Strengthening Municipal Finance through equal Development Distribution at the Municipal Level

Emília Malcata Rebelo

CITTA – Research Centre for Territory, Transports and Environment, Universidade do Porto, Faculdade de Engenharia, Rua Dr. Roberto Frias, s/ n, 4200-465 PORTO, Portugal

Abstract

This communication reports the assumptions, methodology, outcomes and conclusions of a study carried out within the scope of the revision of the Juridical Regime of the Territorial Management Instruments currently taking place in Portugal, namely the Juridical Regime of Edification and Development, Municipal Master Plans and respective regulations, and other Laws that focus on territory. It aims at quantifying the increase in land values that accrue from urban development decisions ("surplus-values") that involve concrete increases in building capacity and/or changes in land uses. These "surplus-values" should be assigned to social purposes, that is, to the achievement of the population´s general interest.

It is proposed that 40% of the surplus-values that accrue from the assignment of a building license higher than the municipal average building should be directed to social aims.

So a methodology is developed to compute the abstract average value of this building capacity, and the concrete average value of specific urban development operations and corresponding surplus values, as well as of the respective percentage aimed at social purposes, through an equal development distribution approach.

This new assessment of the territorial tax instruments is especially relevant within the scope of the prevalent crisis – that strongly affects municipal finance – and its main goal consists in providing municipalities with the appropriate tools to fight for their population´s interests in a sustainable way. This methodology is easily applicable and straight oriented towards the practical implementation of regional and urban policies that trigger growth, based on the improvement in urban resources´ management, clearing up the origins and applications of municipal funds, and justifying the economic and financial sustainability of municipal finance as a necessary condition to improve public services´ quality and efficiency. It further articulates with inclusive growth, as more equity and justice are longed in the distribution of costs and benefits that accrue from development.

In the conclusions and final reflections the relevance of this equal development distribution methodology at the municipal level is stressed, as it assesses municipal benefits and costs that

accrue from the application of this new tax planning instrument, it clears up the origins and applications of funds aimed at urban uses, it quantifies – in a fair, transparent and objective way – the values levied on promoters and builders, according to land surplus-values that result from planning decisions, assuring a more equitable and fair distribution of development benefits and costs among the whole population.

Keywords: urban development costs and benefits; surplus-values; equal development distribution; municipal economic and financial sustainability

JEL Codes: C60; H21; H23; K11; O21

1. Introduction

The main goal of the social assignment of general surplus-values engendered by plans consists allocating for the population´s general social interest land valuation that accrue from urban decisions that involve increases in building capacities and/or land use changes (settled in Municipal Masters Plans, Development Plans, Detail Plans, parcelling out procedures, or other instruments of territorial management).

The study herein reported develops a new urban management instrument directed to this surplus-values´ social assignment goal, and it stands on a rational of equal development distribution at the municipal level. It aims at the reinforcement of Municipal economic and financial sustainability in what concerns the territorial ordinance, in general, and land uses, in particular, thus assuring equity within each Municipality. Additionally, it also turns possible the transparent assessment of benefits that accrue from land surplus-values derived from planning decisions, their unbiased parameter setting, and their collection from promoters/builders, thus ensuring justice and equity in the distribution of urban development´s costs and benefits not only within each Municipality but also among different Municipalities.

The proposal herein presented is applied, as a case study, to the Municipality of Bragança, and consists in the following methodological steps: (a) assessment of the average municipal building capacity of the different kinds of developed spaces – within the categories of developed land and land which development can be programmed -, according to respective Municipal Master Plan and complementary documents; (b) computation of the average cost/m^2 with urban infrastructures´ execution, maintenance and reinforcement; (c) determination of land average municipal building capacity; (d) computation of the average

equal development value that accrues from different urban development typologies (pointing out the specific contribution of each type of urban space for this value); and (e) final conclusions and additional reflections.

2. Brief characterization of the Municipality of Bragança

The Municipality of Bragança is located in the Portuguese northeast extreme, in its northern region, in Alto Trás-os-Montes sub-region. It covers a surface of 1 173.9 Km2 (14.4% of the Alto Trás-os-Montes sub-region surface, and 5.5% of the northern region surface) and lodges 35 341 inhabitants (INE, 2011). This Municipality is bordered at north and east by the Spanish regions of Ourense and Zamora, at southeast by the Municipality of Vimioso, at southwest by the Municipality of Macedo de Cavaleiros and at west by the Municipality of Vinhais (wikipedia; Nemus, 2009; Plural, 2009). It is one of the Portuguese biggest administrative districts, and is made of by forty-nine parishes (Figure 1).

Figure 1. Municipality of Bragança (Source: www.google.pt)

The Municipal Master Plan (Diário da Repúbluca, 2010) is an instrument of territorial planning that, based on the strategy for local development, settles the spatial structure, land

classification and qualifications, as well as the parameters for land occupation, and the requirements of urban facilities (Câmara Municipal de Bragança, 2010b).

According to its 2nd article – Goals and strategy -, the goals pursued by this Municipal Master Plan consist in: (a) the promotion of a municipal balanced development considering its territorial diversity, and the evolution that took place during the latter years; (b) its articulation with the applicable higher-order territorial management tools; (c) its easy application and management, as well as its connection with other enforced plans; (d) its adjustment to the specific features of the Municipality, correcting abnormal situations, and fitting enforced legislation; (e) framing urban uses in rural spaces, respecting growth perspectives, favouring the filling in the interstitial spaces; (f) standing up for the built heritage in general, and the historic and cultural heritage in particular; (g) betting on forest diversification, regulating their possible uses, as well as the urban occupation of rural and isolated areas; (h) maintaining the environment and the landscape; (i) establishing a normative framework for municipal investments, specifying public municipal and state investments; and, e (j) restructuring the road network, linking it up with the road and train plans within the proposed ordinance interventions.

