

V.
CERRADO

ETH Studio Basel
Contemporary City Institute
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Autumn Semester 2013

V. CERRADO

CULTIVATION & URBANISATION

EXPORT TRADITION
Large Scale and Small Scale

BETWEEN TRADITION & MODERNISATION
Family Farming & Dairy Farming
Support Structures

FEEDING THE CITY
Vegetable Farming
Centralised Supply System

LAND IN TRANSFORMATION
Industry
Housing

ADAPTING IN BORDERLAND
The Green Desert
Housing - The Gift and the Curse
Bigger Production same Space

UNPRODUCTIVE LAND

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— Cerrado —

— Topic Map —

Cerrado

0 5 10 20km

— V.2 —

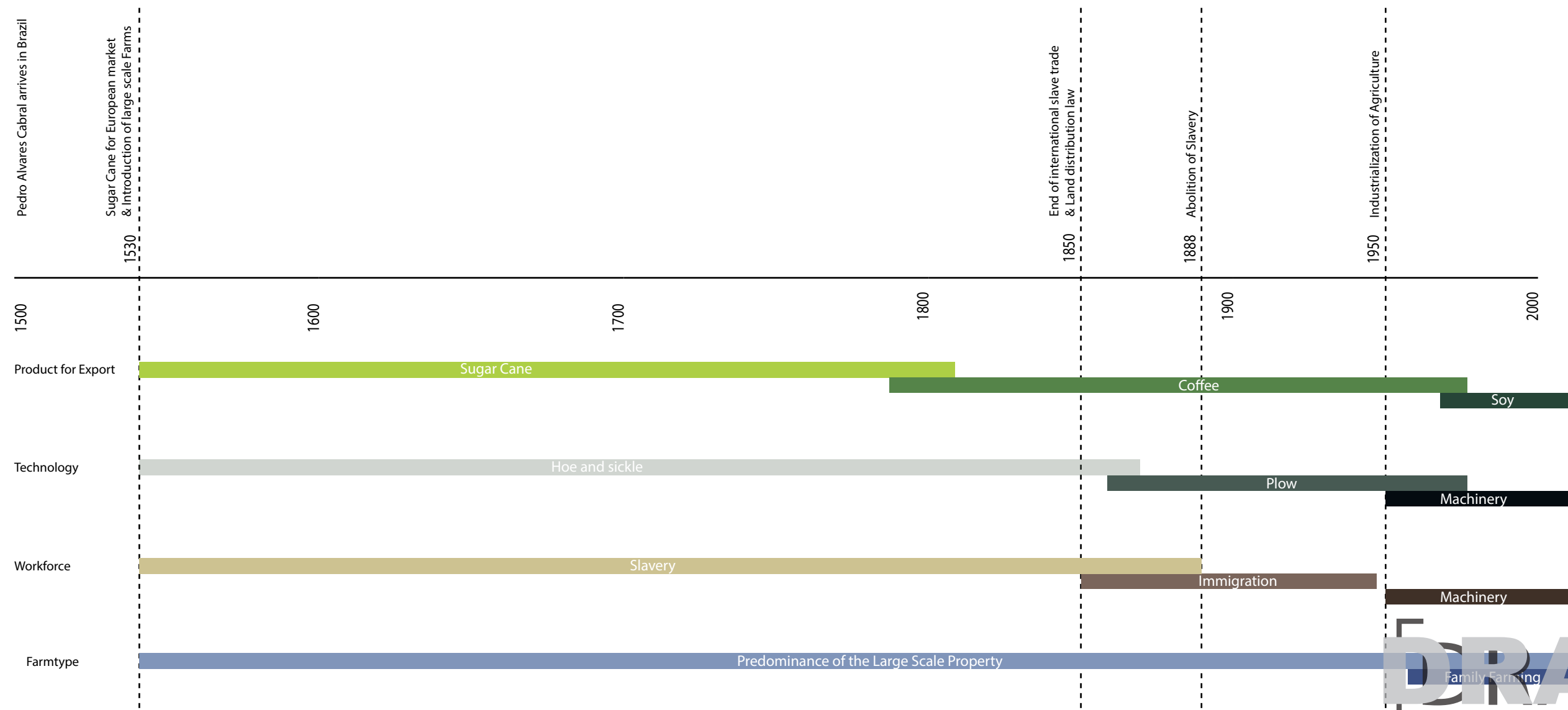
— V.3 —

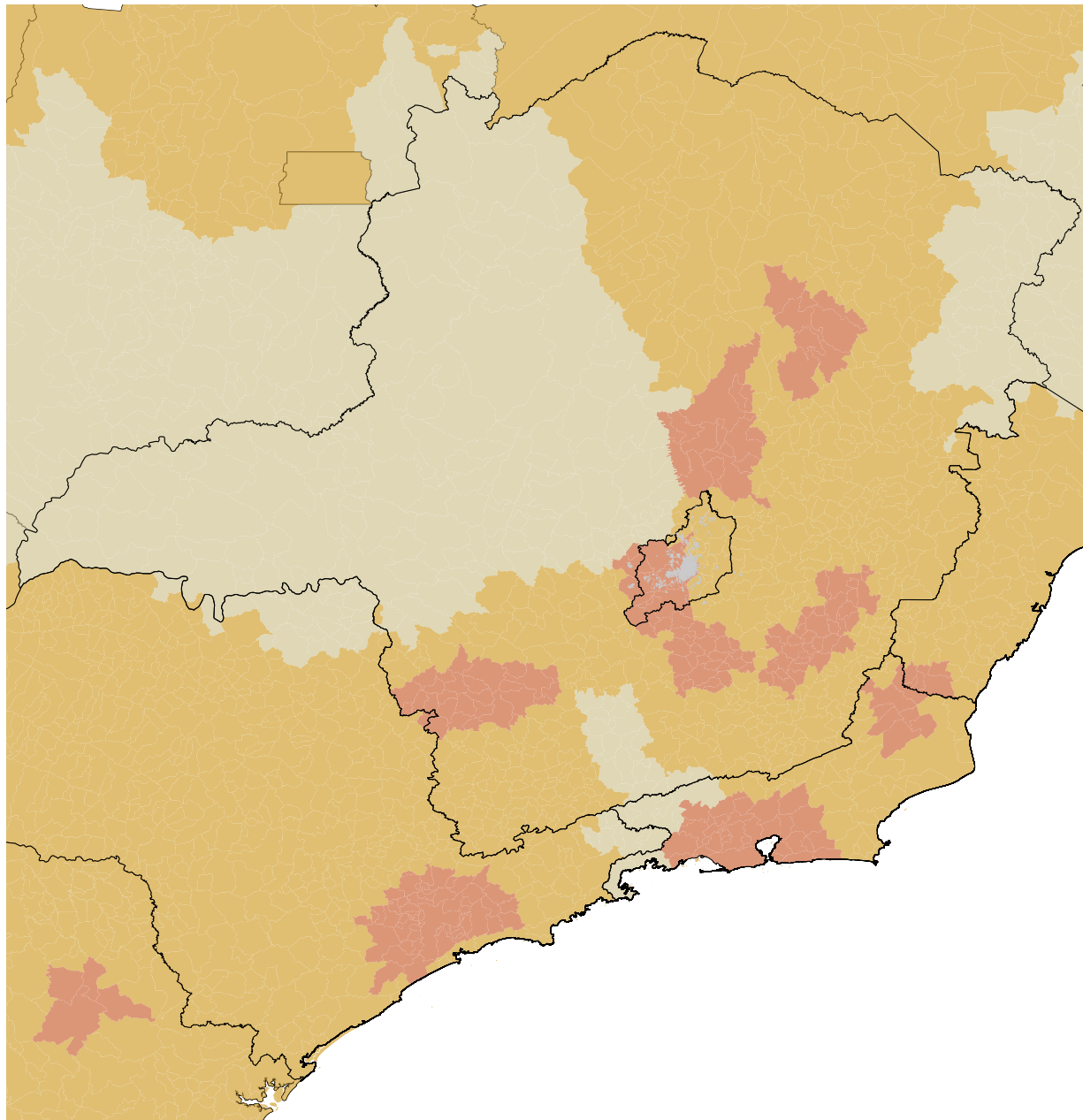
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EXPORT TRADITION

In the early beginnings of the Brazillian colonization the whole economy and agriculture were set up towards exportation. To saturate the European demand for sugar the combination of large scale properties and slave workers was established and endured until the abolition of slavery. By the time the export oriented large scale property was already well established and cheap labor force was found in immigrants. The industrialization of agriculture guaranteed the large scale agriculture to maintain but the rural worker was widely being replaced by machines.



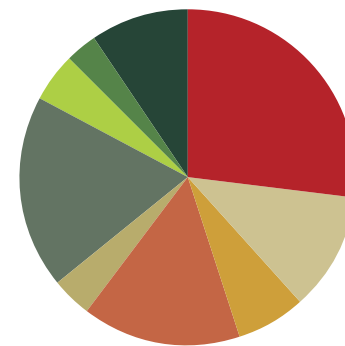


- <10 ha small seized properties
- 10-200 middle seized properties
- 200-500 large seized properties

Land Distribution

The large and middle sized property is the most common type of farm in Minas Gerais and found in most areas of the state. The properties become bigger in the western parts of the state where flat and fertile land can be worked by big machines and where the yield is produced for overseas. Around and inside the metropolitan areas of Belo Horizonte, São Paulo and Rio de Janeiro the small scale properties are predominant.

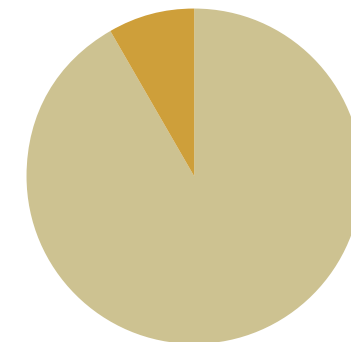
Brazil 95.32 Mia. US\$



- Soya
- Wood
- Coffee
- Fruits
- Meat
- Other
- Sugar Cane (Fuel)
- Tobacco
- Corn
- Vegetables

Export in Agriculture 2012

Brazil generates through exports. Soya climbed in the last decades to the top and ousted coffee. In the Minas Gerais where coffee on dairy production once gave great power to the state coffee remained a stronghold.

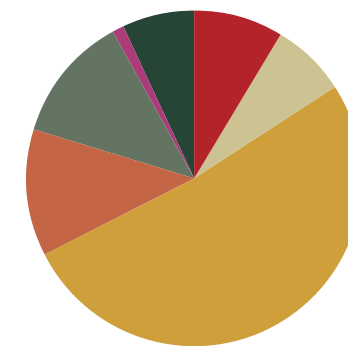


- Other Sectors 91.8%
- Participation Agriculture 8.2%

GDP Brazil 2012 2253 Mia. US\$

The participation of agriculture in Brazil's GDP is among the lower percentages in the world ranking. Burma has with 56% the worlds highest percentage and Singapore with 0% the lowest. Regarding the Volume of the agricultural GDP it ranks amongst the worlds highest.

Minas Gerais 7.812 Mia. US\$

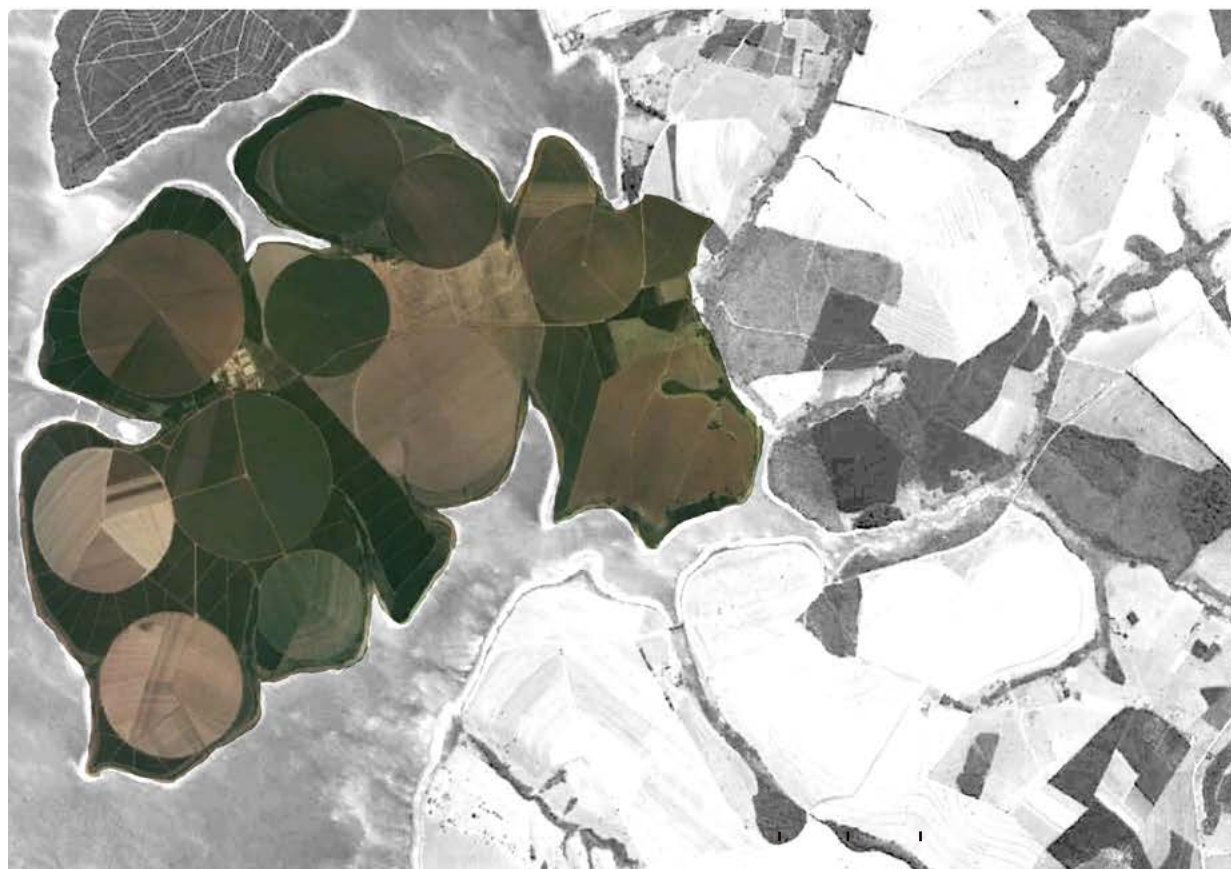


- Other States 85.6%
- Participation Minas Gerais 14.4%

GDP Agriculture Brazil 184.7 Mia US\$

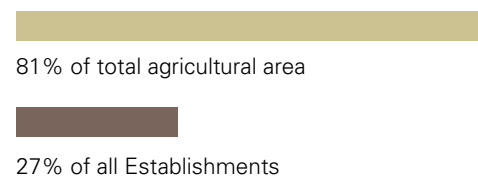
Minas Gerais has a long tradition in agriculture and has still one of Brazil's biggest agricultural productions. It rose with the gold rush and became strong with the coffee. In the 1960's the expansion of monocultures into the cerrado gave its agriculture another main pillar.





