construction of the house, purchase the land besides
4	2011	Start construction of garage besides
5	2013	Continues the construction of the garage





**CARLOTA**

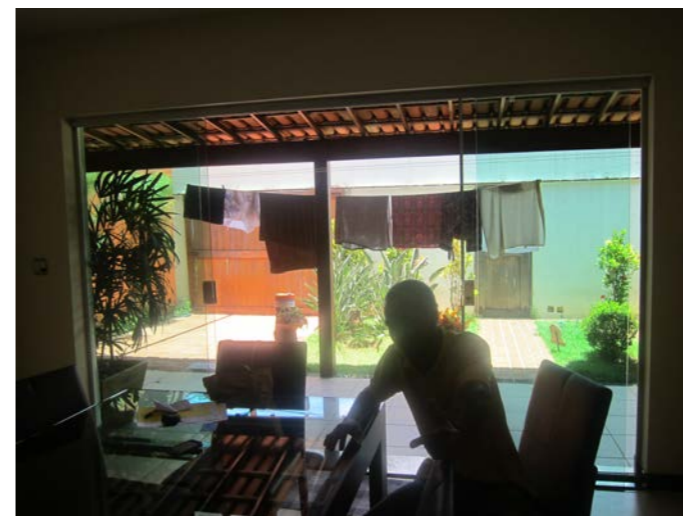
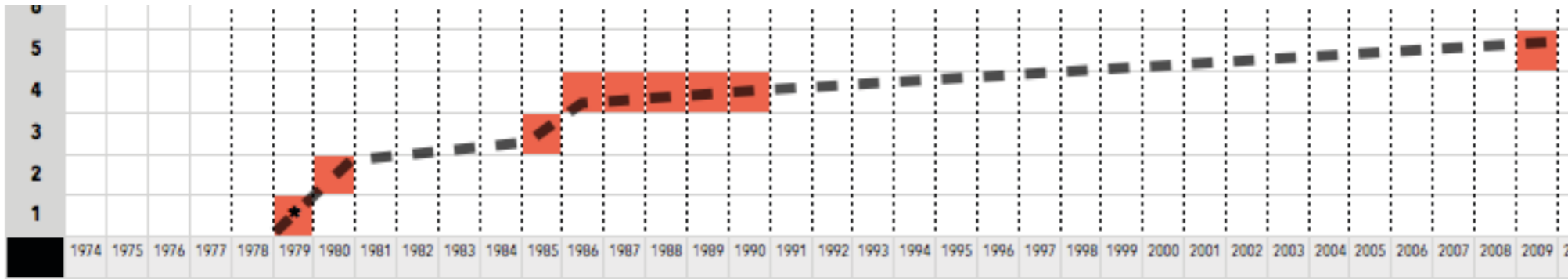
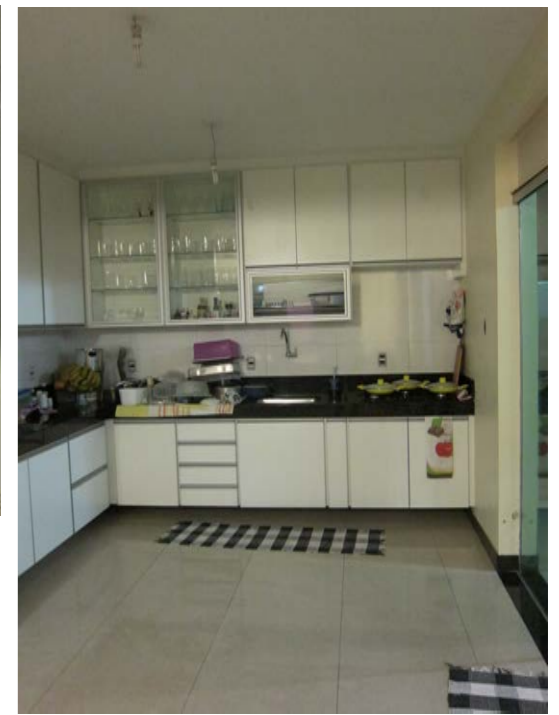
1	2001	Construction of wooden hut - two rooms and one bathroom
2	2002	Purchase of land, start the construction of the ground floor - living room, kitchen and bathroom, without finishings or windows
3	2005	Assembling of brick slab in the second floor, construction of walls with apertures, but no windows
4		Finishings, tiles and plaster on the ground floor (veranda)
5		Purchase and installation of metallic stairs connecting the upper floor to the rooftop
6		Construction of laundry on the rooftop, with concrete structure, asbestos roof and a tank





**OLIVER**

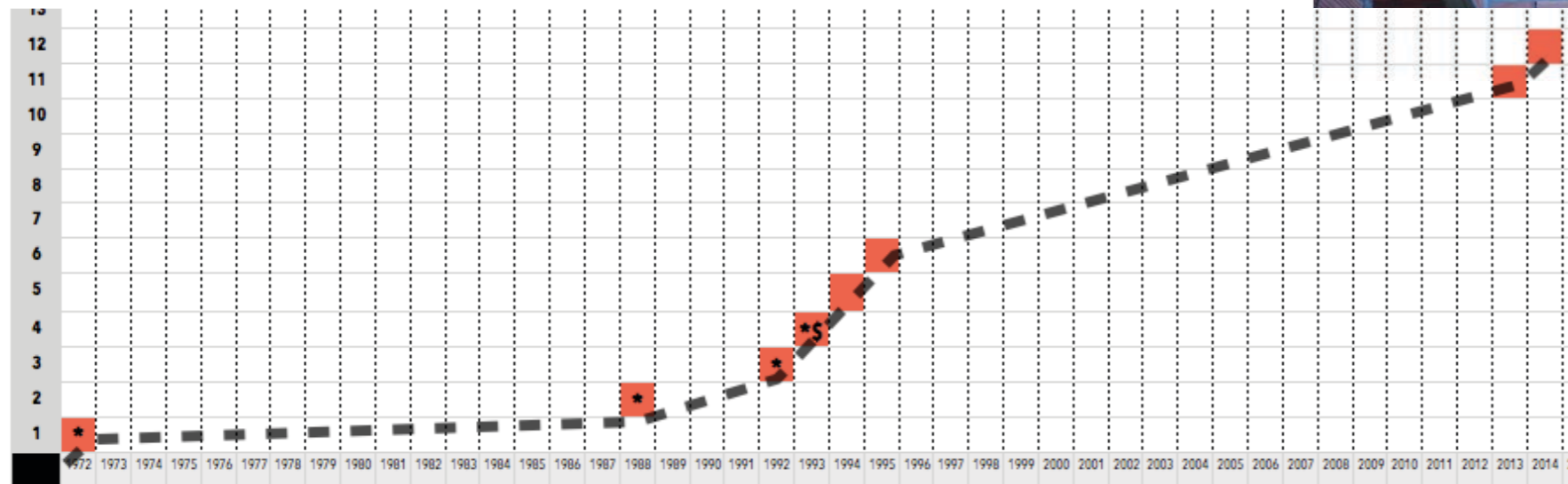
1	1979	Purchased of land
2	1980	Self-building of three rooms, initial embryo
3	1982	Moved in, but left in 1983.
4	1985	Construction of workshop in the back part of the plot.
5	1986-1990	Restarted the construction of the rest of the house
6	1990	Family moved back
7	2008-2009	Renovation of the house, construction of laundry and new bathroom.