The development strategy outlined by this Municipality to achieve these settled goals consubstantiates through (a) the projection of an innovative image of the city, centred around the eco-city concept, strengthening their potentialities as a regional pole, an international link, and a trade and services centre (b) the strengthening of the competitiveness and attractiveness of rural areas on population, through the provision of facilities, infrastructures and equipment, and through the requalification of their public spaces; and (c) the enhancement of the natural, cultural and landscape heritage, boosting the economic appreciation of endogenous potentialities.

As far as land occupation, use and use changes are concerned, and as explained in the chapter III of the Municipal Master Plan, the municipal land can be classified into rural and urban land. The latter is recognized potentialities to undergo development and building processes, and it includes within the urban perimeter developed land or land which development may be programmed, and well as land allotted to the urban environmental structure. According to the section I of the 4th chapter – Qualification of urban land -, the category of developed land includes developed spaces of types I, II, II, IV, V and VI, spaces for urban equipment, and industrial spaces. The category of land which development can be programmed include, by its turn, the subcategories of developing spaces of types I, II, III, IV and V, spaces for urban equipment, and industrial spaces.

The developed spaces of types I, II, III, IV, V and VI within the category of developed land can be described by their high infrastructure levels and building concentration, being this land mainly assigned to construction (article 42nd). These spaces locate in central areas and other rather homogeneous places, characterized by high building concentration where housing, trade and services functions are prevalent, and they may even contain interstitial spaces. The designations assigned to these spaces correspond to their location within different built-up urban areas, and the applicable building indexes are systematized in Table 1:

Table 1. Building regime in developed spaces by space typology (Source: Diário da República, 2010)

Space typologies	Built-up urban areas	Maximum occupation index (%)	Maximum use index
Developed spaces of Type I	Bragança	60	4
Developed spaces of Type II	Bragança	-	-
Developed spaces of Type III	Izeda	40	0,8
Developed spaces of Type IV	Babe, Baçal, Coelhoso, França, Gimonde, Grijó de Parada, Nogueira/Couto, Outeiro, Parada, Paredes (Parada), Pinela, Quintanilha, Rabal, Rebordãos; Salsas, Santa Comba de Rossas, São Pedro de Sarracenos e Serapicos	40	0,6
Developed spaces of Type V	Alfaião, Aveleda, Calvelhe, Carragosa, Carrazedo, Castrelos, Castro de Avelãs, Deilão, Donai, Espinhosela, Faílde, Formil (Gostei), Freixedelo (Grijó de Parada), Gondesende, Gostei, Macedo do Mato, Meixedo, Milhão, Mós, Oleiros (Gondesende), Paçó (Mós), Paradinha (Outeiro), Paradinha Nova, Parâmio, Pombares, Quinta das Carvas (Bragança - Santa Maria), Quintela Lampaças, Rebordainhos, Rio de Onor, Rio Frio, Sacoias (Baçal), Sanceriz (Macedo do Mato), São Julião, Sarzeda (Rebordãos), Sendas, Sortes, Vale de Nogueira (Salsas), Varge (Aveleda) e Zoio	30	0,5
Developed spaces of Type VI	Remaining built-up areas	30	0,4

According to the definitions set out in the 5th article, the land occupation index is given by the quotient between the total implantation surface ($\sum Ai$) and the land surface (AS) the index refers to, and it is expressed as a percentage [($\sum Ai/AS$)x100]. The land use index, by its turn, is given by the quotient between the total built area ($\sum Ac$) and the land surface (AS) the index refers to [($\sum Ac/AS$)].

The urbanizing spaces that belong to the types I, II, III, IV and V within the category of land which development may be programmed – and also according to their location in built-up urban areas – are made up by the areas expected to acquire the characteristics of developed spaces, despite they don´t possess them yet. These spaces are aimed at different occupations and uses, namely housing (with garage parking places and annexes), equipment facilities and public urban green spaces, trade, services, industrial businesses of type 3, and activities

compatible with the prevailing use. New buildings require approval through detailed plans, lot division operations or execution units to be erected in these spaces. To build in already existing buildings presumes the existence of paved streets, urban infrastructures and wastewater treatment plants (article 52nd). The building parameters applicable to these spaces are systematized in Table 2:

Table 2. Building regime of the developing spaces by space typology (Source: Diário da República, 2010)

Space typologies	Built-up urban areas	Maximum occupation index (%)	Maximum use index
Developing spaces of Type I	Bragança	60	4
Developing spaces of Type II	Bragança	60	2
Developing spaces of Type III	Izeda	40	0,8
Developing spaces of Type IV	Bragança, Gimonde, Parada, Rebordãos, São Pedro de Sarracenos e Santa Comba de Rosas	30	0,6
Developing spaces of Type V	Quinta das Carvas (Bragança - Santa Maria), Rio Frio e Sarzeda (Rebordãos)	25	0,5

The current Municipal Master Plan increased by 26.6% (1 207.8 hectares) the surface of urban land in relation to the previous Municipal Master Plan. It results from a rigorously space delimitation, from the integration within the urban perimeter of buildings originally outside it as well as neighbouring buildings erected in the meanwhile, from the creation of new industrial areas or from the expansion of the already existing ones, as well as from the delimitating borders integrated in the environmental urban structure (Nemus, 2009; Plural, 2009) (Table 3):