Large Scale Properties in MG

The displayed property occupies an area of 950 ha and is located 200 km westwards from Belo Horizonte. It is a classic example of a large scale property which directed its production towards foreign markets such as Europe, USA and China. This kind of establishment stands in the long tradition of Brazilian export agriculture.



Small Scale Properties in MG

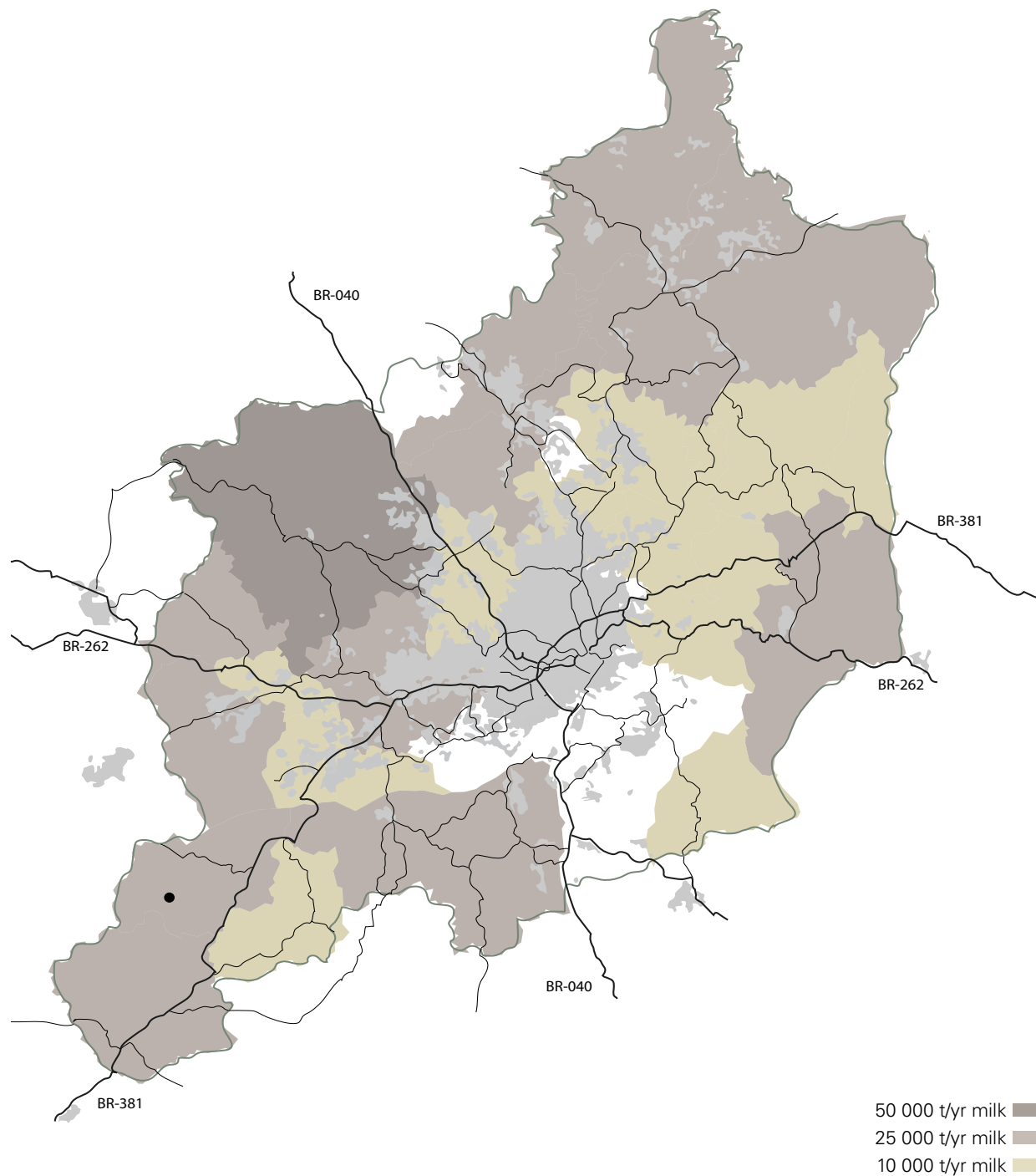
This farm occupies an area of 13 ha and is located in the metropolitan area of Belo Horizonte. Such establishments are in almost all cases family farms and are more directed to the foodstuff production. They total just a small amount of the occupied agricultural land but outnumber the large scale properties by far.



BETWEEN TRADITION AND MODERNIZATION

The industrialization of the agriculture has left many rural workers jobless which resulted in the big rural exodus starting in the 1960's. The rural workers and small scale farmers that were excluded from the technological boost started organizing themselves and created the movement of the "Agricultura Familiar" which translates into family farming. Today's situation of the family farming is characterized by the traditional farming that kept it afloat for the last 60 years and the struggle to find its way into new technologies and markets.





Family Farming & Dairy Farming

Small scale agriculture in Minas Gerais is responsible for 54% of the milk production, which has a long tradition in the state. It is also exemplary for the struggle of the small scale agriculture and family farming. The lack of knowledge, financial means and access to modern technology makes it hard to compete with the large scale properties.



Fazenda de Restente - Fiscal Modules 2,1

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1

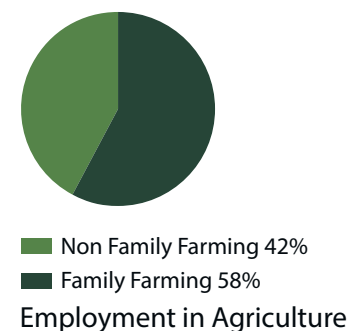
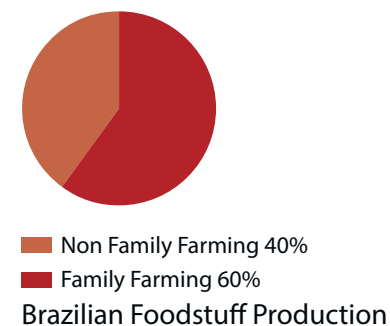
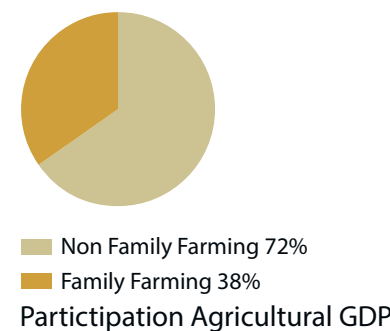
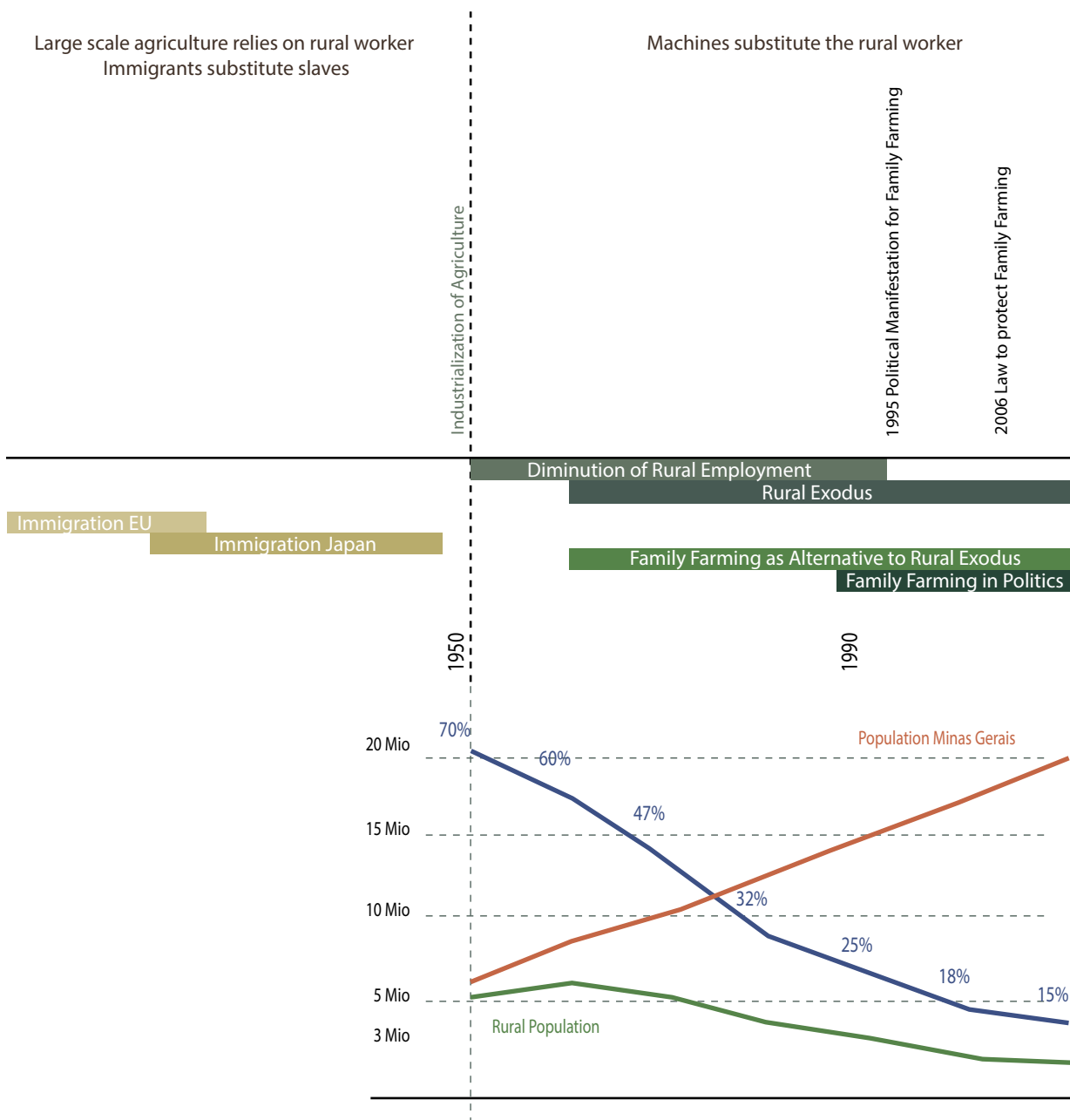


2

Fazenda de Restente

The Farm "Fazenda de Restente" (1) is run by the two brothers João Celestino & Mauro Fereiro de Restente. They inherited the farm from their father who purchased the land for dairy farming - one of the main agricultural activities in the metropolitan area of Belo Horizonte. Their cattle herd (2) counts 25 heads and generates a low but sufficient milk

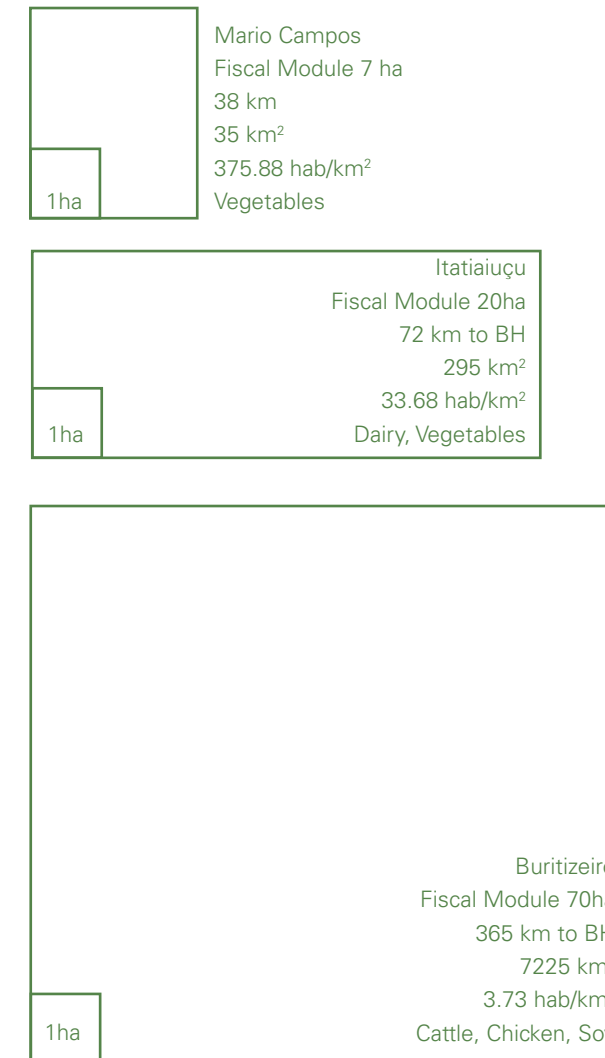
production. As an additional income source they started growing eucalyptus in 2007 facilitated by government support. The farm serves to the Restente brothers as an income generator and also guarantees their self sustainability by growing several types of grains, vegetables and fruits.