**EDUARDO**

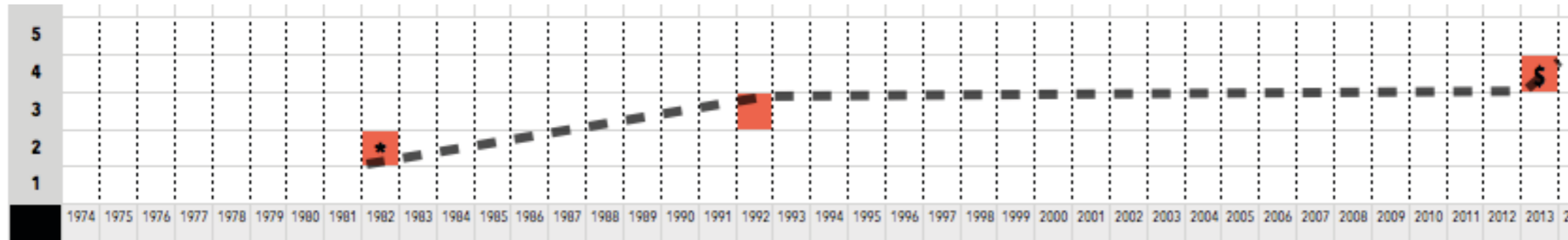
1	1993	Purchase half-plot
2	1993-1994	Construction of a ground floor (2 bedrooms, living room, toilet and kitchen) - walls, slabs, windows, front door.
3	1994-1995	Finishings and facing in the ground floor (tiles, painting, doors)
4		Construction of two rooms upstairs
5		Construction of garage and small shops in front
6	2013-?	Construction of rent house on the upper floor





**RENATA**

1	1982	Arrival, purchase of house
2	1992	First renovation, change of tiles and painting
3	2013	Second renovation - change of finishings, assembling of classroom, roof, drainage





**João**

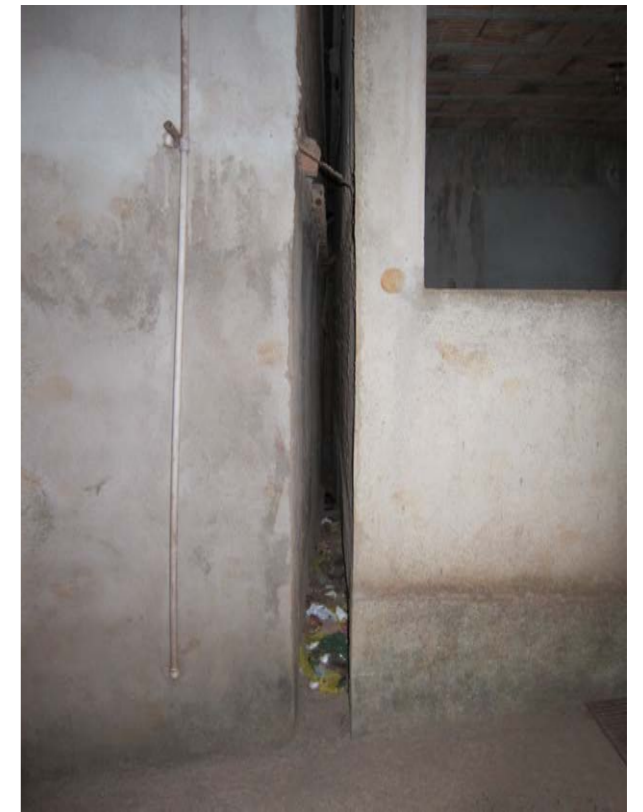
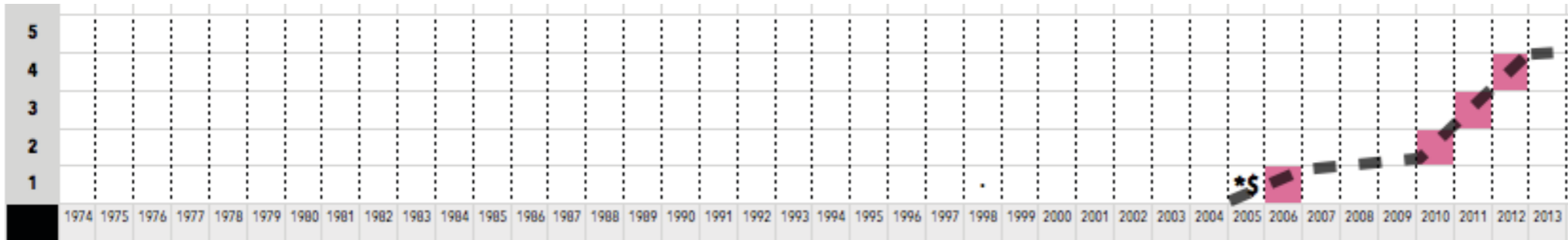
1	1985	Construction of hut in mother's plot
2	1985-1992	Construction of family house on the second floor of mother-in-law's house
3	2000	Purchase of half-plot
4	2002	Construction of first housing unit
5		Construction of second housing unit
6		Construction of third housing unit
7	2013	Construction fourth housing unit





**HUGO**

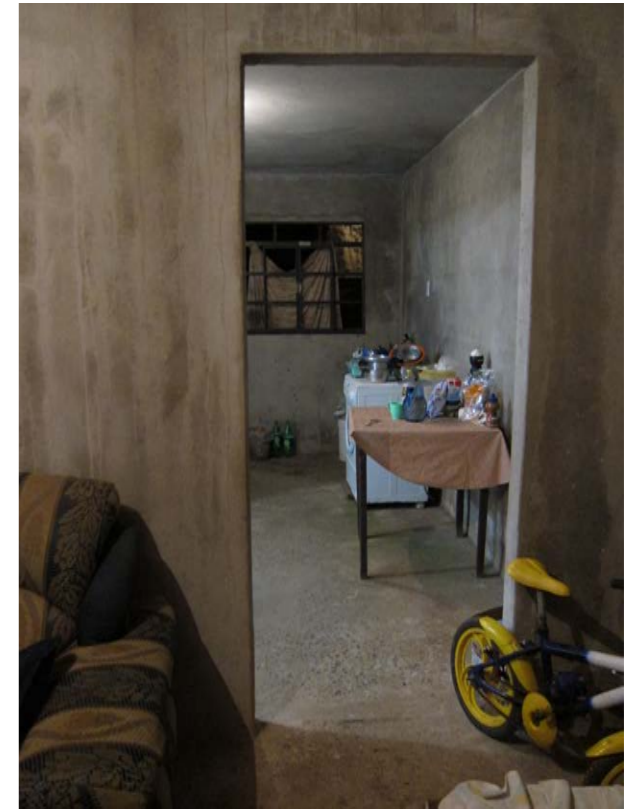
1	2005	Purchase of plot, start building
2	2005	Construction of ground floor - two rooms, living room, kitchen and toilet (without finishings)
3	2010-2012	Construction of upper floor - two rooms, living room, kitchen and toilet, with most finishings