Table 3. Surfaces assigned to urban land uses proposed by the in force Municipal Master Plan of Bragança (Source: Plural, 2009)

Space subcategories			Surface (ha)		%
			Partial	Total	
Developed land	Developed spaces	Type I	384,8	2184,1	57,2%
		Type II	32,1		
		Type III	49,7		
		Type IV	593		
		Type V	616,8		
		Type VI	507,7		
	Equipment spaces			156,1	4,1%
	Industrial spaces			151,4	4,0%
Land which development may be programmed	Developing spaces	Type I	2,3	382,8	10,0%
		Type II	49,4		
		Type III	12		
		Type IV	299,2		
		Type V	19,9		
	Equipment spaces			134,2	3,5%
	Industrial spaces			187,7	4,9%
Environmental urban structure				622,5	16,3%
Total urban land				3818,8	100,0%

3. Methodology

Here is proposed a social assignment of 40% focused on the difference between the concrete building capacity allowed on a certain urban operation and the average abstract municipal building capacity (this percentage can, however, be adjusted by municipal decision-makers).

The values of the abstract average municipal building capacity, and concrete building capacity in a certain execution unit or intervention area that result from an urban operation[1] are computed according to the urban development plan, detail plan, or parcelling out procedures – turning to digital cartography, if required. These values result from the quotient between the sum total of surfaces aimed at different kinds of uses multiplied by respective occupation and use indexes (weighed by respective percentages), and the total surface of municipal or that execution unit´s or intervention area´s urban spaces, respectively. These building capacities are, then, valued by the tributary patrimonial values/m^2 of buildable land assigned to urban uses – according to the formulae and parameters predicted in the the Real Estate Municipal Tax Code (IMI, in Portuguese language).

[1] Supposing that the equal distribution criterion was already applied among landowners within this area.

3.1. Computation of the average municipal building capacity

The average abstract municipal building capacity (that represents the gross built surface expressed in m^2 permitted by the regulation of the Municipal Master Plan by m^2 of buildable land) is computed through the quotient between the sum total of the surfaces assigned to the different kinds of uses multiplied by respective occupation and land use indexes (and weighed by the percentages assigned to each kind of use), and the total municipal buildable area (of urban land and land which urban use can be programmed).

The following methodology was pursued in the Municipality of Bragança to set up the average municipal building capacity:

- Identification of the different kinds of land assigned to urban spaces within the categories of urban land and land which urban use can be programmed, settled in the Municipal Master Plan (NEMUS, 2009);
- Computation, for each type of anticipated land use, of the maximum allowed building capacity/m^2 [3], through the product between the maximum land occupation index [1] and the maximum land use index [2];
- For each category of land assigned to urban uses, setting up of the percentages corresponding to each specific land use [5], through the quotient between respective anticipated surfaces (ha) [4] and the total surface of that land category (ha) [6];
- Computation of the contribution of each kind of land within each category [7] for corresponding building capacity through the product between this percentage [5] and respective building capacity [3];
- Identification of building capacity values corresponding to each of these categories [8], through the sum total of these individual contributions extended to all kinds of land within the categories of urban land and land which urban uses can be programmed.

3.2. Computation of the costs of urban infrastructures´ execution, maintenance and reinforcement

The average annual cost/m^2 of urban infrastructures´ execution, maintenance and reinforcement was computed through the quotient between the average annual budgeted investment and the average annual built surface, weighed by the percentage of municipal land assigned to urban uses, settled in the Regional Territorial Ordinance Plan.

For each year under analysis (2009, 2010, 2011 e 2012[2]), the budgeted investments were gathered for the following urban infrastructures: streets and road network; drainage systems of domestic, industrial and pluvial residual waters (namely collector networks and wastewater treatment plants); public lighting; public parking (including surface parks, underground parks and multimodal transport terminals); neighbourhood equipment and public spaces. Investments in sewerage and water supply have been considered in all despite only the investments in urban qualification strictly connected to streets were taken into consideration. As far as investments in environment protection and green spaces are concerned, only those reflecting neighbourhood green spaces were contemplated. It is also important to stress that in the reckoning process used the whole value for the anticipated investments (and not just the part assigned to pre-defined investments), in order to assure that all municipal investment are covered without financing requirements.

The following procedure was followed in order to compute the value of the annual built surface:

- Collection from the statistical yearbooks of the Portuguese Northern Region of data concerning the total number of concluded buildings [1] corresponding either to new construction, and buildings´ enlargement, changes or reconstruction, (INE[3], 2009, 2010, 2011, 2012).
- The total liveable surface for urban uses (m^2) was, then, estimated by the product between this number [1] and the average liveable surface per housing building[4]. The later, by its turn, was reckoned through the product among the average number of floors per building [2], the average number of dwellings per floor [3], the average number of compartments per dwelling [4], and the average liveable surface per room (expressed in m^2) [5];
- The total gross built surface (m^2) [6] is, thus, approached by the division of the total average liveable surface by 0,65 considering that the liveable surface usually amounts to approximately 65% of the gross surface.

[2] The average cost of urban infrastructures´ execution, maintenance and reinforcement was determined from the values of investments and gross building surfaces concerning a four-year period, in order to prevent situation´s variations.

[3] The most recent data made available by the Portuguese National Statistics Institute INE refers to 2011. So, in order to find out the annual average value based on a four-year period, building gross surfaces concluded in 2008, 2009, 2010 e 2011were estimated.