Definition of Family Farming

Besides producing the majority of the Brazilian foodstuff it has a huge social value in rural areas. Family farming offers a tool for Brazil to cope with its class system on the rural area. It guarantees self supply for the productive unit and generates employment. Family farming is defined by the law nr. 11.326 of 24.07.2006:

- The size of an establishment must not surpass 4 fiscal modules.
- The workforce on the establishment has to come predominantly from family members.
- The income has to be generated predominantly on its own establishment.
- The establishment has to be run by the family



What is a Fiscal Module?

The fiscal module is an unit for agricultural land expressed in hectares. The size of one fiscal module is variable and has to be determined for each municipality, it can vary from 5 ha up to 110 ha. One fiscal module is the minimum seize for a family farm to remain economically viable. The fiscal module takes in account:

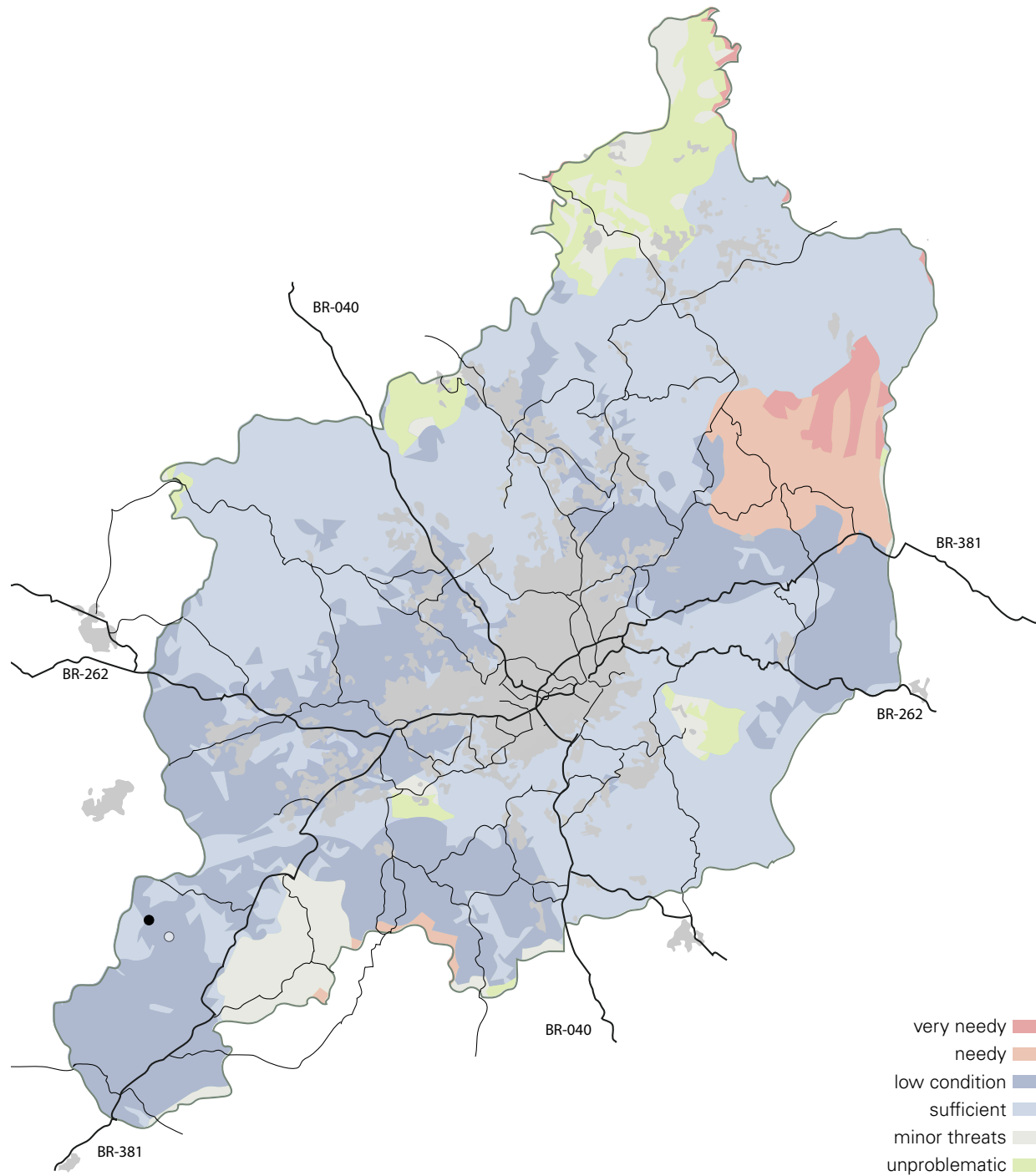
- The predominant agrarian activity in the municipality.
- Income generated by the predominant agrarian activity.
- Other existing agrarian activities in the municipality with significant impact in income or landuse.

The variability of the fiscal module is necessary to cover the range of different types of family farms. The fiscal module tends to be smaller close to urban centers and bigger in more remote areas.

Rural Exodus

The rural population of Minas Gerais began steadily declining in the 1960's. The rural exodus is an interstitial phenomenon and has its biggest movement from the poorest rural areas of Brazil to the wealthier southeastern region consisting of São Paulo, Minas Gerais and Rio de Janeiro. Therefore the population in the capitals of those states grew even more than the rural population of the state shrunk. As the Brazilian cities seemed to explode in

the late 1980's and 1990's criticism on the overcrowding cities rose. The correlation of the the rural exodus and the industrialization of agriculture became apparent. The small scale farmers and unemployed rural workers that started the movement of family farming received support from politicians in the mid 1990's as family farming emerged as a solution to the overcrowding cities by offering a solution for people to stay in rural areas.



Support Structures

Brazil faces severe ecological destruction and poverty that comes along with a wide range of complex problems and its agriculture is in the midst of it. The socio-economic potential paired with the ambient vulnerability results in the Ecological-Economic Indicator of Minas Gerais developed and applied for the whole state. It also indicates where help is needed most.



0 100m 200m

Fazenda Perreira - Fiscal Modules 0,65





1

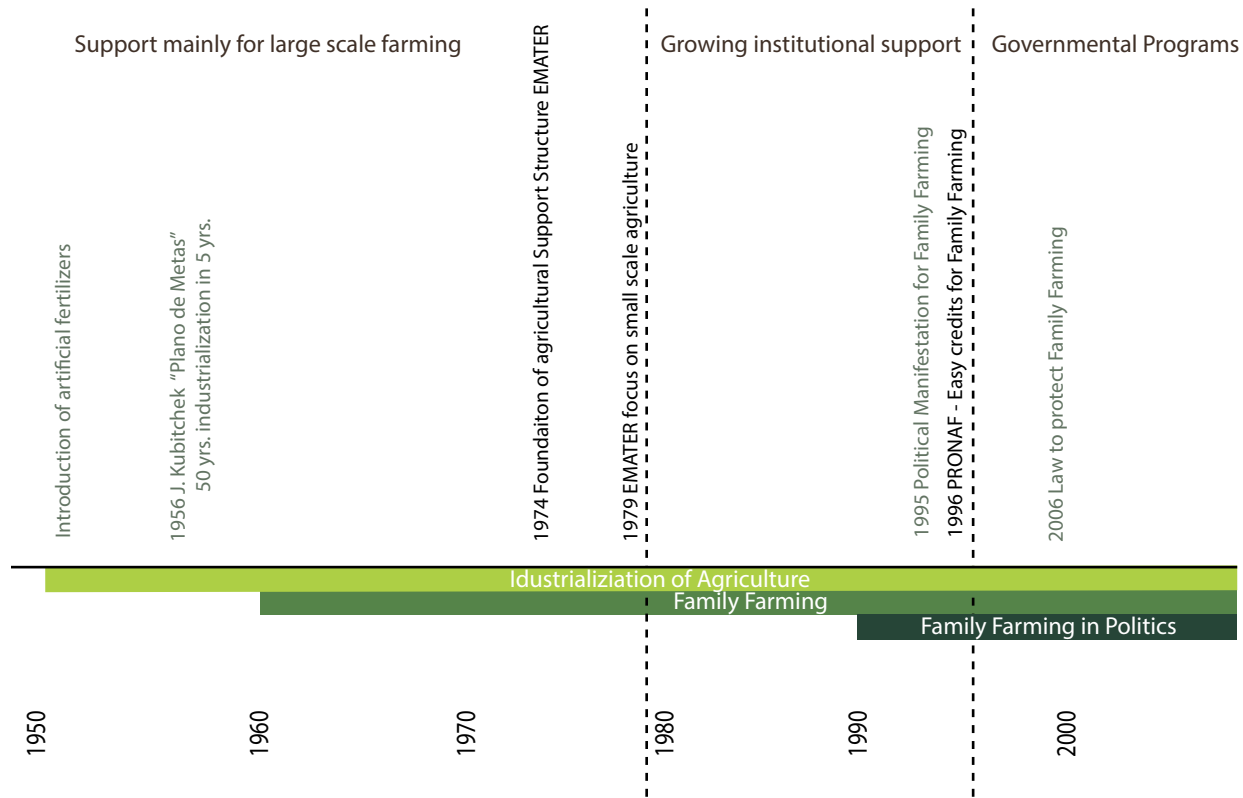


2

Establishment of the Perreira Family

Alencar Alvez Perreira lives with his wife and two children in their selfbuilt house (1) on the land which he recieved from his father. There he cultivates manioc (2), sugar cane and eucalyptus. The sugar cane serves as feedstuff for his father's cattle and the eucalyptus is sold as firewood. manioc is harvested by him and his family and further

processed on his establishment to manioc flour. Alencar Alvez Perreira relies heavily on governmental support structures to venture successfully into new technologies. With PRONAF he was able to purchase a tractor, which makes work on his plantations more efficient and gives him additional income in using it on neighbouring farms.



Much Needed Help

The exclusive character of the industrialiation of agriculture worsened the condition of many rural wrorkers as well as the competitive position of small scale farmers. Out of this inequality governemental support emerged. EMATER is a widespread state-run support structure with agronomists

in most rural municipalities. Their main competence is the knowledge transfer. Then there is PRONAF which was the first governmental program to support family farming financially. It is best known for its agricultural credits that are given to family farms to good conditions.

Large Scale Agriculture



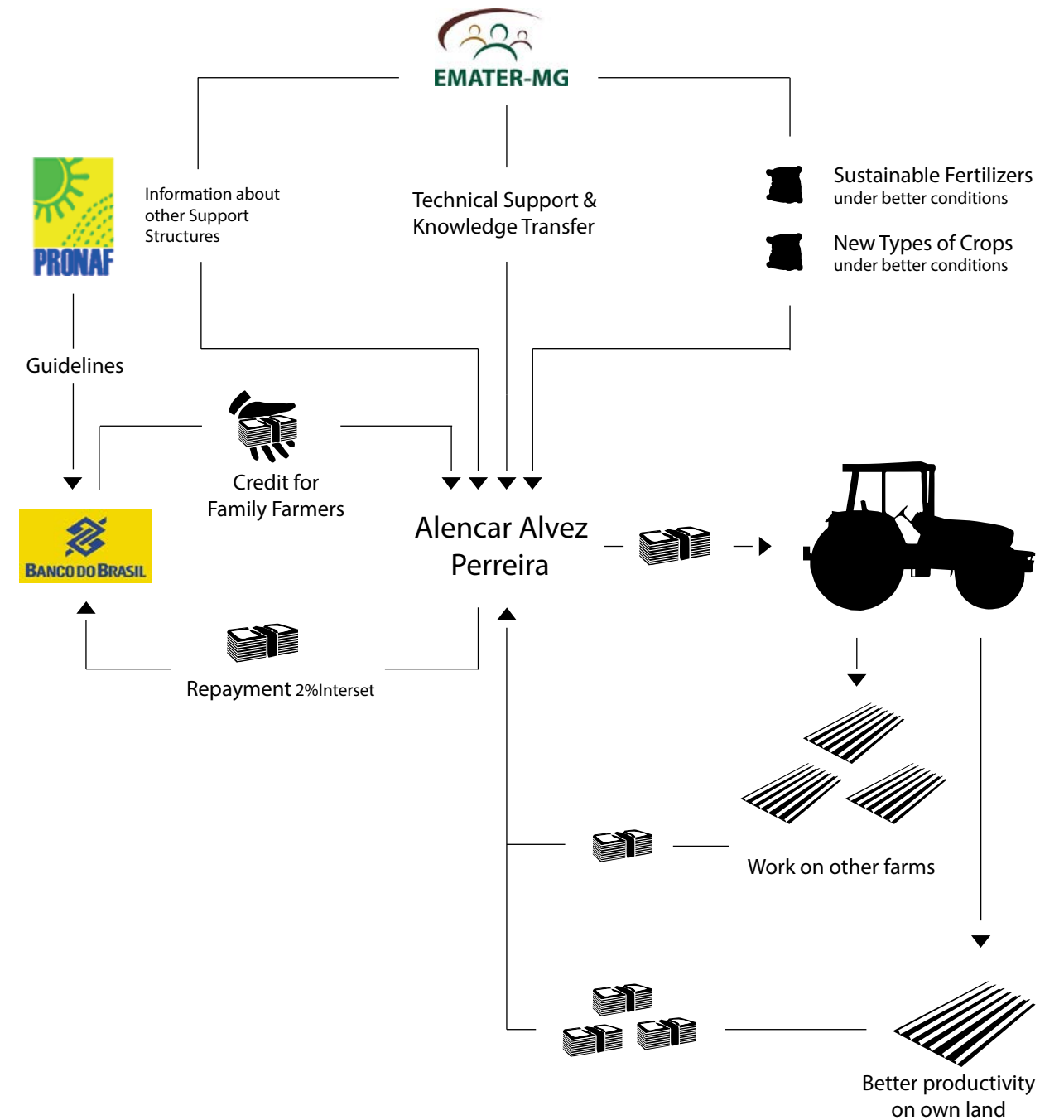
Family Farming



Everyday Struggle

Family farming faces many difficulties and hurdles in its daily operations. The governemnts focus for support is mainly directed towards large scale agriculture. The lack of support for family farming for a very long period had the family farms relying solely on traditional farming meth-

ods. The lack of knowledge and financial means imposes severe limitations to family farming. There is the struggle for access into new markets as well as the implentation of advanced technologies. Even though governmental support emerged in the mid 90's it is not sufficient yet.