**CARLOS**

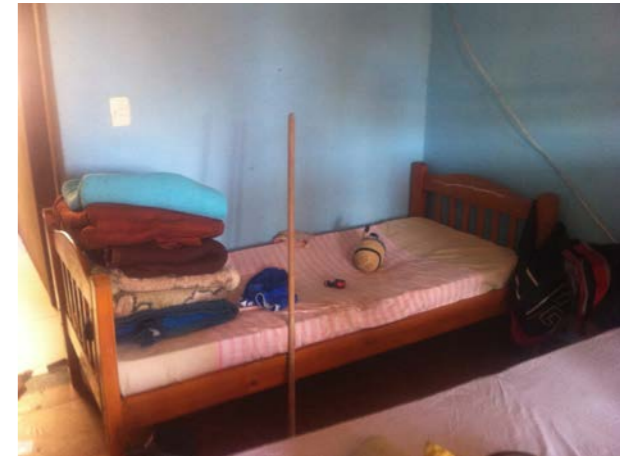
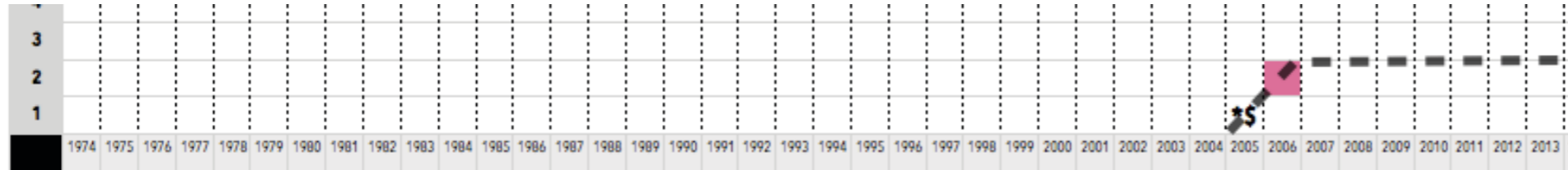
1	2005	Purchase of plot
2	2006	Construction of two rooms and toilet, plastered without painting
3	2008-2010	Improvement, construction of entrance hall and kitchen, plastered without painting
4	2013	Internal changes and kitchen ?





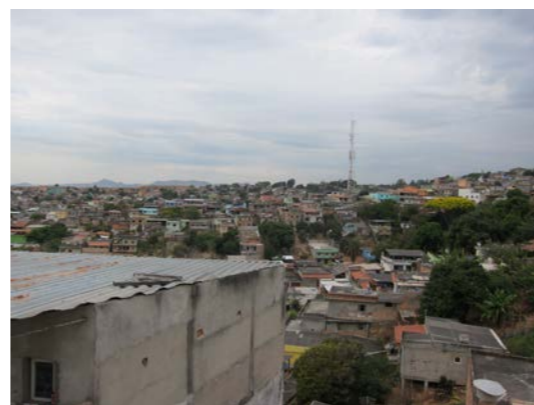
**Rosa**

1	2006	Purchase of plot
2	2007	Construction of all the house at once, without tiles but with painting





NIVEA





Data on building processes - arrival at neighbourhood, purchase and start of building process, initial general conditions, dreams and regrets, regularity							
Case Study	Arrival Purchase Building starts	Kick-start? When?	Loan? When?	How was the beginning?	Dreams, new ideas	Regrets and mistakes	Informal Condominium? Y/N  Regular plot? Y/N
Flavia	1974 1974 1974	Small heritage (1975)	Casa de Mariah (2004)	The mother first has exchange a small inherited plot in the periphery for the first family's house, with a living room together with kitchen and a dormitory, no fence, no division walls and a separate bathroom, outside the house. Close to this first embryo there were two old houses, which were bought by the family in 2000. In 2013, the family bought another house besides. In its place, one sister built a pizzeria.	To transform the roof top in a recreational space. This demands: to remove the clay tiles of the balcony and to install pre-assembled slabs; to remove the old asbesto roof from the rooftop; to use the old shingles to cover the new terrace; to install new metallic stairs between the garage and the house, to access the rooftop.	The balcony: the construction was very expensive and at the end, it has been scarcely used, since it is turned to the dominant wind. The excess of humidity soils the pieces and the view from below is ugly. They installed windows to control the wind, but the balcony remains misused.  To have hired Rodrigo* to build the stairs to the rooftop. He just disappeared.	Y (Flavia transformed a misused cellar into a small flat for rent. There are two families living in the same plot).
					To build a deposit for handcrafts made by one sister in the garage and maybe a beauty saloon.		
					To close the balcony with windows.		
					To enlarge the living room, which they consider is tight for their needs.		
					To demolish the old bathroom and to build a new one in a tidy corner of the kitchen.		
					To buy a new sofa for the living room and to take the old one to the rooftop.		
To change the water reservoir. They have only 250l for seven people and need more.							
Cintia	1975 1975+2009 1975	Reimbursement from the city (2009)	-	Around 1975, Cintia's family began to build an eight square meters single room, where seven people used to sleep. They have improved the house for a long time and it has risen to a three-floor building, where they lived until 2009. They came to be removed by the municipality and received a reimbursement. In three months they had to leave the building, to build a hut to move in. As some time ago Cintia's father had already bought the place where they are today and they had savings, they managed to quickly move in. In 2013, they have built a small condominium, with a bar and five housing units.	To finish all the building processes (dwelling n. 3, 4 and finishings in the bar) before the World Cup in 2014. She wants to make profit with the event, selling beverages and snacks during the games. The idea is afterwards to rent the bar and go for vacation for a long time, since she works without stop since when she was a kid.	Cintia does not appreciate that the building is not straight (because of the irregular shape of the plot, the construction presents breaks in the form). She says such irregularities make the house ugly. At the same time, Cintia's father comments that building straight would reduce building area.  She thinks if she could have built the bar smaller and another housing unit in the rest of the space, on the street level, as the shop.	Y (The family owns the grocery shop, three rented dwellings, besides the dwelling where they live).  N (Vila Fátima is considered an informal settlement. Its residents have no ownership titles yet).



**Data on building processes - arrival at neighbourhood, purchase and start of building process, initial general conditions, dreams and regrets, regularity**