[4] Supposing that shops, offices or other kinds of services inserted in urban areas generally occupy surfaces equivalent to residential uses.

3.3. Computation of the abstract average municipal value of land building capacity

The following methodology was pursued in order to compute the average value/m^2 of the building capacities of urban land and of land which urban use can be programmed, considering each kind of urban spaces typified in the Municipal Master Plan:

- Survey of the surfaces (m^2) assigned to the different types of urban spaces predicted in the Municipal Master Plan [1];
- Computation of the percentage that the surfaces assigned to each type of urban space (m^2) represent in relation to the total surface of urban land and land which urban use can be programmed [2];
- Computation of the minimum [17], maximum [18], and average [19] tributary patrimonial values[5] per square meter of buildable land (according to current or predicted urban uses by the Municipal Master Plan), through the application of the formulae settled in article 38th (Determination of the tributary patrimonial value) of the Real Estate Municipal Tax Code (CIMI). This value is obtained through the product between the base-value of the built plots and the surface adjustment, assignment, location, quality and comfort, and ancientness coefficients. The tributary patrimonial value for each type of land use identified in respective Municipal Territorial Ordinance Plan is computed according to the following methodology[6]:
- The minimum tributary patrimonial value of buildable land (€) [17] is obtained through the product between the base value of the buildings [3], the total surface [8] (given by the sum of the gross built surface and the surface that exceeds the implantation surface), the surface adjustment coefficient [9], the assignment coefficient [10], the minimum location coefficient [11], the minimum quality and comfort coefficient [13], and the ancientness coefficient (that refers to older works) [16];
- The maximum tributary patrimonial value of buildable land (€) [18] is obtained through the product between the base value of the buildings [3], the total surface [8] (given by the sum of the gross built surface and the surface that exceeds the implantation surface), the surface adjustment coefficient [9], the assignment coefficient [10], the maximum location coefficient

[5] These values result from the application of in force laws and land value´s references, which allows a more objective and unbiased analysis of chargeable values though the urban management instrument herein proposed.
[6] In this analysis was used the average construction cost of 482.4 €/m^2 as settled in Decree nº 424/2012, of 28th December of the Ministry of Finance, for the application of article 39th of the Real Estate Municipal Tax Code, to be in force in 2013.

[12], the maximum quality and comfort coefficient [14], and the ancientness coefficient (that refers to recent works) [15];

- The average tributary patrimonial value of buildable land (€) [19] is the arithmetic average between the minimum [17] and maximum [18] tributary patrimonial values per square meter of buildable land;
- As tributary patrimonial values refer to joint values of land and buildings, we must subtract to those values the costs of infrastructure and of construction. In order to reckon the costs of urban infrastructures, the gross built surface was converted into the corresponding land surface, according to the following steps:
  - Estimation of the land surface (m^2) [20] through the sum of the quotient of the gross built surface (m^2) [6] and the maximum number of floors allowed by the regulation of the Municipal Master Plan [5] and the surface that exceeds the implantation surface (m^2) [7];
  - Computation of the urban infrastructures´ costs (€) [21] through the product between the land surface [20] and the costs of urban infrastructure/m^2 (previously reckoned);
  - Computation of the construction costs (€) [22], through the product between the gross built surface and the value of 482.4 €/m^2 settled in Decree nº 424/2012, of 28 December of the Ministry of Finance, for the application of article 39th of the Code of Real Estate Municipal Tax, to be in force in 2013;
- Reckoning of land (€) minimum [23], maximum [24], and average [25] values, being the minimum value [23] given by the difference between the minimum tributary patrimonial value [17], the costs of urban infrastructure [21] and the construction costs [22]; the maximum value [24] given by the difference between the maximum tributary patrimonial value [18], the costs of urban infrastructure [21] and the construction costs [22]; and the average value given by the arithmetic average between these both values;
- Computation of the average value of land building capacity (€/m^2), according to the Real Estate Municipal Tax Code (CIMI) [26], for each type of land aimed at urban uses, through the quotient between the average value of land according to CIMI [25] and the homologous land surface [1];
- Finally, calculation of the contribution of each type of land aimed at urban spaces to the average municipal value of land building capacity (€/m^2) [27] weighing the average value of each type of land [26] by the percentage of its surface in relation to the whole urban land and land which urban use can be programmed [2].

3.4. Computation of the value to assign to social purposes in different urban development operations

The contribution of each type of land aimed at urban uses (within the categories of urban land and land which urban use can be programmed) allows the computation of the equal development values to assign to social purposes, using as reference the land price/m^2 computed according to the application of the Real Estate Municipal Tax Code (CIMI), according to the following methodology:

- Identification of the base-value of built land plots, according to the Real Estate Municipal Tax Code [1];
- Identification of the building capacities of the different types of urban spaces within the categories of urban land and land which urban use can be programmed [2];
- Identification of the abstract municipal average value of land building capacity (€/m^2), according to the Real Estate Municipal Code [3];
- Computation of the average equal value (€/m^2) [4], given by the difference between the average value of land use capacity in each considered type of urban land use [3] and the total contribution of all the types of urban spaces to the value of land building capacity (computed in proportion to the surface of each type of land in relation to the total land surface assigned to urban uses that, in the current case study, amounts to de 61.14 €/m^2).