Reinforcement of Family Farming

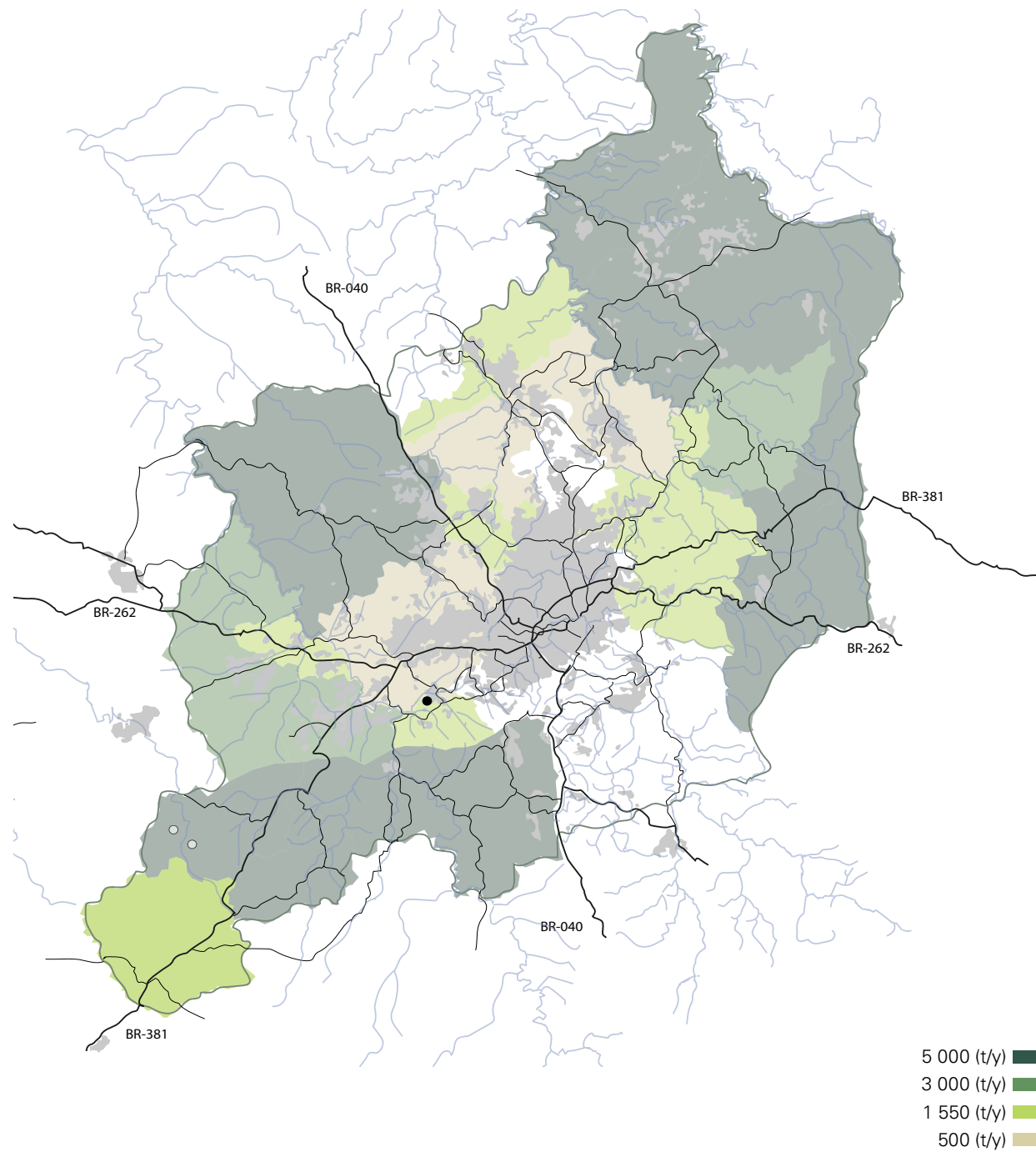
Even though the governmental support does not reach the level of support given to large scale farming, there are numerous programs to support family farming. The case of Alencar Alvez Perreira shows how some support structures dirctely benefit the small scale farmer.



FEEDING THE CITY

At the same pace as Belo Horizonte grew its demand for foodstuff increased. As the focus of the large scale agriculture remained on generating its profit largely on exportation a niche emerged to appease the city's hunger. It led to a densification of agricultural activity on the edges of the city forming the so called green belt. The agriculture in the green belt consists largely of small scale family farming whose structure guarantees the flexibility needed in this constantly changing environment. Even though there highly heterogenous field of agriculture in the metropolitan area is a highly heterogenous field a cumulation of vegetable farming can be observed.





Vegetable Farming

The short transportation the consumer in Belo Horizonte favours the production of Vegetables. The products remain fresh and there is less damage on the delicate goods. Another reason for the widespread vegetable plantations in the metropolitan area of Belo Horizonte is the dense water network. The cultivation of vegetables requires a considerable amount of water. Therefore plantations of vegetables and especially leafy vegetables are always found close to water sources.



Fazenda Augustin - Fiscal Modules 2,5

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1

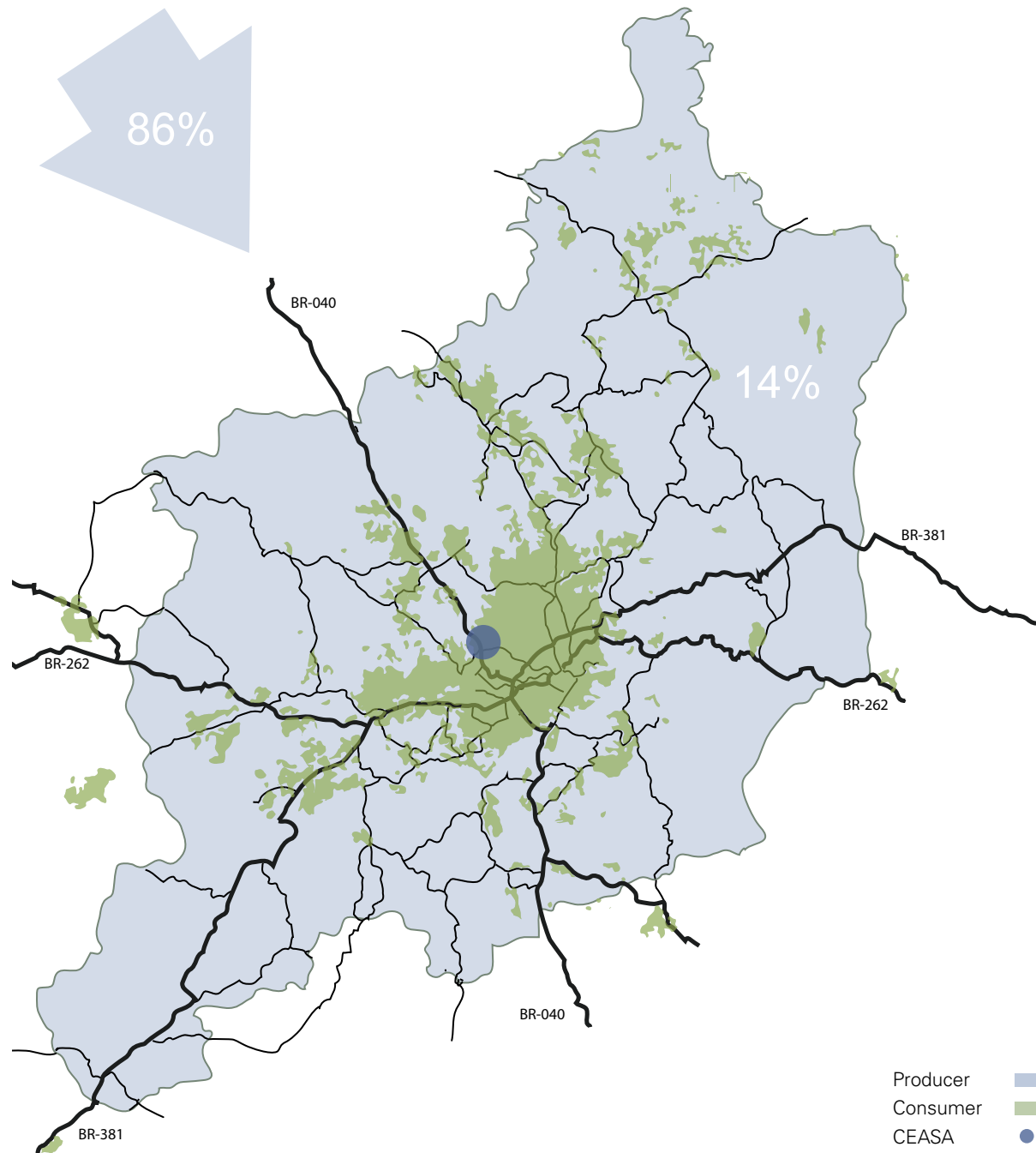


2

Establishment of the Augustin Family

The Establishment of the Augustin family (1) is specialized in leafy vegetables such as lettuce, spinach and cove. Around 2000 they started experimenting with culinary herbs which eventually became a big part of their production as a reaction to the growing demand in the gastronomy of Belo Horizonte. By diversifying their portfolio (2) they reacted to the dependency on just a few products which

is the downside of the specialisation in niche markets. The Establishment and the land was inherited from their parents and is currently being used by two brothers and their families. The municipality Mario Campos in which they operate has its basis in vegetable farming and is known as capital of lettuce. 30% of the lettuce consumed in Belo Horizonte comes from Mario Campos.



Centralized Supply System

Belo Horizonte is since its beginnings steadily growing. In the 1960 when its population was approaching the 10 Mio. mark the city's supply system was becoming increasingly chaotic. Nationwide projects called CEASA to improve and centralize the supply system of metropolitan areas for fruits and vegetables arose. The CEASA of Belo Horizonte was inaugurated in 1974 and was built in Contagem right by the BR-040 as the primary means of transportation for foodstuffs is the truck. The continuous physical growth of the CEASA since its inauguration displays the increasing demand of foodstuffs of the city.



- 1 Market Hall
- 2 Rentable Stores
- 3 Administration

CEASA Belo Horizonte





1

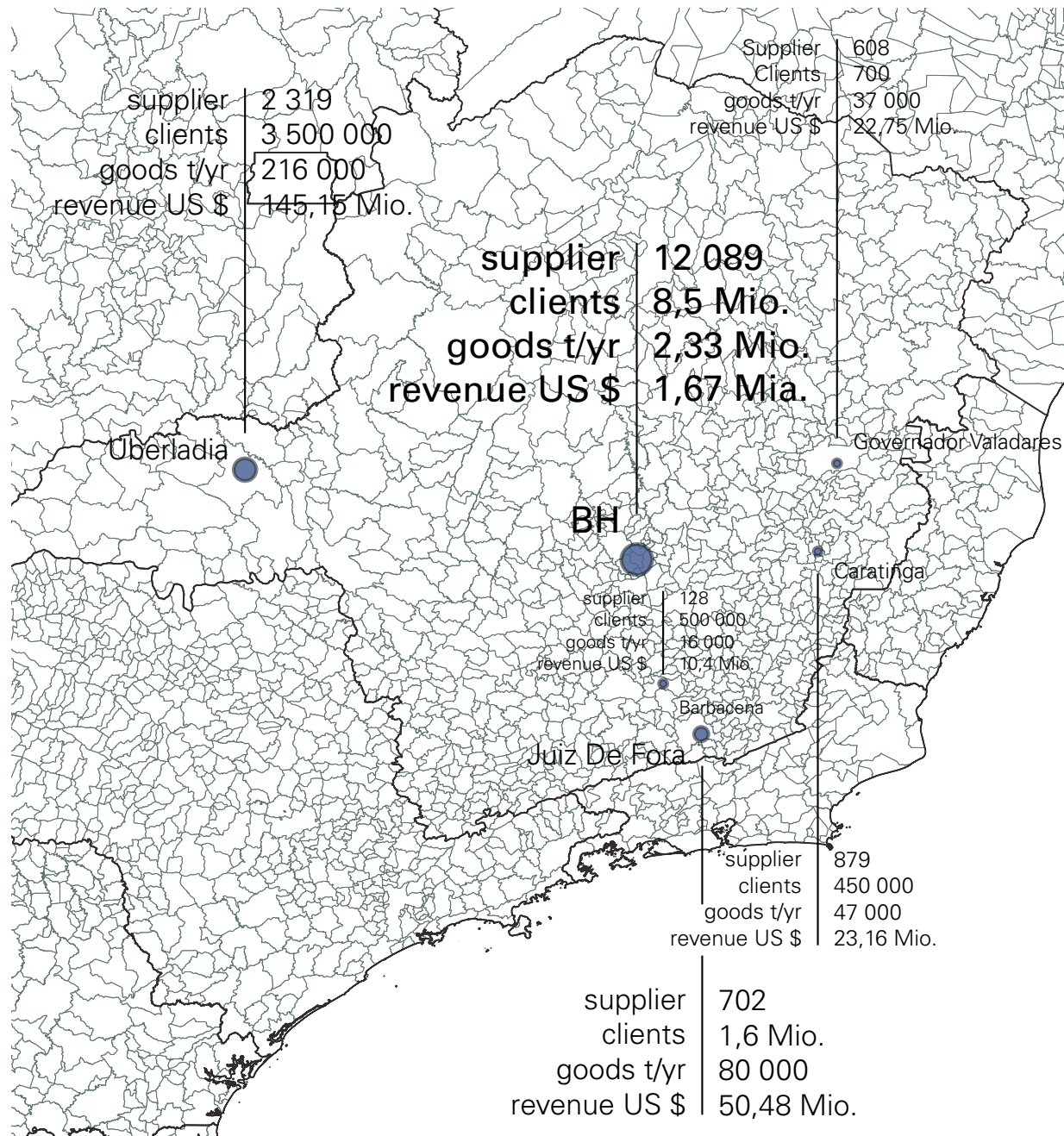


2

CEASA

The CEASA of Belo Horizonte is the main market place for fruits and vegetables for the State of Minas Gerais. The major part of the states production of fruits and vegetables is brought to the CEASA and it serves as the main supplier to the metropolitan area of Belo Horizonte. The complex con