Case Study	Arrival Purchase Building starts	Kick-start? When?	Loan? When?	How was the beginning?	Dreams, new ideas	Regrets and mistakes	Informal Condominium? Y/N  Regular plot? Y/N	
Levy	1993	Co-habitation	Construcard (2009)	In 2003 Levi's brother-in-law heard about a small piece of land on sale, very close to his place. He convinced Levi to buy it as an investment. The land had 170 m2 and after negotiating with the owner, it costed him R\$3.500 (R\$1.000 cash and the rest in six monthly payments). Levi never thought about building there to live, but decided to build for rent. He lives with his sister's family and plans to buy him an apartment in the formal city.	To work for about five years as an engineer and then to have his own construction company.	To have always believed and accepted what workers have told him.	Y (Levy built one building with 12 rented apartments distributed in three floors).	
	2004				To buy an apartment in the formal city.			
	2009							
Louis	born there		-	In 1998 the family bought the piece of land and started building an embryo of what they have today - a bar on the street level; the family house on the underground floor, which will be increased to a second underground floor. They plan to rent the last as a housing unit.	To buy a car.	Since the house is located in the underground in relation to the street level, he believed the house should not have been built so close to the street limit, because of infiltration problems. In his opinion, he should have left an empty space of one meter wide to separate the building from the soil.	Y (He has started to build another dwelling and has owned a rented shop)	
	1978				To build a slab over the backyard, behind the house, and to expand the shop.			
	1978				To build a new kitchen outside, where they are building the roof and to use the current kitchen as a dining room.			
					To transform the cellar into a small flat for rent.			
Nely	xxxx	Previous ownership	Construcard (2013)	Nely and her husband had a small house in the upper part of the <i>vila</i> and decided to sell it in order to buy the current lot, located in the lower part of the slum, at one of the entrance streets. They had to build the initial part of the new house very fast in order to move, since they needed to sell the old house to pay for the new one. This land was bought in 1998 and immediately they started building the house, step by step. The process never stopped and they have all the time shared the space as a building site. Besides the main building there is a garage, bought in 2001.	To finish the construction of the garage. Her husband wants to move back to the country side and live in a farm with the family.	He would like to have bought both plots at once and then to have built a single and direct concrete slab, covering both plots. The situation today is that the concrete slab of the house and of the garage are not on the same level.	Y (There is a small rented shop and besides the dwelling, garage, which might go for rent).	
	1998				Nely dreams to live in the formal city, to protect her daughters from drugs and other dangers.			He believes the family could have fewer but bigger floors.
	2001				To start a set of renovations: to have an extra bedroom; to have a bigger kitchen, a bigger bedroom. The main idea is to have the bedrooms all together in the second floor (see drawings).			To have bought tiles in a different color, not too dark.
		Co-			They did not paint the slab over their bedroom, because at that time the slab was very good made and did not need to be painted.	N (Vila Fátima is considered an informal settlement. Its residents have no ownership titles yet)		



Data on building processes - arrival at neighbourhood, purchase and start of building process, initial general conditions, dreams and regrets, regularity							
Case Study	Arrival Purchase Building starts	Kick-start? When?	Loan? When?	How was the beginning?	Dreams, new ideas	Regrets and mistakes	Informal Condominium? Y/N  Regular plot? Y/N
		habitation			To build a new staircase.		
Carlota	2001	Co-habitation	Construcard (2005)	The family arrived in 2001 and went to live in a wooden hut, arranged by Carlota's brother-in-law, close to his house. They lived so for one year before buying the piece of land where they are today settled and quickly started to build.			N
	2002						N (Vila Monte São José is considered an informal settlement. Its residents have no ownership titles yet).
	2002						
Oliver	1980						N
							Y
Eduardo	1993	Loan from Military Police	Employer (1993)	Eduardo bought himself the first house at Neves, in a COHAB project. After a while, he sold it, bought a house in Estrela Dalva, and again sold it to finally come back to São Joaquim, where he lived for some time in his childhood. He bought the current plot empty and start to build in 1993.	His wife wants to see the enterprise completely finished, with good furniture.  “(...) to enjoy the life, to travel, to make vacation, you know, to know that we do not need to invest in building anymore, to go for vacation, to think about having a small car (...)”	A beam was built very low. People can hit their heads.	Y (Eduardo built two renting houses besides his one, two small shops and a garage).
	1993	Co-habitation					Y
	1993						
Renata	1982		Construcard (2013)	Renata came to live in São Joaquim with her husband. They bought the plot and received a standard architecture project for a house, which they built exactly as the project. After some time her husband got sick and they came to improve the house only in 2013.	Maybe to sell the house and buy herself a small apartment.  To plant flowers and vegetables.		N
	1982						Y
	1982						
João (2)	born there	Co-habitation	-	João has lived in São Joaquim since he was born and was dating her wife when she got pregnant. Both were very young and his mother allowed them to build a small hut in a corner of her plot. Afterwards they built a definitive house on the second floor of his mother-in-law's house. Years later he started to build for rent.	To finish the construction of the last renting flat.  To build a shop on the free space in the front.  On the shop to build one more flat with two rooms.		Y (Plot is shared among family members. There is a two store house, total two housing units).
	1986						Y
	2000 2002						Y (João built two two-stored houses , total four housing units, all for rent)



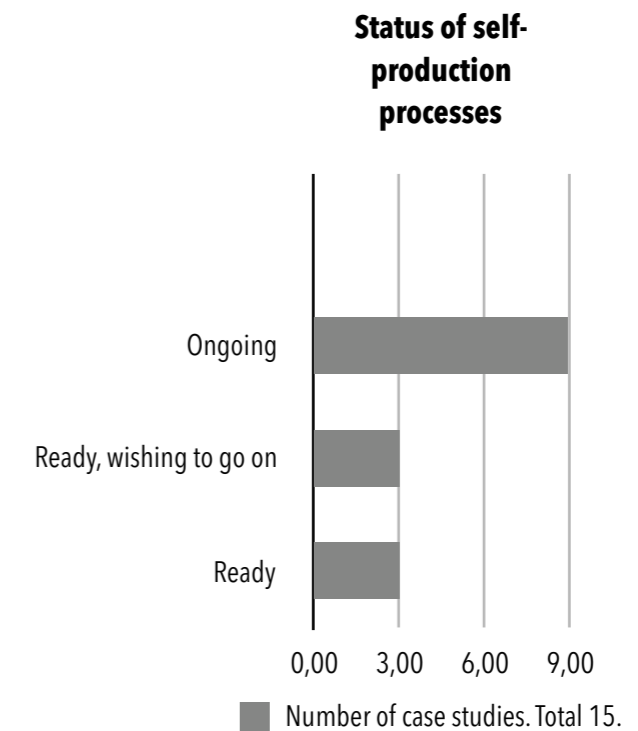
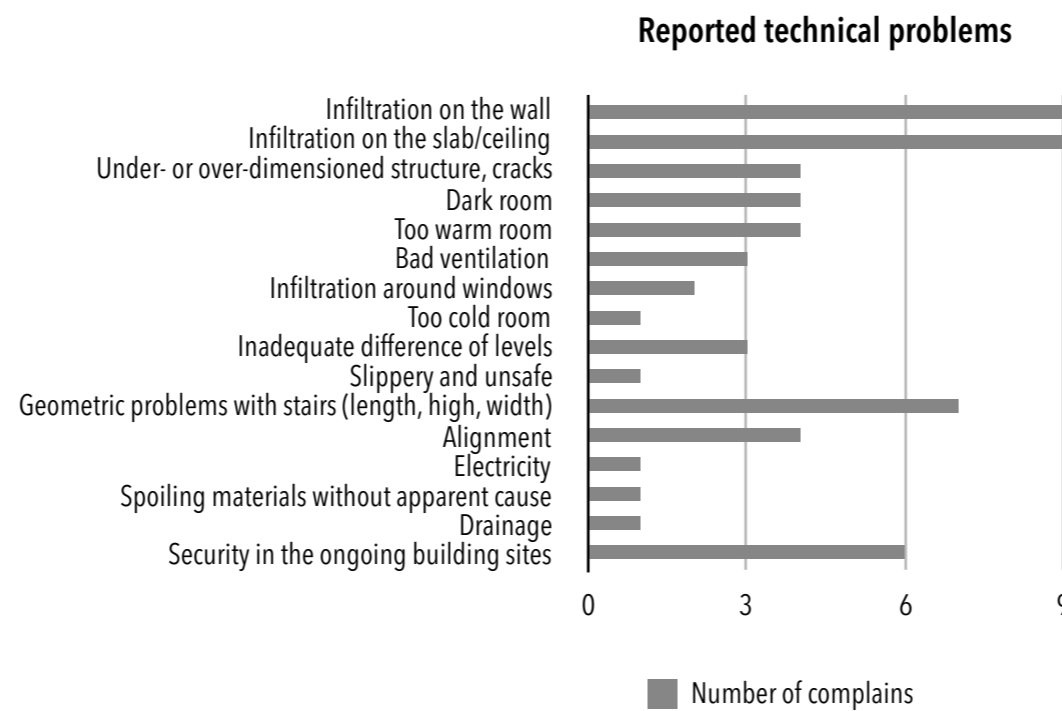
**Data on building processes - arrival at neighbourhood, purchase and start of building process, initial general conditions, dreams and regrets, regularity**