In order to find out the concrete average equal values to assign socially some specific examples of urban development operations were considered that fit construction and division into lots typologies (Leitão, 2012). Each typology was, then, subdivided into sub-typologies of single-family housing, multifamily housing, and multifamily housing with trade and services (that show different types of uses). More specifically, the studied typologies and respective building gross surfaces were the following ones (ver Leitão, 2011) (Table 4):

Table 4. Typologies of urban development operations considered in this study

Typologies / Gross surfaces	Construction		Division into lots	
	Housing	Trade and services	Housing	Trade and services
Single-family dweelings	210 m^2		2 100 m^2	
Multifamily dwellings	4 200 m^2		12 600 m^2	
Multifamily dwellings with trade and services	3 150 m^2	1 050 m^2	8 400 m^2	4 200 m^2

For each of these typologies of urban operations the total equal value is, then, reckoned [6], through the product between the average equal value/m^2 [4] and respective gross built surface [5]:

- According to the proposal here presented, 40% of the total equal value [7] should be assigned to social uses;
- The contribution of each type of urban land and land which urban use can be programmed to the equal value of each urban operation [8] is proportional to the weight of respective surface in relation to the corresponding total surface.

4. Case study

Tables 5 and 6 systematize the computation of the building capacities of urban land and of land which urban uses can be programmed in the Municipality Bragança:

Table 5. Computation of the building capacity of urban land in the Municipality of Bragança

Space subcategories			Maximum occupation index (%) [1]	Maximum use index (m^2/m^2 of land) [2]	Land building capacity/m^2 [3]=[1]x[2]	Surfaces assigned to each type of use (ha) [4]	% of surfaces assigned to each type of use (%) [5]=[4]/[6]	Land use capacity of urban land [7]
Developed land	Developed spaces	Type I	0,6	4	2,4	384,8	17,6%	0,42
		Type II	0	0	0	32,1	1,5%	0,00
		Type III	0,4	0,8	0,32	49,7	2,3%	0,01
		Type IV	0,4	0,6	0,24	593	27,2%	0,07
		Type V	0,3	0,5	0,15	616,8	28,2%	0,04
		Type VI	0,3	0,4	0,12	507,7	23,2%	0,03
						2184,1 [6]	100,0%	0,57 [8]=∑[7]

Table 6. Computation of the building capacity of land which urban uses can be programmed in the Municipality of Bragança

Space subcategories			Maximum occupation index (%) [1]	Maximum use index (m^2/m^2 of land) [2]	Land building capacity/m^2 [3]=[1]x[2]	Surfaces assigned to each type of use (ha) [4]	% of surfaces assigned to each type of use (%) [5]=[4]/[6]	Land use capacity of urban land [7]
Land which development may be programmed	Developed spaces	Type I	0,6	4	2,4	2,3	0,6%	0,01
		Type II	0,6	2	1,2	49,4	12,9%	0,15
		Type III	0,4	0,8	0,32	12	3,1%	0,01
		Type IV	0,3	0,6	0,18	299,2	78,2%	0,14
		Type V	0,25	0,5	0,125	19,9	5,2%	0,01
						382,8 [6]	100,0%	0,33 [8]=∑[7]

The average annual investments in urban infrastructures´ execution, maintenance and reinforcement amounted to 5 980 625 € (Table 7):

Table 7. Investments allotted to urban infrastructures´ execution, maintenance and reinforcement in the Municipality of Bragança (Source: Câmara Municipal de Bragança, 2007, 2008, 2009, 2010a)

Investments in urban infrastructures´ execution, maintenance and reinforcement	2009	2010	2011	2012
Repairs in different streets in the city of Bragança	25.000	20.000	700.000	150.000
Reconversion of urban Infrastructures in Forte de S. João de Deus area	500			
Different pavements in the city of Bragança	5.000	5.000	5.000	5.000
Reconversion of Av. João da Cruz and other streets	500	5.000	5.000	1.000
Remodelling of Av. Cidade de Zamora and Av. Do Sabor	500	5.000		
Duplication of Av. General Humberto Delgado from the school Abade de Baçal to the inside circular road	2.100.000	400.000	5.000	1.000
Construction of the west approach road to the city since the inside cirsular road till Av. Abade de Baçal	500	5.000	5.000	1.000
Construction of the cycle lane in the environmental area of IPB	1.600.000	1.800.000	500.000	100.000
Requalification of approach roads to different villages	25.000	5.000	5.000	5.000
Requalification of squares in villages	120.000			
Execution of lot infraestrutures in S. Tiago - 1st Phase	450.000	50.000	20.000	1.000
Repavement of residential areas in the city of Bragança	1.000.000	500.000	50.000	25.000
Different pavements in the city of Bragança	80.000	300.000	50.000	20.000
Requalification of Izeda´s central street		5.000	5.000	1.000
Construction of the cycle lane - 2nd Phase - connection to CCV		30.000	895.000	200.000
Construction of the cycle lane of Mãe d´Água		200.000	530.000	200.000
Construction of the new sqare of Mãe d´Agua		100.000	400.000	200.000
Repavement of Av. Abade de Baçal and the twentieth-century residential area				60.000
Repavement of the streets in the industrial area	500			
Construction of the inside circular road - connection to Av. Abade de Baçal				350.000
SEWERAGE	523.500	430.000	585.000	1.791.000
WATER SUPPLY	254.000	410.000	410.000	209.000
ENVIRONMENTAL PROTECTION AND CONSERVATION OF THE NATURE			130.000	
Gardening of different municipal spaces	30.000	30.000		31.000
Acquisition of equipment and urban maintenance	10.000	30.000		30.000
Protection of built-up areas	1.000	5.000		1.000
Green park of Coxa	500	20.000		
PUBLIC LIGHTING	145.000	110.000	110.000	47.500
Construction of infrastructures in the industrial area	205.000	10.000	10.000	1.000
Maintenance of the municipal road network	85.000	30.000	40.000	35.000
Different pavings	150.000	550.000	100.000	50.000
Traffic signs in the municipal road network - directional and informative signs	5.000	5.000	75.000	10.000
Urban road signs	25.000	20.000	50.000	10.000
Maintenance of the urban road network - road signs and painting	125.000	30.000	30.000	20.000
Construction of a little bridge in the CM over the Fervença River		30.000	20.000	1.000
Construction of the international bridge over the Maçãs River	55.000			
Pavement of municipal roads	1.271.000		15.000	3.000
Pavement of different villages with granit cubes	880.000		30.000	1.000
Repairs and paving of municipal roads	100.000		435.000	147.000
Repirs, widening and paving of municipal roads			366.000	40.000
Maintenance of car parks		25.000		5.000
Ground leveling and widening of the streets	150.000			
Parking	1.500			
TOTAL	9.424.000	5.165.000	5.581.000	3.752.500
Annual average investment (€)	5.980.625			