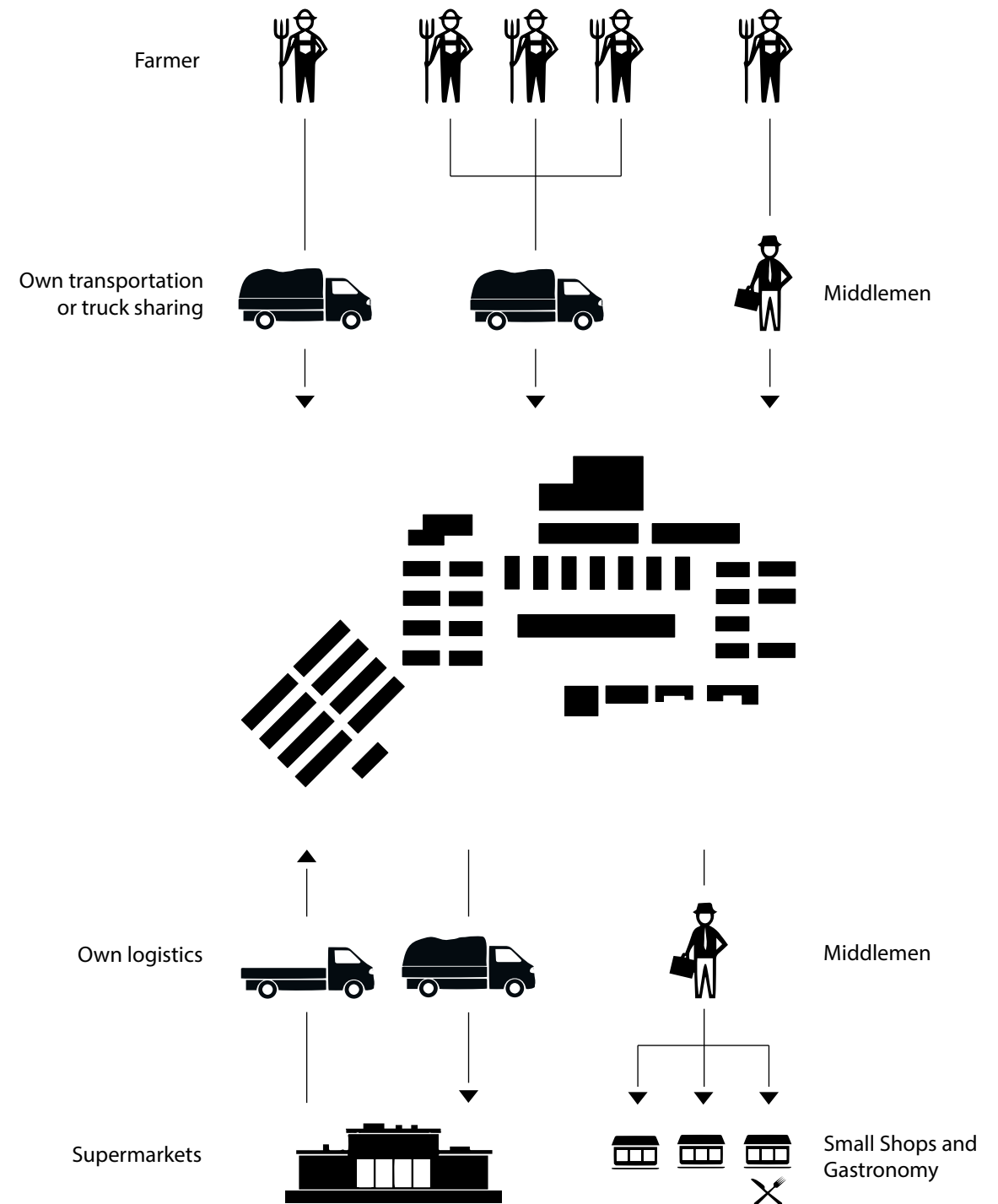
sists out of a network of halls and streets (1) to facilitate the transportation by truck that often come from far away. 60% of the products (2) dealt on the CEASA come from family farming. The CEASA of Belo Horizonte is one of the worlds most divers marketplaces for fruits and vegetables.



Supply Network

The centralized system of CEASA in Minas Gerais connects remote areas to the capital. To broaden the network five more smaller units were opened in the state of Minas Gerais throughout 1978 to 1990. The expansion of the network is necessary for its efficiency as there is the problem

of elongating the distances of transportation by going through Belo Horizonte. In the metropolitan area of Belo Horizonte being the main consumer of the states foodstuff the a high degree of centralizing the system of supply allows its most efficient organization.



Every Road leads to CEASA

85% of the fruits and vegetables sold in the state of Minas Gerais were dealt on the CEASA of Belo Horizonte which amounts to a daily flow of 4.58 Mio. US\$ and 6389 tons of foodstuff.

LAND IN TRANSFORMATION

There is a considerable amount of agricultural land to be found in the metropolitan area of Belo Horizonte. While the proximity to the city is to many establishments their *raison d'être* it can also be their nemesis. The growing demand of land for housing and industry is often met at the cost of agricultural land. The family farmers appear often as the weakest stakeholders when conflicting interests appear. Therefore the agricultural land in the metropolitan area of Belo Horizonte is constantly facing transformation.





Axis of Industrial Extension ■

Industry

The main routes connecting Belo Horizonte with other regions of the state and the country exercise an accelerating effect on the the areas around them and within the metropolitan region of Belo Horizonte. Industry and larger uses linked to the tertiary sector are settling in those areas. Such an area is found in the municipality of Igarapé, which has its roots in agriculture and already experienced a transformation towards the tertiary sector.



8 ha

0 100m 200m

Fazenda Araujo - fiscal modules 0,4

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1

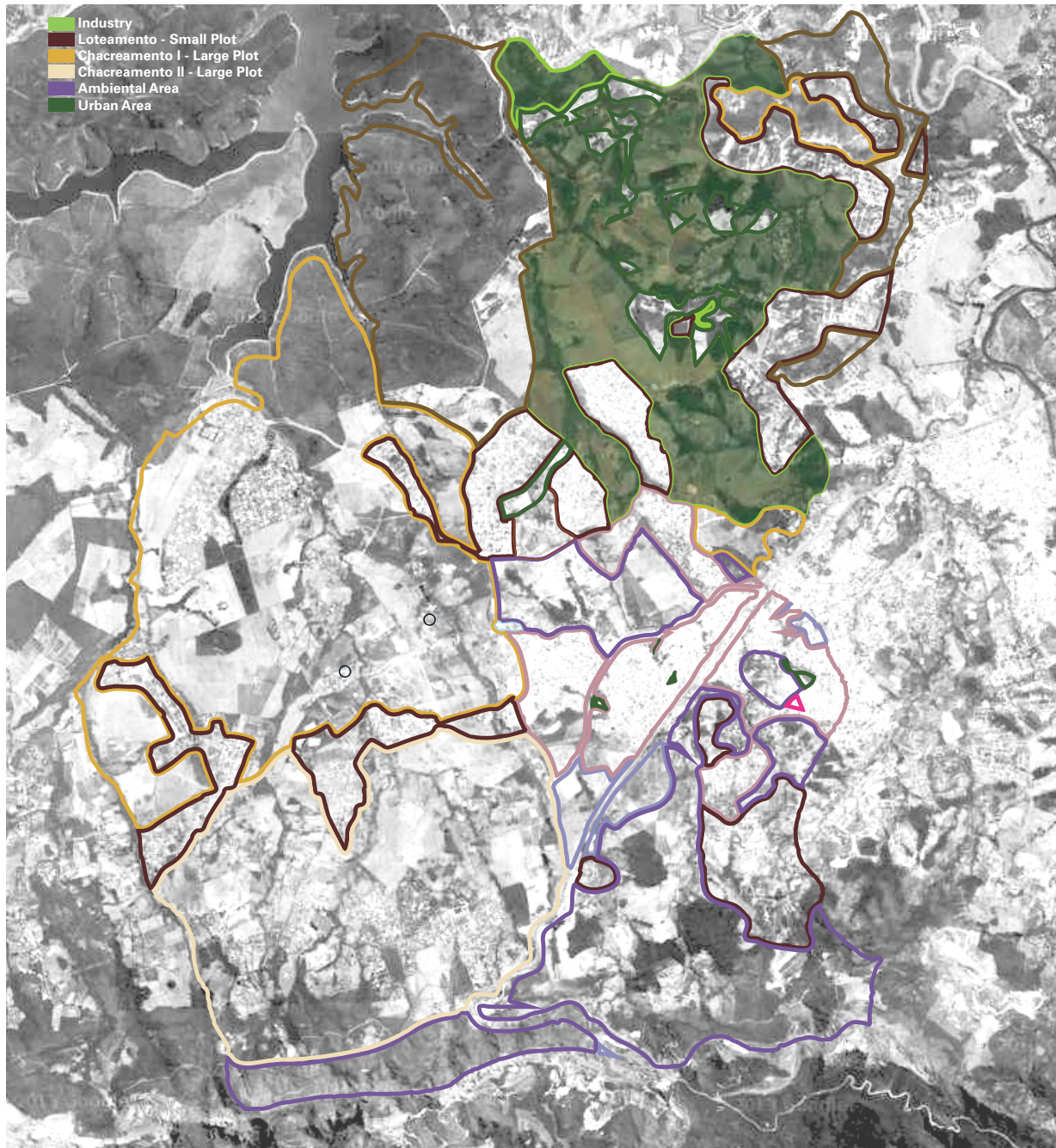


2

Farm Araujo

The Farm Araujo is run by three sisters and the land is owned by their father who is a retired farmer. This establishment (1) is a characteristic vegetable farm (2). The farm exists since 1973 when they were moved due to changes in the zoning plan of their municipality. up to this point their

father used to run his agricultural establishment in an area nearby which became protected by COPASA - the water supply company of Belo Horizonte. In the near future they will be faced with another transformation of their land and they might have to move once again.



1



2

Industrial Park and SADA

The area zoned out for industrial use is connected to two main routes the BR-381 to São Paulo and the BR-262 to Divinópolis. This strategic position is of high value to industrial use, thus the originally agricultural land was zoned in 2013 into an area for industrial use. The driving force behind the change of the zoning plan was a distribution company for Fiat cars called SADA. Their 90 Mio. US-Dollar invest

ment was greatly welcomed and is currently being built(1). Properties, mainly farms were being bought out beforehand among them several farms surrounding the Farm Araujo which is in the industrial zone and sooner or later they will have to move away. On they way to their farm walls (2) indicate the border of the soon-to-be industrial park.

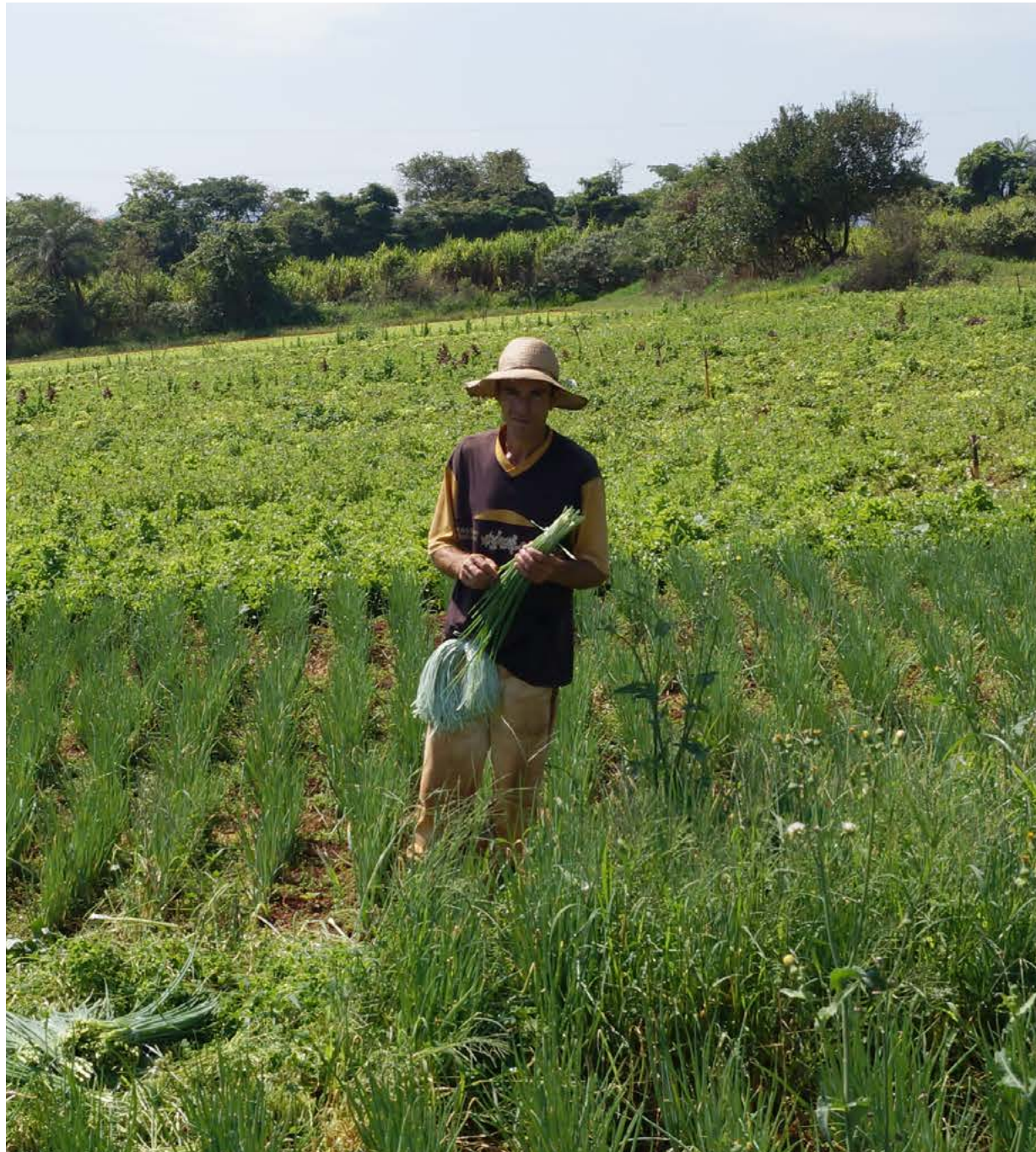


Housing

The direct access to the BR-381 and the predominance of the automobile in Belo Horizonte makes Igarapé interesting for housing. The resulting land speculation is putting pressure on agricultural land and building sites are more apparent than vegetable farms as Igarapé has the third fastest growth in population of the metropolitan region of Belo Horizonte.