Case Study	Arrival Purchase Building starts	Kick-start? When?	Loan? When?	How was the beginning?	Dreams, new ideas	Regrets and mistakes	Informal Condominium? Y/N  Regular plot? Y/N
Nivea	1975	Co-habitation on same plot	-	Nivea's father bought a plot at Pindorama when she was five years-old. They lived in a hut with two rooms made of bricks and another two made of wood. He started renting part of rooms to neighbors and so started building the first house down in the plot. Today the plot is occupied by seven housing units, shared among her siblings.			Y (The plot is shared among seven family members. Each one has build his own dwelling).
	1975						
	1975						Y
Hugo	1998	Co-habitation	Construcard (2005)	Hugo had some savings, which were not enough to buy a whole plot. He decided than to share the purchase and the area with his brother and brother-in-law. They established a small horizontal condominium.	Her wife wants downstairs finished and good furniture.	<i>"I would rather have increased my kitchen. I always wanted to have a huge kitchen, huge. I dreamed with a kitchen like, with a huge sink, a big bench. (...) The kitchen is not how big I wanted. But then, it does not justify to have two kitchens, right? The only thing, only the kitchen, right, that I would like to have it much bigger."</i>	Y (The plot is shared among three family members. Each one has build his own dwelling)
	2005				<i>"(...) I want to choose the tiles. I will see what I am going to install. I will install also... everything fitting, the washing machine, the sink. I also want a little table, a little bench, because I want to have a small grill downstairs as well, do you understand?"</i>		
	2005				The bedroom for the boy.		
					The living room on the ground floor.		
	The laundry organised outside.						
	<i>"I will do now, I will disassemble it (the roof) and to use wood to have a rustic style, do you understand? I will take the steel out, because I did it as provisory. I will change everything for wood. I will leave all rustic".</i>						
Carlos	2000	Co-habitation	Construcard (2006)	Convinced by his brother, he took part of the horizontal condominium. He did not have enough money immediately, but the group convinced the plot's owner to pay cash the biggest part and then to divide the rest of the payment in three months.	To build a second floor.		Y (The plot is shared among three family members. Each one has build his own dwelling)
	2005				<i>"I think about something better for my kid. Because my life was not easy. I want something much better for him."</i>		
					<i>"(...) to work in the kitchen at the end of the year".</i>		



Data on building processes - arrival at neighbourhood, purchase and start of building process, initial general conditions, dreams and regrets, regularity							
Case Study	Arrival Purchase Building starts	Kick-start? When?	Loan? When?	How was the beginning?	Dreams, new ideas	Regrets and mistakes	Informal Condominium? Y/N  Regular plot? Y/N
	2006						Y
Rosa	1998 2005 2006	Loan from employer	Employer (2005)	Rosa and her ex-husband desperately needed to stop paying rent, but did not have enough money to pay for the plot, located besides her brother. Her employer lent her the money to be paid in four months.	"(...) in the future my house will be on the second floor".	"If I could do it again today, I would build here one living room, one kitchen and the rest on the second floor. (...) Because then we would have more space for the kids to play, understand?"	N
					To build three bedrooms upstairs.		Y
					To finish the kitchen - panelling, tiles, painting, installing cabinets and buying a new table.		

- Vila Fátima
- Vila Monte São José
- São Joaquim
- Pindorama
- Jardim Canadá





### Technical problems, causes and resolutions

current technical problems, hypothetic causes and solutions given by informants themselves

preventive actions taken by informants, who have previewed future problems themselves

situations that can cause future problems, not noticed by informants

current technical problems not noticed or not reported by informants

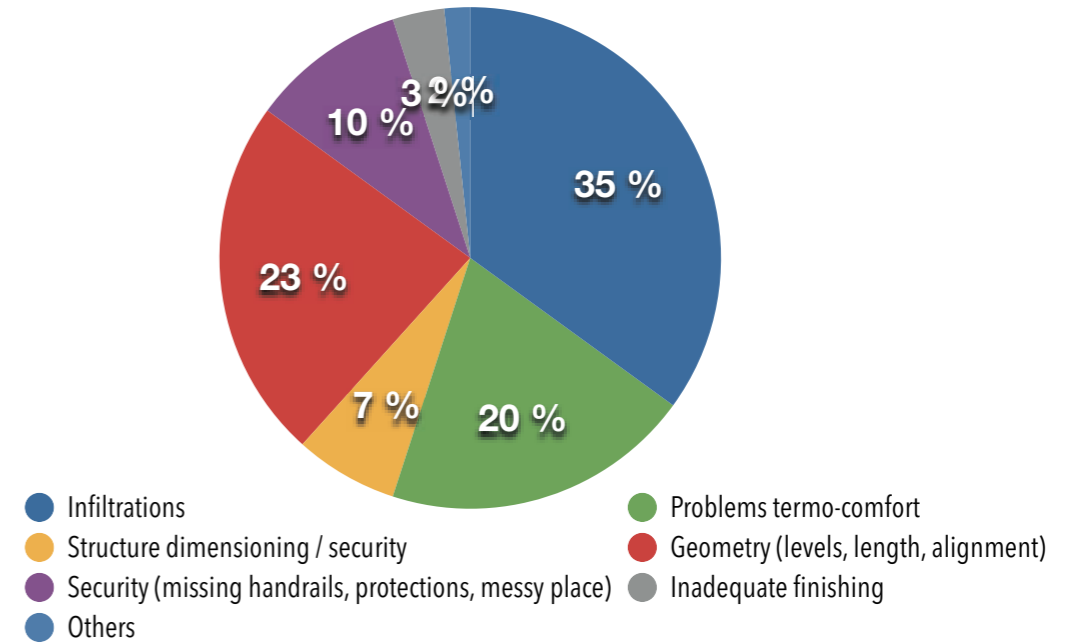
#	Problem	Cause	Resolutions (made (x) or intended)	
				Status
1	Ceramic shingles accumulated dirty, mould and are too humid, presenting infiltrations.	Inadequate inclination of ceramic roof.	To remove ceramic shingles and wooden structure. In its place, to assemble a new ceramic bricks slab as a continuation of the existent slab.	
2	Balcony is too windy and cold, rain water comes inside with the wind.	The house is located on a very high spot and the side where the balcony is located is too exposed to the dominant wind. There are no obstacles or any protection.	To install windows, closing the balcony. The windows would be made of glasses panels without frames.	
3	There are short steps (+-2cm) between rooms.	Rooms were built in different moments, possibly by different workers.	To fill the level difference with plaster and reassembling of tiles	
4	Infiltrations on bathroom's walls	The bathroom has no windows.	To remove the tiles from the damaged areas. To paint the affected spots. In the future - demolish the bathroom and build it somewhere else.	x
5	Bathroom is too dark	Tiles present a very dark colour and heavy texture.		
6	A big crack on the wall of one of the bedrooms.	Infrastructure work close by has damaged the structure of the house because of geological movements.	-	
7	Very dark and slippery kind of stone was installed on one bedroom's floor.	It was the cheapest option.		
8	Infiltration spots in one bedroom, on the ceiling and on the superior part of the walls.	The slab on the bedroom is not covered or adequately protected against rain water.		
9	Infiltration spots in the dinning room, under the ceiling and on the superior part of the walls.	The rain water penetrates in a small gap between two separate concrete slabs. They were built in different moments.	To paint the walls with a "grafiatto", a kind of texture for walls, which is more able to hide the infiltrations, because it is thicker.	
10	Infiltrations on the walls, under the windows	There are no sills to conduct the rain water to outside. The water passes through the window frame, dripping inside the house.		
11	Infiltrations in the garage, under the ceiling.	The slab is not covered or adequately protected against rain water. The slab presents a depression where rain water accumulates about 5cm deep.		