(unit: euros)

It is supposed that the total built surface concluded each year refers to the total municipal land surface aimed at urban uses, which represents about 70.4% of its total surface (according to the Municipal Territorial Ordinance Plan). The average annual cost/m^2 with urban infrastructures´ execution, maintenance and reinforcement [8] thus corresponds to 70,4% of the quotient between the average municipal annual investment (expressed in euros) [7] and the annual average gross built surface [9] (Table 8):

Table 8. Computation of the average annual cost/m^2 with urban infrastructures´ execution, maintenance and reinforcement carried out by the Municipality of Bragança during 2008, 2009, 2010 and 2011 (Source: INE, 2009, 2010, 2011, 2012)

	2008	2009	2010	2011	Total	Annual average
Total number of finished buildinds	240	184	120	132	676	169
Floors per building (nº)	2,55	2,40	2,60	2,40	9,95	2,49
Dwellings per floor (nº)	0,64	0,80	0,80	0,70	2,94	0,74
Compartments per dwelling (nº)	5,47	5,40	4,90	5,30	21,07	5,27
Average liveable surface per compartment (m^2)	20,04	19,90	19,70	20,80	80,44	20,11
Total gross built surface (m^2) (urban uses)	66.054,6	58.405,3	37.067,5	37.610,5	199.138	49.784
Average annual investment (€)	5.980.625					
Average annual cost with infrastructures´ execution, maintenance and reinforcement (€/m^2)	84,6					

The average costs with infrastructures´ execution, maintenance and reinforcement amount to 84.6 €/m^2, what points out the strong investment in infrastructures that translates an important bet in the whole Municipality´ s development (especially in less developed built-up areas, with lower building levels).

The calculations of the abstract average municipal building capacity of land assigned to urban uses is systematized in Table 9 – for urban spaces belonging to the categories of urban land and land which urban uses can be programmed -, that amounts to 61.14 €/m^2:

Table 9 Computation of the value of the abstract average building capacity in the Municipality of Bragança (Source: author)

Types of land	Developed land						Land which development may be programmed				
	Developed spaces						Developed spaces				
	Type I	Type II	Type III	Type IV	Type V	Type VI	Type I	Type II	Type III	Type IV	Type V
Surfaces assigned to each kind of space (m^2) [1]	3.848.000	321.000	497.000	5.930.000	6.168.000	5.077.000	23.000	494.000	120.000	2.992.000	199.000
% of surfaces assigned to each kind of space (m^2) [2]	14,99%	1,25%	1,94%	23,10%	24,03%	19,78%	0,09%	1,92%	0,47%	11,66%	0,78%
Base-value of built plots (€/m^2) [3]	603	603	603	603	603	603	603	603	603	603	603
Building capacity of urban land (m2 of gross surface/m^2 of land) [4]	0,42	0,00	0,01	0,07	0,04	0,03	0,01	0,15	0,01	0,14	0,01
Maximum number of floors [5]	6	3	3	2	2	2	6	4	3	0	2
Gross building surface (m^2) [6]	9.235.200	0	159.040	1.423.200	925.200	609.240	55.200	592.800	38.400	538.560	24.875
Surface that exceeds the implantation surface (m^2) [7]	230.880	0	3.976	35.580	23.130	15.231	1.380	14.820	960	13.464	622
Total surface (m^2) [8]=[6]+[7]	9.466.080	0	163.016	1.458.780	948.330	624.471	56.580	607.620	39.360	552.024	25.497
Surface adjustement coefficient [9]	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85	0,85
Assignment coefficient [10]	1	1	1	1	1	1	1	1	1	1	1
Minimum location coefficient [11]	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35
Maximum location coefficient [12]	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
Minimum quality and comfort coefficient [13]	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Maximum quality and comfort coefficient [14]	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7
Ancientness coefficient (recent works) [15]	1	1	1	1	1	1	1	1	1	1	1
Ancientness coefficient (older works) [16]	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
Minimum tributary patrimonial value (€) [17]=[3]x[7]x[9]x[10]x[11]x[13]x[16]	339.628.751	0	5.848.770	52.338.838	34.024.658	22.405.083	2.030.006	21.800.494	1.412.178	19.805.793	914.790
Maximum tributary patrimonial value (€) [18]=[3]x[8]x[9]x[10]x[12]x[14]x[15]	10.722.564.862	0	184.654.010	1.652.411.893	1.074.207.057	707.360.470	64.090.175	688.272.745	44.584.469	625.297.182	28.881.215
Average tributary patrimonial value (€) [19]=([17]+[19])/2	5.531.096.807	0	95.251.390	852.375.365	554.115.857	364.882.777	33.060.090	355.036.619	22.998.324	322.551.487	14.898.003
Land surface (m^2) [20]=[6]/[5]+[7]	1.539.200	0	53.013	711.600	462.600	304.620	9.200	148.200	12.800	-	12.438
Infrastructure costs (€) [21]=[20]xinfrastructure costs/m^2	130.216.320	0	4.484.928	60.201.360	39.135.960	25.770.852	778.320	12.537.720	1.082.880	-	1.052.213
Construction costs (€) [22]=[6]xconstruction costs/m^2	4.455.060.480	0	76.720.896	686.551.680	446.316.480	293.897.376	26.628.480	285.966.720	18.524.160	259.801.344	11.999.700
Minimum land value, according to CIMI (€) [23]=[17]-[21]-[22]	-4.245.648.049	0	-75.357.054	-694.414.202	-451.427.782	-297.263.145	-25.376.794	-276.703.946	-18.194.862	19.805.793	-12.137.123
Maximum land value, according to CIMI (€) [24]=[18]-[21]-[22]	6.137.288.062	0	103.448.186	905.658.853	588.754.617	387.692.242	36.683.375	389.768.305	24.977.429	625.297.182	15.829.303
Average land value, according to CIMI (€) [25]=([23]+[24])/2	945.820.007	0	14.045.566	105.622.325	68.663.417	45.214.549	5.653.290	56.532.179	3.391.284	322.551.487	1.846.090
Average land building capacity, according to CIMI (€/m^2) [26]=[25]/[1]	245,8	0,0	28,3	17,8	11,1	8,9	245,8	114,4	28,3	107,8	9,3
Contribution to average land building capacity (€/m^2) [27]=[2]x[26]	36,85	0,00	0,55	4,11	2,67	1,76	0,22	2,20	0,13	12,57	0,07