Establishment Leomar - Fiscal Modules 0,15



1

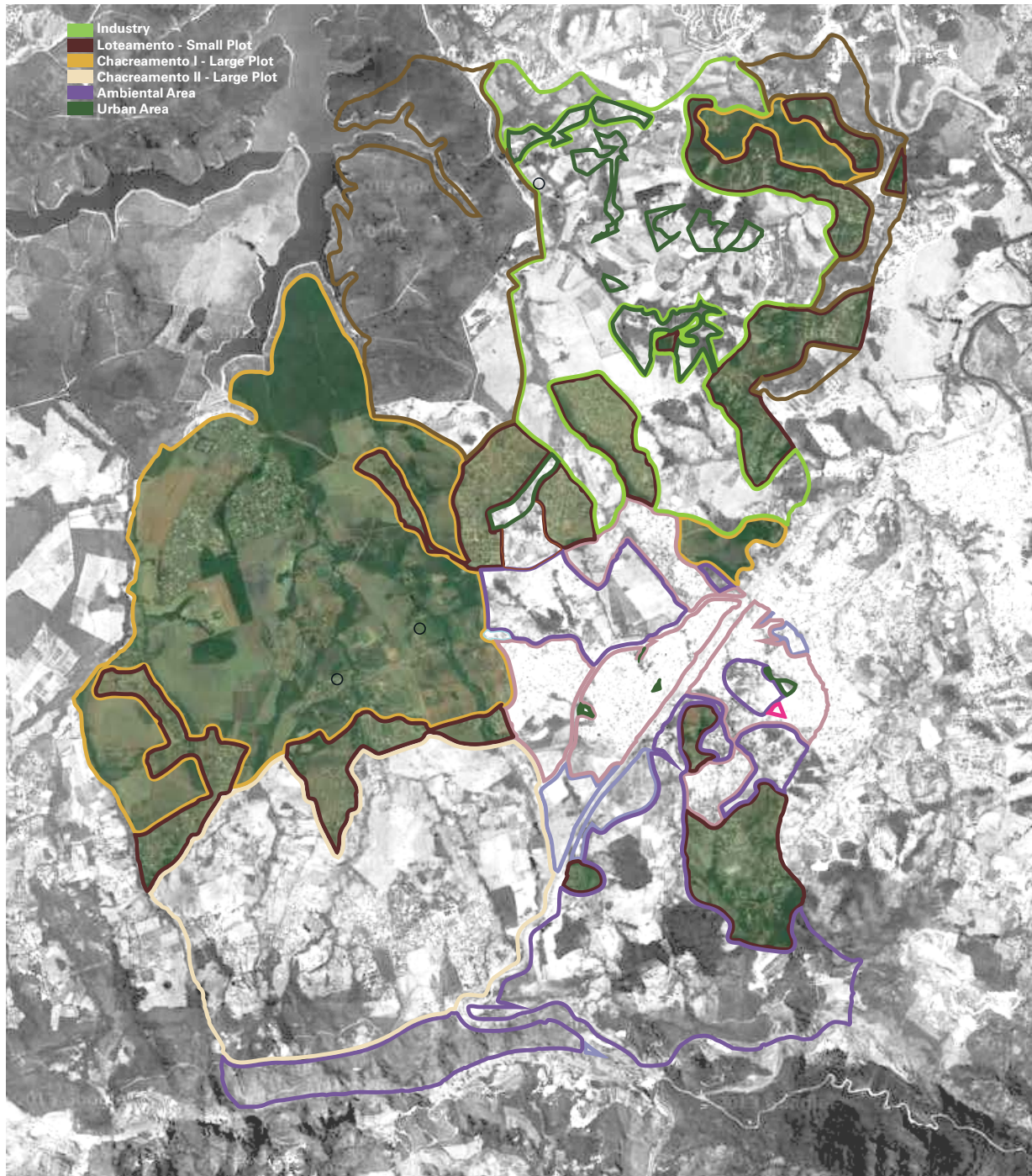


2

Establishment Leomar

The family Leomar lives in Mario Campos but cultivates Land in Igarapé as tenants who are called “Meeiros” (1). They represent a common group of family farmers that do not own their own land and have contracts with landowners to whom they pay a monthly rent. The family Leomar cultivates mainly leafy vegetables and is run by two brothers

that have their adult sons working on the fields (2) as well. The landowner lives nearby and is a retired farmer whose children did not choose to continue farming and he is facing many difficulties to keep his land as he says: “It’s the law of the dog out here!” referring to the illegal housing on his land and acts of sabotage on his farm.



Transforming Agricultural Land

The land subdivision into small plots brought many problems to the municipality of Igarapé such as lacking infrastructure illegal housing. A way of coping with this phenomenon was to minimize the zoning for small plots and maximize the zoning for large plots. The zoning for large

plots, which is mostly used for gated communities and weekend cottages used to be zoned as agricultural land. The hopes of the municipality are not only to curtail the small plot land subdivision but also to attract a wealthier population stratum.

110,08 km² | 40,31% Growth in the last 10 years | 34 851 Inhabitants - 6,28% rural | 316,60 inh / km²

Igarapé

DRAFT
© ETH Studio Babel



1



2

Land Subdivision into Small Plots

The rising prosperity in the metropolitan area of Belo Horizonte and governmental programs such as "My Life My House" enabled many underprivileged people to purchase their own piece of land and build a house (1). The Process of the land subdivision for small land plots follows a certain pattern. There are real estate companies that buy large plots of land and subdivide them in plots of 360 m² (30x12)

These companies are obliged to provide basic installations for water supply, canalization, pavement and electricity. Often those services are not provided with the intention to maximize the profit. The bleak neighbourhood and the paltry conditions (2) left many habitants with a modest dream disappointed: "I am used to a simple life but here it shouldn't be like that!"



1



2

Land Subdivision into large Plots

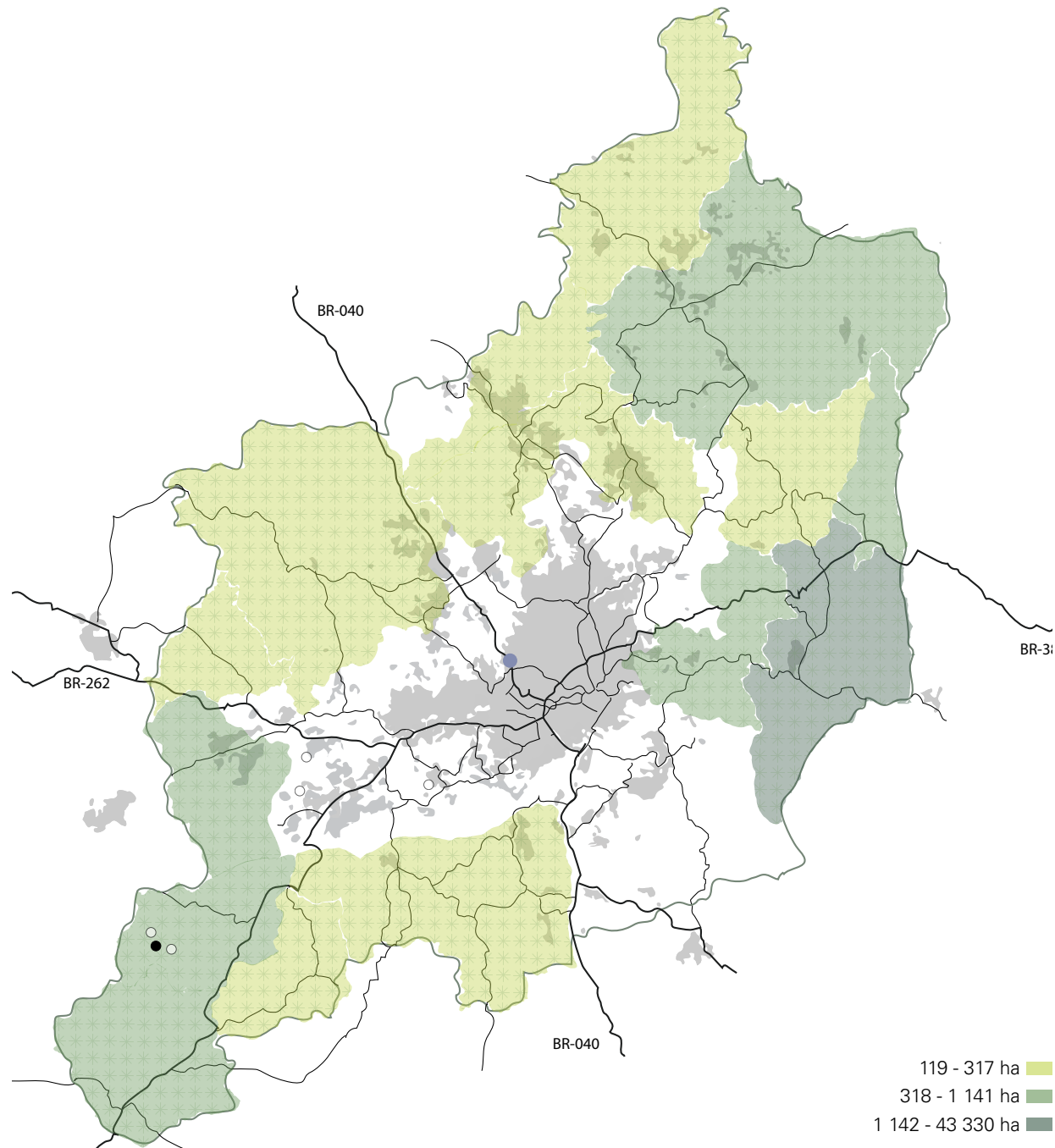
The land subdivision into small plots brought many problems to municipality of Igarapé such as lacking infrastructure. A way of coping with this phenomenon was to minimize the zoning for small plots and maximize the zoning for large plots. This strategy is only possible because Igarapé became attractive to people with the necessary purchasing power (1) such as the commuter who enjoys the amenities

of the country life while working in the city or the owner of a weekend cottage who celebrates the rural lifestyle. To attract this kind of clientele large plots of land are enclosed by walls and subdivided in plots of sizes ranging from 360m² to larger than 1000m². In this case basic infrastructure (2) is provided and usually additional facilities and services are provided.

ADAPTING IN BORDERLAND

The agriculture in the metropolitan area of Belo Horizonte is experiencing constant mutations and is bound to adapt to the changing landscape. With all the transformations new opportunities and markets emerge. The following portraits are from people who came from a non agricultural background and found a lucrative niche in agricultural activities. They serve as examples of how dynamic the agriculture in the metropolitan region of Belo Horizonte is.





The Green Desert

The expansion of eucalyptus into small scale and middle scale agriculture brought the eucalyptus monocultures inside the Metropolitan area of Belo Horizonte. The high density of eucalyptus plantations in the east of Belo Horizonte is tied to the high demand of wood by the steel Industry. The process of converting iron ore to steel consumes a lot of wood as an energy source and as the primary alloying element in steel. The cultivation of eucalyptus reduced the deforestation of native forests in Minas Gerais. The demand of wood could be covered by eucalyptus opposing to other areas in Brazil where native forests were cut down for eucalyptus plantations.