Flavia



Cintia	12	The internal stairs present too high and too tidy steps.	The minimum high and length necessary to locate the stairs were not correctly calculated.			
	13	People hit their heads on the upper slab when they leave the stair to enter in the living room.	The minimum high and length necessary to locate the stairs were not correctly calculated.			
	14	The stair presents no landing, which is as deep as a normal step.	The minimum high and length necessary to locate the stairs were not correctly calculated.			
	15		The rooftops of the house and of the garage are not located in the same level. The difference is about 30cm.			
	16	Feeling of insecurity when walking on the stairs up.	There are no handrails or protections.			
	17	The dwelling's walls which are located on the limit of the plot are are lopsided, not straight.	Plot's geometry is irregular and the construction followed it in order use the maximum of available space.	Keep building in the limit of the plot, accompanying the irregularity of its geometry.		
	18			Part of the first floor will remain uncovered for some time. The slab presents some inclination and will be protected only with asphalt layers. Risk of infiltrations is present.		
	19		The house on the second floor is covered with pre-fabricated slab. On the top the dweller used a thicker layer of concrete to level it and also asphalt layer.	The house might be too warm, because of the thick layer of concrete together with the asphalt layer and small windows. Maybe the condition will be not so bad because the house is located in a high spot, where there is a lot of wind.		
	20	The first dwelling unit that was firstly built, in the under ground floor, presents lots of mould spots on the walls.	The house is located in the underground floor. Very probably the walls were built directly facing the soil.			
	Nely	21	Infiltrations on the walls, inside some bedrooms.	The house is located on a high spot and this side is too exposed to wind and rain. There are no obstacles or any protection.		
22		There is a difference in level between the upper slabs of the house and of the garage.	House and garage were built in different moments, possibly by different people.			
23		Roof presents infiltrations.				
24		Infiltrations under the windows	There are no sills to conduct the rain water outside.			
25		Handrails were not installed yet.	The priority was to finish the basic - concrete structure, external and internal walls, electric and hydraulic parts.			

Summary Technical Problems



Comparisons population, area, cities, Architecture faculties and number of architects.

	Brazil	Minas Gerais	Belo Horizonte Metropolitan Area
population	206.081.432	20.997.560	5.873.841
area (Km <sup>2</sup> )	8.515.767.049	586.522.122	9.467.797
total number of cities	5.570	853	34
number of Architecture faculties	466	50	11
number of cities with at least one Architecture School	210	31	2 (BH and Santa Luzia)
number of architects	83.754		

Sources: IBGE, 2016; ABEA, 2015; CAU/BR, 2012.



Levy	26	Building site was very confusing, messy and dangerous. There were rests of steel and shards of bricks everywhere. On the last rooftop there were no protections or handrails.			
	27	Infiltration on the ceiling of the first floor.	The concrete slab had no protection for six months.		
	28	External wall gets wet when it rains a lot.	The building is located on a high spot and one side is too exposed to wind and rain. There are no obstacles or any protection.		
	29	A whole brick wall fell down twice on the neighbours's house.	On the first time, the wall was assembled without any structure to frame it. On the second time, pillars had been built, the beam was not yet there. The frame was incomplete.		
Louis	30	Infiltrations in the underground floor, on the front walls.	The public water pipe lines pass very close to the front wall and sometimes they split.		
	31	The concrete structure of the new addition is over dimensioned. Six concrete pillars were built in a row of in less than 10m.	Because there is no calculation, people are used to over dimension the structures to assure some security.		
	32	Building site was very confusing, messy and dangerous. There were rests of steel and shards of bricks everywhere.			
Oliver	33	Tiles were installed lopsided, not perpendicular to the bordering walls.	The bricklayer did not notice that the tiles were lopsided.	The bricklayer had to re-do the work.	x
Renata	34		The new addition (classroom) was built along the sided division wall and there were no windows previewed in the front part.	To install a window on the division wall, opened to the neighbour, to assure illumination to the classroom.	x
	35	A very strong wind took the old asbestos roof out. Like a hand-glider it flew away.	It was not correctly installed.	To repair the old roof. To build a new one, also using ceramic shingles, larger in front, to form a porch.	x
	36	The tiles of walls and floor from the rooms and kitchen are too dark.	They were the cheapest options at that moment.		
	37	Floods are frequent. The water drains from the public piping into the plot through the house piping and the part of the rain water stays in the plot.	The street level became higher than the house level, because the street received diverse layers of pavements. The public piping is congested. The public water piping systems has defects.	To build a water reservoir to collect rainwater to liberate the piping.	x
	38	Infiltration on the base of the walls. Painting fell down and bricks started to fall apart.	Soil is very humid, because of the frequent floods and ground water.	To re-build the base of the walls with new bricks.	x
	39	Even when installing the tiles correctly, at some point they start to look like as they were lopsided.	The internal walls of the house are not straight.	To use a thick layer of plaster, to eliminate the difference. Then to paint again.	x

### Numbers on field

case studies	15
informants	13
households	4
mix use (households and income source)	9
enterprises (real state - rental flats)	2 (João and Eduardo)
residents	53
children < 10 years old	10

### Irregular residential buildings in Belo Horizonte until 2012.

Estimation of number of permanent households (considering household = dwelling)*	781.189
Number of regular dwellings (architecture projects were approved by the municipality, dwellers have or not occupation license)**	210.516
Number of irregular dwellings (without any approval by the municipality)**	551.620
<b>Percentage of irregular residential buildings (%)***</b>	<b>70,6</b>

\*Cidades IBGE, 2010. \*\*Prefeitura Municipal de Belo Horizonte, 2017c; \*\*\* Estimated by the author, 2017.