The average equal values the Municipality can potentially collect from the different studied urban operations – aimed to be socially assigned – are systematized in Table 10:

Table 10. Computation of the average equal values to collect from different urban operations and to be socially assigned in the Municipality of Bragança (Source: author)

Types of land		Developed land							Land which development may be programmed						Global total
		Developed spaces							Developed spaces						
		Type I	Type II	Type III	Type IV	Type V	Type VI	Total	Type I	Type II	Type III	Type IV	Type V	Total	
Municipal average value/m^2 of land building capacity,		0,00	5531096806,56	0,00	95251389,91	852375365,46	554115857,31		364882776,60	33060090,06	355036619,34	22998323,52	322551487,37		
Average equal value/m^2 (€/m^2) [2]=[1]-61,14		-61,14	5531096745,42	-61,14	95251328,77	852375304,32	554115796,17		364882715,46	33060028,92	355036558,20	22998262,38	322551426,23		
Single-family housing - construction	Gross built surface (m^2) [3]	210							210						
	Total equal value (€) [4]=[2]x[3]	38.778	-12.839	-6.904	-9.098	-10.501	-10.969		38.778	11.193	-6.904	9.800	-10.891		
	40% of average equal value (€) [5]=0,4x[4]	15.511	-5.136	-2.762	-3.639	-4.200	-4.387		15.511	4.477	-2.762	3.920	-4.356		
	Contribution to the total equal value [6]	8.758	0	-27	-317	-238	-163	8.014	101	312	-12	249	-13	637	8.651
Multyfamily housing - construction	Gross built surface (m^2) [3]	4.200							4.200						
	Total equal value(€) [4]=[2]x[3]	775.562	-256.778	-138.083	-181.969	-210.023	-219.374		775.562	223.860	-138.083	196.002	-217.815		
	40% of average equal value (€) [5]=0,4x[4]	310.225	-102.711	-55.233	-72.788	-84.009	-87.749		310.225	89.544	-55.233	78.401	-87.126		
	Contribution to the total equal value [6]	175.170	0	-537	-6.334	-4.752	-3.269	160.278	2.016	6.250	-250	4.971	-255	12.732	173.010
Multifamily housing with trade and services -	Gross built surface (m^2) [3]	4.200							4.200						
	Total equal value (€) [4]=[2]x[3]	775.562	-256.778	-138.083	-181.969	-210.023	-219.374		775.562	223.860	-138.083	196.002	-217.815		
	40% of average equal value (€) [5]=0,4x[4]	310.225	-102.711	-55.233	-72.788	-84.009	-87.749		310.225	89.544	-55.233	78.401	-87.126		
	Contribution to the total equal value [6]	175.170	0	-537	-6.334	-4.752	-3.269	160.278	2.016	6.250	-250	4.971	-255	12.732	173.010
Single-family housing - division into lots	Gross built surface (m^2) [3]	2.100							2.100						
	Total equal value (€) [4]=[2]x[3]	387.781	-128.389	-69.041	-90.985	-105.011	-109.687		387.781	111.930	-69.041	98.001	-108.908		
	40% of average equal value (€) [5]=0,4x[4]	155.112	-51.356	-27.617	-36.394	-42.005	-43.875		155.112	44.772	-27.617	39.200	-43.563		
	Contribution to the total equal value [6]	87.585	0	-269	-3.167	-2.376	-1.634	80.139	1.008	3.125	-125	2.486	-128	6.366	86.505
Multifamily housing - division into lots	Gross built surface (m^2) [3]	12.600							12.600						
	Total equal value (€) [4]=[2]x[3]	2.326.686	-770.333	-414.249	-545.908	-630.068	-658.121		2.326.686	671.581	-414.249	588.005	-653.445		
	40% of average equal value (€) [5]=0,4x[4]	930.675	-308.133	-165.699	-218.363	-252.027	-263.248		930.675	268.632	-165.699	235.202	-261.378		
	Contribution to the total equal value [6]	525.509	0	-1.611	-19.001	-14.257	-9.806	480.834	6.048	18.749	-749	14.914	-765	38.196	519.030
Multifamily housing with trade and services -	Gross built surface (m^2) [3]	12.600							12.600						
	Total equal value (€) [4]=[2]x[3]	2.326.686	-770.333	-414.249	-545.908	-630.068	-658.121		2.326.686	671.581	-414.249	588.005	-653.445		
	40% of average equal value (€) [5]=0,4x[4]	930.675	-308.133	-165.699	-218.363	-252.027	-263.248		930.675	268.632	-165.699	235.202	-261.378		
	Contribution to the total equal value [6]	525.509	0	-1.611	-19.001	-14.257	-9.806	480.834	6.048	18.749	-749	14.914	-765	38.196	519.030