Mr. Wagner

DRAFT
 © ETH Studio Basel



1

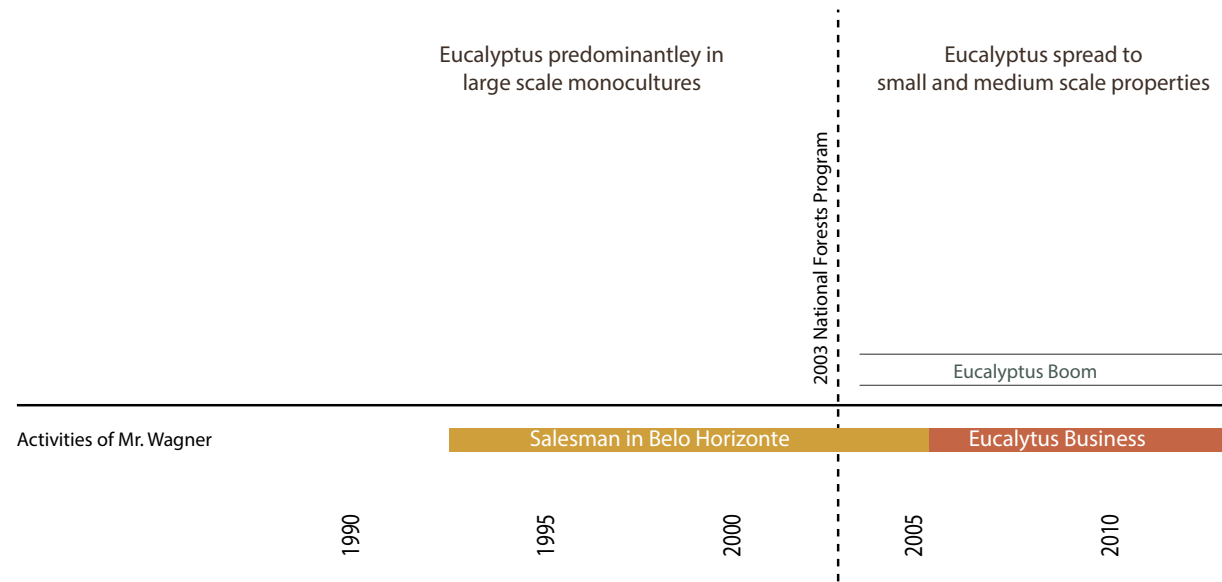


2

Mr. Wagner

Mr. Wagner used to work as a salesman in Belo Horizonte. By spending his holidays on his father's small rural residence he became attracted to the rural lifestyle. With the National Forests Program in the era of President Lula he saw a chance how to make living from an agricultural activ-

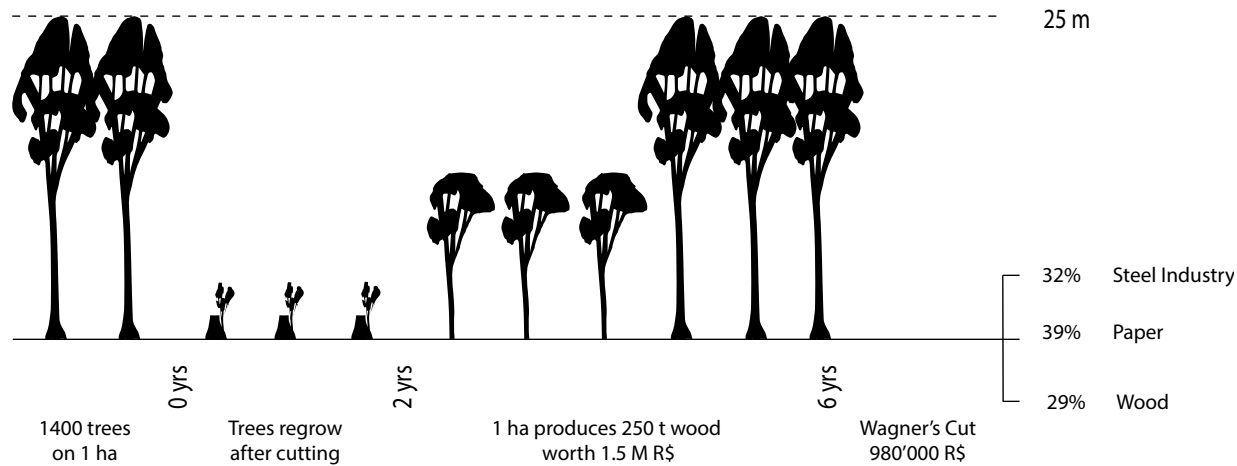
ity. He turned his back to the city and started his one-man business (1). He buys the still standing trees from plantations, chops (2) them and sells the wood. The work is hard, as he says but the revenue is better than as a salesman in Belo Horizonte.



Governmental Incentive

In 2003, to satisfy the hunger for wood the federal government launched the National Forests Program, with the intention of increasing the pace of expansion for monoculture trees and broadening participation in small and medium

scale agriculture. Among the governmental promotion programs PRONAF served to bring public financing for monoculture trees to the small scale farmer.



Paper at which cost?

New breeds of Eucalyptus trees grow extremely fast and are ready to be cut after just 6-7 years. Records of 35 meter high trees after just 6 years are reality but found in different areas with industrialized large scale monocultures. In the metropolitan area of Belo Horizonte where this kind

of cultivation is not possible the cultivation turns out to be more modest. Which doesn't mean that it is less problematic. The intensive eucalyptus cultivation exhausts the soil and native plants won't grow in between as much as animals are rarely found in the so called green desert (1).



1



Housing - The Gift and the Curse

While the increasing construction of residential buildings consumes a lot of agricultural land it creates opportunities for agricultural establishments. In the case of large plot land subdivision it is the market for ornamental plants and landscape gardening.



Floricultura Takashi - Fiscal Modules 0,1

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 © ETH Studio Babel



1

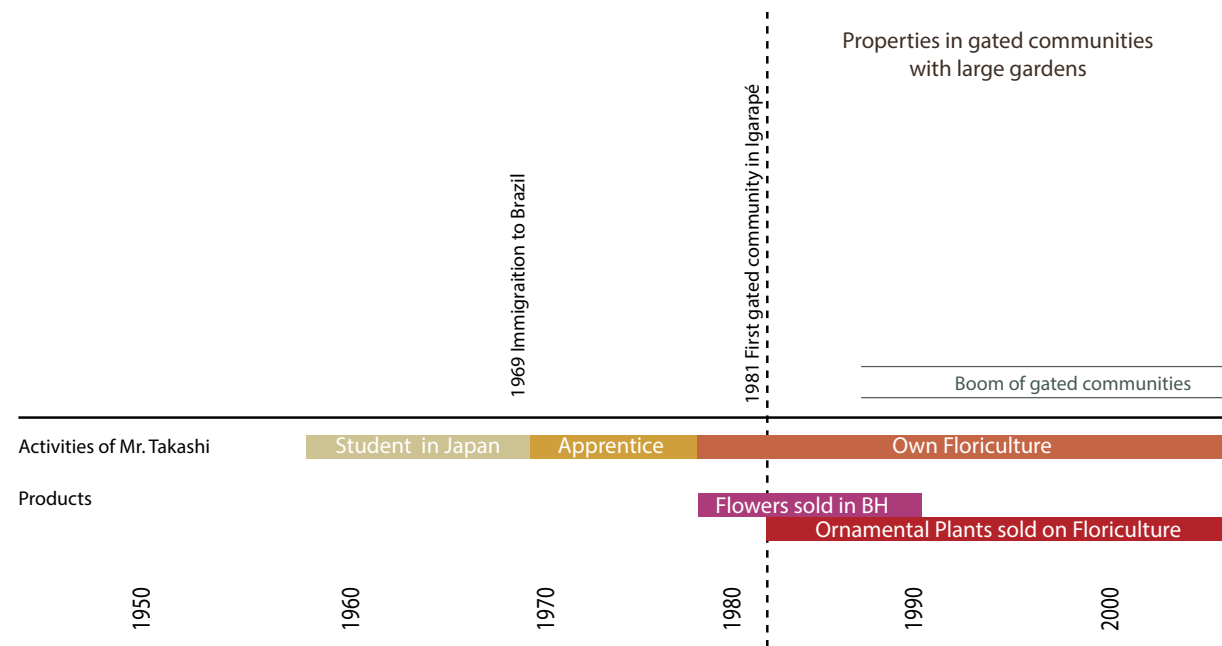


2

Mr. Takashi

Mr. Takashi was born in Tokio and studied sociology but always felt the urge to explore the world. When he was 30 years old he migrated to Brazil which at the time had the largest community of Japanese outside of Japan. Later on he started his own floriculture (1) on which he lives

with his wife and four kids. With the emergence of the gated communities in Igarapé he began increasingly directing his production towards them. Today he is specialized in growing ornamental plants (2) for the their respective yards.



1



2

From Cut Flowers to Ornamental Plants

Mr. Takashi's floriculture is situated on the street leading to the gated community "Fazenda Solar". During the beginnings of his floriculture he used to bring and sell his products, mainly cut flowers, in Belo Horizonte. The Demand for Or

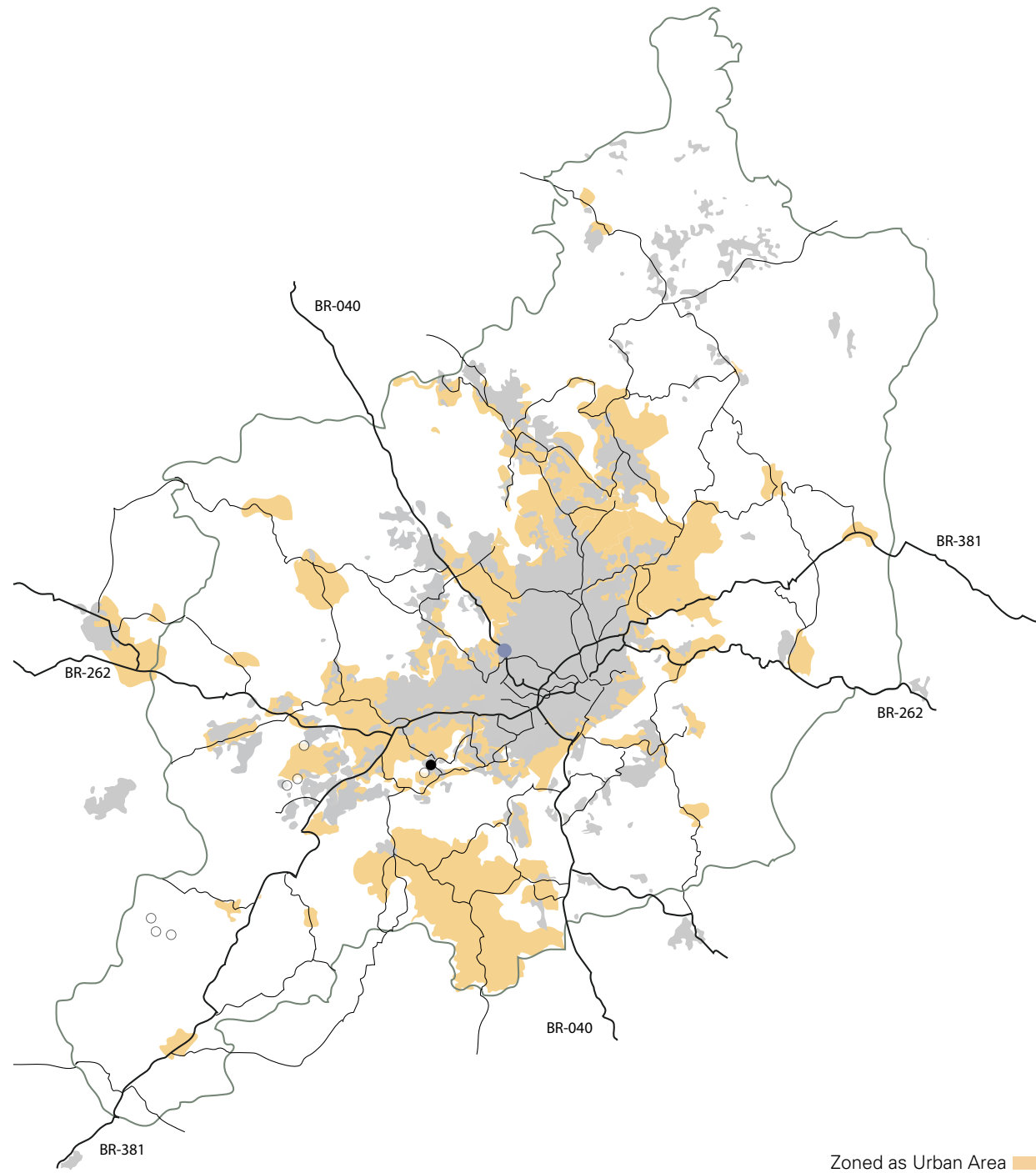
namental Plants had him not only transforming his portfolio but it also saved him the transportation to Belo Horizonte. Today he sells directly from his floriculture.



Cold Beers and Camelia Japonica

The gated communities in Igarapé contain many weekend residences (1) of city dwellers. Cold beers by the pool (2) and the traditional "Churrasco" are part of a celebrated Brazilian lifestyle and put the emphasis on outdoor activities.

Combined with the absence of walls around each property the cultivation of the yards and its decoration with ornamental plants enjoys great popularity. Takashi's floriculture is right in between two gated communities.



Bigger Production Same Space

As the agricultural land in the municipality of Mario Campos is becoming fewer due to similar transformations as observed Igarapé, the rampant spreading of housing absorbed since 2000 30% of agricultural Land in Mario Campos. One way of coping with agriculture in an urban area is to become independant from soil.