### Distribution of permanent households in BH, according to the material of external walls

plastered masonry	687.343
not plastered masonry	72.743
timber	786
recycled timber	231
straw	12
plastered mud	73
not plastered mud	52
others	895
Total	762.136

Sources: IBGE, 2016; PBH, 2017



	40	The internal walls present saliences and are not straight.	Builders were not proper bricklayers.	To use a thick layer of plaster, to eliminate the difference. Then to paint again.	x
	41	A very low roof might make the room too warm.	The new roof to cover the classroom must be installed lower, fit under the existent roof.	To use thermo-isolation in the new roof.	x
	42	People hit their heads on the concrete beam that supports the concrete slab, when they leave the stair to enter in the garage.	The beam is too high.		
Eduar - do	43		Since there are three dwellings, two small shops and a garage in a half plot of 180m2, there is a risk of compromising ventilation and illumination conditions of the rooms.	To leave an internal yard, which assures good ventilation and illumination to all dwellings.	x
	44	Rooms are dark and seem stuffy.	Windows are too small. They were bought in a second-hand shop, very cheap.		
João	45		Rainwater might wet the free concrete slab, on the open part of the first floor.	To cover the open part of the first floor with metallic roof.	x
	46	Steps are very high.	Informant used ceramic bricks as measure for the high of a step, when assembling a stair.		
	47		The displays of water and electricity consumption should be accessible to the inspectors.	Small holes in the front wall directed to the electric and water measurement display.	x
Hugo	48		The rain water might penetrate in the small gap between two constructions.	To leave a narrow free space between his house and the house of the neighbour, for them not to be skintight.	x
Carlos	49	House is too warm.	Asbestos roof.		
	50	Infiltrations on the ceiling.	The concrete slab had no protection and remained uncovered for a while.	To install a roof. She chose ceramic shingles.	x
Rosa	51	Mould on the kitchen walls, under and by the sink.	The baseboard was not installed.	To install a baseboard soon.	
	52	Lamps are blowing very often.	The wires are very loose.		
Carlota	53	The ground floor had many infiltrations in the beginning.	The covering slab had no protection against rainwater.	They built the first floor and covered part of it with a metallic roof.	
	54	One stairs present too high risers and too short treads and do not occupy the complete empty space. There is a rest of space with no use.	The minimum high and length necessary to locate the stairs were not correctly calculated, the wide of the stairs either.		
	55	Very low concrete beam above the first steps of another staircase.	The form of the stairs are not adequate for the available space they had.		

**Climate information**

	Belo Horizonte	Berlin
Average precipitation (mm)	1430	570
Average temperature (°C)	20,5	9,1
Relative humidity (annual average)	around 70%	around 80%

**About Horizontal Condominiums**

total case studies	15		
only the family home	4	Renata, Carlota, Rosa, Carlos.	
informal condominiums	11	Flavia, Cintia, Levy, Nely, Louis, Oliver, João (I and II), Eduardo, Nivea, Hugo.	
only residential use	5	Flavia	Family home + 1 small rental flat
		Levy	12 rental flats
		João I	Family home + mother-in-law's home
		João II	5 rental flats
		Hugo	Family home + 1 small rental flat
mixed use	6	Cintia	Bar + family home + 4 renting housing units
		Nely	Family home + 1 small rental shop
		Louis*	Family home + rented bar + rented garage
		Oliver	Family home + workshop behind the house
		Eduardo	Family home + 2 small rental shops + 2 rental apartments
		Nivea	Family home + professional kitchen + 6 owned housing units



**Nivea**

56		Because of the high inclination of the plot, it is a slope, it might occur landslides.	The plot was occupied gradually, from the lower part to the upper part, through small plateaus boarded by retaining walls. On each plateau each housing unit was built.	
57	The house had many leaks.	The bricklayer applied many plaster layers, believing to protect the slab against rainwater. There were many small holes and gaps and the water came inside.	They had to remove all cement layers, which were very thick and to install an asbestos roof, to protect the slab against rainwater.	
58		As the inclination of the land is high, the water might comes from the street, will drain to the back part of the plot and might accumulate at some point.	A private rainwater network was built in order to receive the water and conduct it properly through drains and from them to the public network.	
59	Tiles get very quick spoiled.	Tiles were too cheap.	To change them to better quality ones.	

## Informants' socioeconomic aspects

	informants + family members (age group)	main occupation	side occupation	educational level	place of birth, origin	family's dwelling as an extra income source?
Flavia	Flavia (30-40)	public teacher, school director	-	Master Degree (Education) and 2 Bachelors (Education and Business Administration)	Belo Horizonte	Small flat was built for rent, occupying the slope, under the house.
	sister (40-50)	sanitary agent	handicrafts producer	secondary (night school)	Belo Horizonte	
	mother (>60)	housemaid	-	probably only first years of school	Aimorés	
	daughter (5-10)	student	-	attending school	Belo Horizonte	
	son (<5)	student	-	goes to nursery	Belo Horizonte	
	nephew (10-20)	student	-	attending school	Belo Horizonte	
Cintia	Cintia (40-50)	small entrepreneur (grocery shop) (before has worked as baby-sitter, housemaid, delivery-girl, secretary, pharmaceutical industry worker)	-	?	Dionisio (Region)	Three dwellings for rent.
	mother (>60)	housewife, retired?	-	probably only first years of school	Dionisio (Region)	
	father (>60)	retired (before has worked as cleaner, doorman, industry worker, swine breeder)	cattle breeder	probably only first years of school	Dionisio (Region)	
Nely	Nely (40-50)	self-employed cleaner	-	secondary	small town close to Campo Azul	In the future they plan to rent the garage. (?)
	husband (50-60)	person in charge (building site)	-	third year of elementary school	Campo Azul	
	daughter (10-20)	secondary student	formal job in a shop	attending school	Belo Horizonte	
	daughter (10-20)	student (eighth grade of elementary school)	informal job (manicure)	attending school	Belo Horizonte	
	niece (10-20)	student (secondary)	formal job in a shop	attending school	Belo Horizonte	
	brother (30-40)	doorman	student (university - Electric Engineering)	on going Bachelor	small town close to Campo Azul	
	brother (Levy)	small entrepreneur (furniture shop)	student (university - Civil Engineering) and real state entrepreneur	on going Bachelor	small town close to Campo Azul	
Levy	Levy (30-40)	small entrepreneur (furniture shop)	student (university - Civil Engineering) and real state entrepreneur	on going Bachelor	small town close to Campo Azul	AS MAIN OR VERY IMPORTANT INCOME SOURCE
Louis	Louis (30-40)	unemployed, before ?	self-builder		Belo Horizonte	Snack-bar on the ground floor is rented.
	mother (50-60)	housewife				