The analysis of the obtained results leads to the conclusion that these equal development values to be collected by the Municipality in each of the considered typologies of urban development operations (representative of urban development operations in general) assume

potential important amounts, especially in land plots already in urban development uses. These amounts – that result from the surplus-values resulting from municipal planning decisions – will potentially support the municipal economic and financial sustainability, especially in socio-economic grounds, as they are assigned to uses that will trigger municipal population´s quality of life.

5. Conclusions and final reflections

The collection of the average equal development value proposed in this article allows:

- To reinforce municipal finance in order to support their economic and financial sustainability;
- To clear up municipal funds´ origins and applications that accrue from urban development, and to objectively quantify the concrete contribution values thus obtainable;
- To assess the differences between concrete building capacities of certain urban development operations and the average abstract municipal building capacity in an objective and transparent way, so to figure out the importance of the surplus-values that accrue from urban operations and from municipal planning decisions in relation to the average municipal land value;
- To assure that these surplus-values are allocated for the population´s general social interest and not for private-oriented interests;
- To render easy the computation of these surplus-values, thus favouring their articulation with digital cartography;
- To assure a better equity among the whole population living in a certain Municipality, in what concerns the distribution of costs and benefits that accrue from urban development processes.

This new territorial management tool takes on a general character, applicable to all the Portuguese Municipalities, and it is based on information and methodologies that support inter-municipal comparisons.

Besides, it fits the goals of sustainable development settled in Europe 2020 Agenda as it promotes: (a) a smart development, resorting to digital modern technologies of the information and communication society in order to increase the efficiency and flexibility in the application of urban planning instruments; (b) a sustainable development, as it suggest

higher efficiency levels in resource management, rendering clear the origins and applications of municipal funds, and proving that the economic and financial sustainability of municipal finance are required conditions to improve public services´ quality and efficiency, especially in urban development; and (c) an inclusive development, as it seeks a better equity and fairness in the distribution of costs and benefits that result from urban development operations.

6. Bibliographic references

Câmara Municipal de Bragança - Plano Plurianual de Investimentos 2008, 2007. www.cm-braganca.pt

Câmara Municipal de Bragança - Plano Plurianual de Investimentos 2009, 2008. www.cm-braganca.pt

Câmara Municipal de Bragança - Plano Plurianual de Investimentos 2010, 2009. www.cm-braganca.pt

Câmara Municipal de Bragança - Plano Plurianual de Investimentos 2011, 2010a. www.cm-braganca.pt

Câmara Municipal de Bragança - Regulamento do Plano Director Municipal de Bragança, 2010b. www.cm-braganca.pt

Diário da República - Aviso nº 12248-A/2010, de 18 de Junho (Aprovação Final do Plano Director Municipal de Bragança), 2010c.

Instituto Nacional de Estatística, I. P. - Anuário Estatístico da Região Norte 2008, Lisboa. Portugal, 2009. www.ine.pt

Instituto Nacional de Estatística, I. P. - Censos 2011 XV recenseamento geral da população, V recenseamento geral da habitação, Lisboa, Portugal, 2009-2012. www.ine.pt

Instituto Nacional de Estatística, I. P. - Anuário Estatístico da Região Norte 2009, Lisboa. Portugal, 2010. www.ine.pt

Instituto Nacional de Estatística, I. P. - Anuário Estatístico da Região Norte 2010, Lisboa. Portugal, 2011. www.ine.pt

Instituto Nacional de Estatística, I. P. - Anuário Estatístico da Região Norte 2011, Lisboa. Portugal, 2012. www.ine.pt

Leitão, Dinis - Taxas e Procedimentos Sustentáveis em Operações Urbanísticas, Tese de Doutoramento, Universidade do Minho, Escola de Engenharia, 2011.

Nemus, Gestão e Requalificação Ambiental, Lda. - Avaliação Ambiental da 1ª Revisão do Plano Director Municipal de Bragança, Volume I – Resumo Não Técnico, Câmara Municipal de Bragança, Bragança, Portugal, 2009.

Plural - 1ª Revisão do Plano Director Municipal de Bragança – Relatório. Volume II. Janeiro de 2009. Câmara Municipal de Bragança, Bragança, 2009.

www.google.pt

www.wikipedia.org