Fazenda Koyshi - Fiscal Modules 0,43

DRAFT
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1

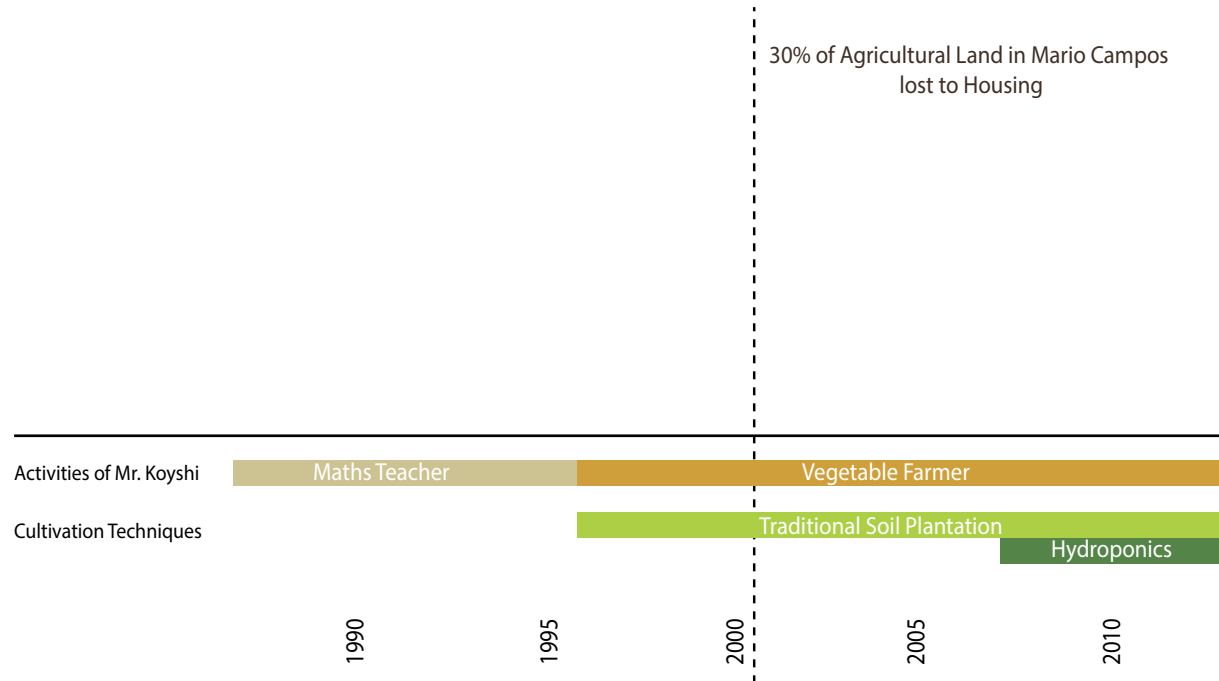


2

Mr. Koyshi

Mr. Koyshi was born and raised in Brazil as a descendant of Japanese immigrants. His parents were like many Japanese immigrants involved in floriculture and vegetable farming. Mr. Koyshi first worked as a mathematics teacher.

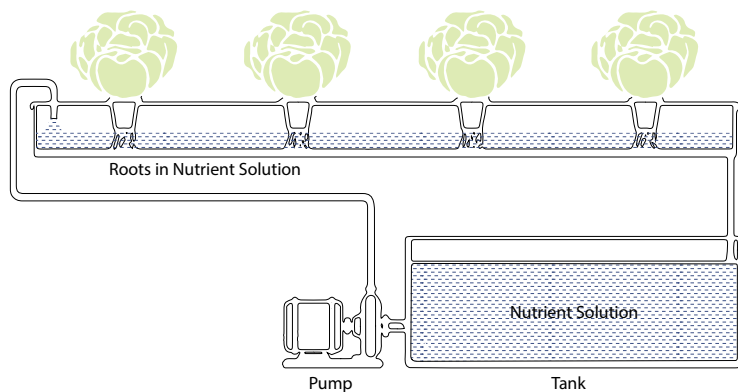
in Belo Horizonte but returned later on to agriculture. He bought land to grow leafy vegetables (2) and seedlings. He always tried to apply new technologies (1) to his craft. A big part of his vegetables is cultivated in hydroponics.



Back to Agriculture

Coming from a rural background Mr. Koyschi's aspiration was to taste a glimpse of that citylife. Hence he worked several years as a teacher in Belo Horizonte. The decision to return to agriculture was not only one of preferences but

also a monetary one. The agriculture turned out to bring him significant more revenue than teaching. While many youngsters are leaving the rural areas and the hard work others are returning.



Hydroponics

Hydroponics (1) is a method of growing plants without soil but instead using a mineral nutrient solution. The roots of the plants are constantly in the nutrient solution which is being pumped through a tank (2) to keep the concentration of the nutrient solution consistent. The amount of nutrient

solution can be calculated and optimized and herbicides and pesticides are not necessary. Hydroponics is a highly efficient method of cultivation and its production volume is above average. The independence from soil makes hydroponics an interesting alternative in urban areas.



1

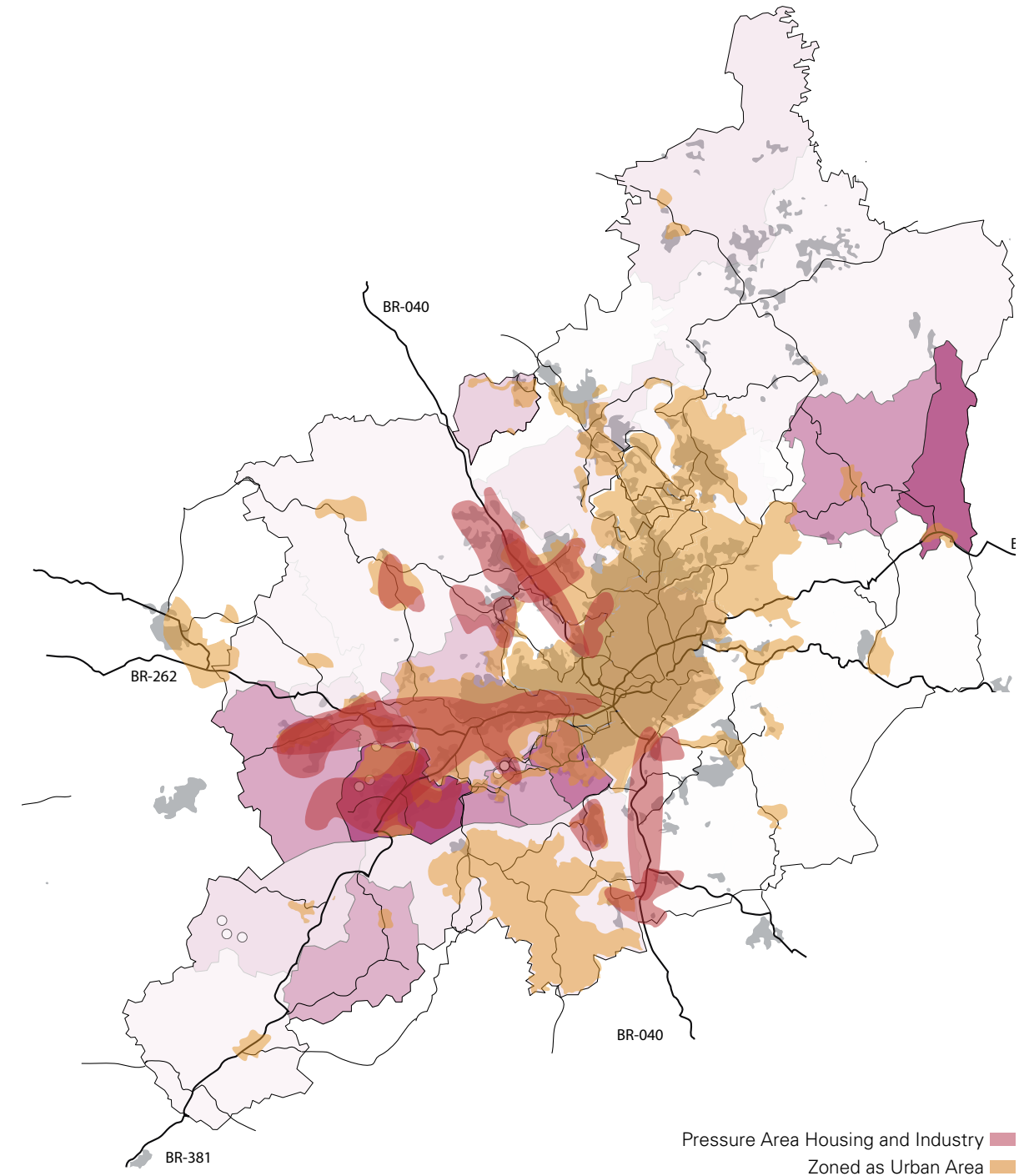
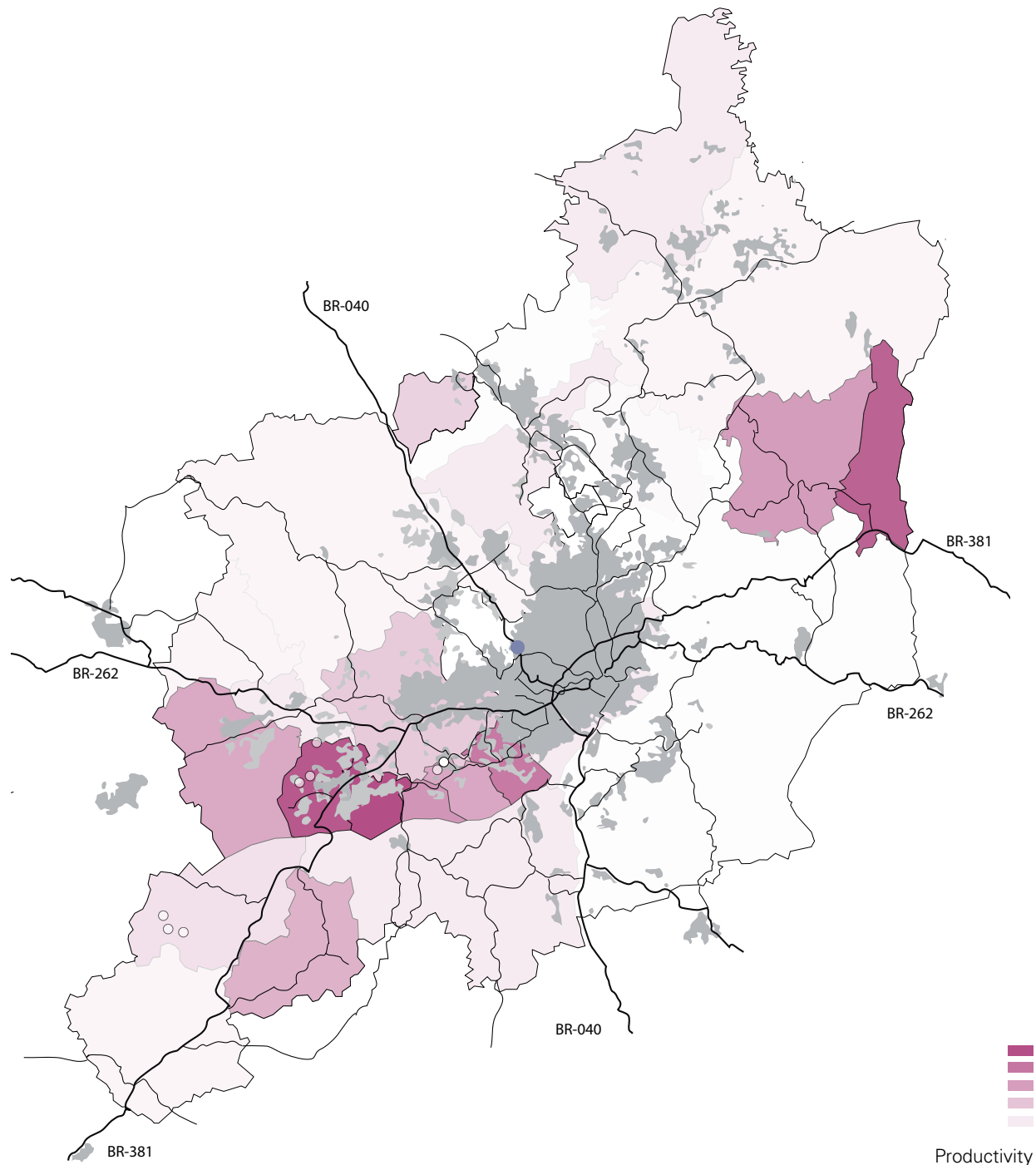


2

UNPRODUCTIVE LAND

The agriculture in the metropolitan area of Belo Horizonte covers a wide array of agricultural activities and it consists of a highly heterogeneous group of farms and establishments that have the ability to adapt to changing circumstances. As the Brazilian agriculture experienced dramatic transformations during the 1950's and 1960's it is still in the process to find its role on a global and a national scale. As 85% of the country's population live in urban areas providing the city with foodstuff becomes more important than ever. The constant transformations of the agricultural land in the metropolitan area is consuming a lot of agricultural land. But there is an unknown variable inbetween which is the unproductive and under used agricultural land.





Where is Unproductive Land Found?

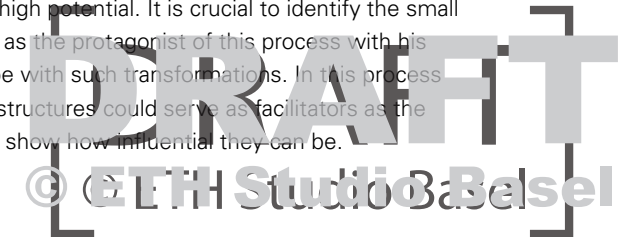
Unproductive and underused land is a common phenomenon in Brazilian agriculture. The reasons for this phenomenon are various and hard to summarize. The ratio of the agricultural production value of a municipality and the size of it shows huge differences in the metropolitan region of Belo Horizonte. Of the 35 Municipalities in the metropoli

tan region nine stick out with a really high production value per area. Its agriculture is largely based on vegetables what indicates the high profitability of this agricultural activity. Then there are the larger municipalities on the outskirts of the metropolitan region with extended rural areas with a low production value per area.

Moving into Unproductive Land

Overlying the maps of pressure areas and urban zones it becomes visible that some of the most productive agricultural land is in a very sought after area. The case studies showed how small scale farms react in such situations how quickly land can be transformed. The question has to be where the small scale farmer can move out to. The

unused or unproductive land could be seen as a reservoir of land with high potential. It is crucial to identify the small scale farmer as the protagonist of this process with his ability to cope with such transformations. In this process the support structures could serve as facilitators as the case studies show how influential they can be.



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IMAGE CREDITS

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Persons

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