<b>Oliver</b>	Oliver (50-60)	self-employed master builder, before lathe operator	-	technical level		Possibility of renting the space on the upper floor and the workshop at the back of the plot.
	wife (50-60)	public teacher	-	Bachelor in Education		
	son (10-20)	student (secondary)	-	attending school	Contagem	
<b>Renata</b>	Renata (50-60)	retired as public teacher	self-employed supporting private teacher, cosmetics seller	secondary	Mutum	Classroom for supporting classes.
	daughter (20-30)	student (university - Land Surveying Engineering)	self-employed supporting teacher	Master Degree (Geography), on going second Bachelor (Land Surveying Engineering)	Belo Horizonte	
<b>Eduardo</b>	Eduardo (50-60)	retired as policeman	real state entrepreneur	secondary	Belo Horizonte	Two dwellings for rent, small snack shop and small boutique.
	wife (50-60)	housewife	-			
	son (10-20)	student	-	attending school (secondary)	Belo Horizonte	
<b>João (home)</b>	João (40-50)	painter, before security guard	self-employed security guard, self-builder, real state entrepreneur	elementary school	Contagem	-
	wife (40-50)	industrial tailor, before housewife	-		Contagem	
	son (20-30)	public employee	-	secondary	Contagem	
	son (10-20)	attendant at mobile phone shop	-	secondary	Contagem	
<b>João (flats)</b>	João (40-50)	painter, before security guard	self-employed security guard, self-builder, real state entrepreneur	elementary school	Contagem	AS MAIN OR VERY IMPORTANT INCOME SOURCE
<b>Hugo</b>	Hugo (30-40)	attendant at building material shop	self-employed delivery-boy	elementary school	Água Boa	Small dwelling for rent.
	wife (30-40)	stone modeler at marble stone shop	-	uncompleted secondary	Água Boa	
	daughter (10-20)	student	-	attending school	Nova Lima	
	son (5-10)	student	-	attending school	Nova Lima	
	daughter (5-10)	student	-	attending school	Nova Lima	
	daughter (<5)	-	-	goes to nursery	Nova Lima	
<b>Carlos</b>	Carlos (30-40)	building material shop	-	not completed secondary	Água Boa	-
	son (5-10)	student	-	attending school	Nova Lima	
<b>Rosa</b>	Rosa (30-40)	formal job (cleaner)	self-employed cleaner, manicure	not completed secondary, technical course (manicure)	Água Boa	-
	daughter (10-20)	student	-	attending school	Nova Lima	
	daughter (5-10)	student	-	attending school	Nova Lima	

<b>Rosa</b>	daughter (<5)	-	-	goes to nursery	Nova Lima	
	son (10-20)	student	-	attending school	Nova Lima	
	son (5-10)	student	-	attending school	Nova Lima	
	son (<5)	-	-	goes to nursery	Nova Lima	
<b>Carlota</b>	Carlota (50-60)	baby sitter	-		Ataléia	
	husband (50-60)	doorman	-		Ataléia	
	mother (>60)	minimum wage retirement?	-		Ataléia	
	daughter (20-30)	employee of a radio	-	secondary	Ataléia	
<b>Nivea</b>	Nivea (40-50)	nurse	self-employed depilator, baker, cosmetics consultant	Bachelor in Nursery, technical courses (Waxing and Cosmetics)	Belo Horizonte	New kitchen on the upper floor exclusive for baking.
	husband (40-50)	autonomous construction worker	-			
	son (10-20)	student	-		Belo Horizonte	
	son (10-20)	student	-		Belo Horizonte	
<b>Total</b>	<b>0-10</b>	<b>10-20</b>	<b>20-30</b>	<b>30-40</b>	<b>40-50</b>	<b>50-60</b>
<b>53</b>	<b>10</b>	<b>11</b>	<b>3</b>	<b>8</b>	<b>8</b>	<b>9</b>

From 15 families, nine came from the countryside (the informant him/herself or one generation immediately before).

From nine, eight come originally from the same region (North / Northeast MG): municipalities of Aimorés, Água Boa, Campo Azul, Mutum, Ataléia, Dionísio. All informants who came from the countryside, were used to work with agriculture and cattle in their hometowns.



Control of sources in field - ONLY CASE STUDIES

Neighborhood	Case study	Visits	Audios	Photos	Videos	Indirect Speeches	Transcripts	Sketches	Notes
Vila Fátima	Flávia	05.03.2013	X	X	X	X	X	X	X
		29.08.2013	X	X		X	X		
		02.10.2013	X	X		X	X		
		24.10.2013			X		X		
		16.11.2013		X	X		X		
	Cíntia	03.09.2013	X	X	X	X		X	X
		02.10.2013	X	X		X			
		24.10.2013		X	X				
		16.11.2013		X	X				
	Nely	02.09.2013	X	X	X	X		X	X
	Levy	07.09.2013	X	X	X	X		X	X
		24.10.2013		X	X				
		21.11.2013	X	X	X	X			
	Louis	07.09.2013	X	X	X	X		X	X
		02.10.2013	X	X	X	X			
			06.11.2013		X				
<b>16 VISITS</b>									
São Joaquim	Oliver	15.09.2013	X	X			X	X	X
		19.11.2013	X	X			X		
	Renata	20.09.2013	X	X	X		X	X	X
		19.11.2013	X	X			X		
	João (2)	20.09.2013	X	X	X		X	X	X
		24.10.2013	X	X			X		
	Eduardo	24.10.2013	X	X	X		X	X	X
<b>7 VISITS</b>									
Jardim Canadá	Hugo	26.08.2013	X	X	X		X	X	X
	Carlos	30.08.2013	X	X			X	X	X
	Rosa	26.09.2013	X	X	X		X	X	X
<b>3 VISITS</b>									
Pindorama	Nivea	17.09.2013	X	X	X		X	X	X
<b>1 VISIT</b>									
Vila M. São José	Carlota	22.09.2013	X	X	X		X	X	X
<b>1 VISIT</b>									
<b>28 visits</b>									

Summary of working relations

	For the informant, was the manpower mentioned as the main problem of self-production?	Did the informant help with manual labor on the building site?	Did the informant hire manpower to work on weekends?	Had the informant friends working on the building site for free?	How and when did informants pay the manpower?	Has the informant done working contracts with building site workers?
Flavia	Y	carried bricks	Y	for the slab	the whole work, after finished	Y
Cintia	N	N	Y	for the slab	by week	Y
Nely	N	husband did foundations and walls	Y	for the slab	diverse	not mentioned
Levy	Y	foundations, hydraulic pipes from outside	not mentioned	not mentioned	diverse	Y
Louis	N	works as the helper of the master builder (a bit of everything)	N	Y	the whole work, after finished	not mentioned
Oliver	Y	a bit from everything except painting	N	N	depend on the worker - by day, by week or the whole work	Y
Renata	Y	N	N	N	the whole work, managed by Oliver	Y
Eduardo	N	works as a helper (did a bit of everything)	N	Y	diverse	N
João	N	everything	N	Y	he did most of the work himself	not applicable
Hugo	Y	foundations, water pipes	not mentioned	Y	by week	N
Carlos	N	N	N	Y	diverse	N
Rosa	N	husband built concrete structure on the front, helped bricklayers and painted	not mentioned	Y	diverse	N
Carlota	N	husband worked as a helper (did a bit of everything)	not mentioned	Y	diverse	
Nivea	Y	carrying building materials, checking manpower, a bit of all	not mentioned	not mentioned	diverse	