

Legal and institutional aspects of urban and peri-urban forestry and greening

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FOREWORD

It is a recognized fact that forest and trees in rural areas contribute to the improvement of livelihoods and the alleviation of poverty. With more than two-thirds of humanity living in cities by the year 2050, the global village, which already accounts for over 50 percent of the people in cities, is turning into an urban globe. This deep transformation of societies and their territory generally generates poverty and other perverse effects, namely, natural resource degradation. Among the problems faced by cities in developing countries and those with economies in transition is one of first necessity product supply (agricultural products, wood energy and water), erosion, sand encroachment and floods. On the other hand, fighting against pollution and looking for recreational areas have become universal needs.

Good tree and forest management in and around cities, associated with good governance, enabling policies, participatory approaches and capacity building of stakeholders should lead to convincing and promising results. An important result for poor dwellers is income generation from the production of service wood, fuelwood, non-wood forest products and foodstuffs. Activities towards reduction of air pollution and other environmental improvement can also generate income and reduce expenses.

The policy and legal conditions for promoting forest and tree cover in urban environments and the constraints on the use of and access to these resources are different from those of forestry in rural areas.

As part of its mandate to support countries in addressing poverty alleviation and food security, FAO assists in building the capacities of national policy and decision-makers and institutions in order to address legal, economic, social and environmental issues related to urbanization and urban environment with regard to trees and forests. However, so far little information has been published on this subject generally, and in particular on the legal and institutional aspects of urban and peri-urban forestry and greening (UPFG).

For those who are interested in understanding the overall legal and institutional framework of UPFG in their country, and in developing an enabling policy-legal-institutional environment for UPFG, this concept note is intended to provide a basic understanding of the overall legal framework at

national and sub-national levels. The suggested elements provided in the Annexes cover relevant aspects of the legal and institutional framework of UPFG, as well as guidelines for undertaking case studies at national and city levels, with particular attention to developing countries.

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**LIST OF SELECTED ACRONYMS
AND ABBREVIATIONS**

CBD	Convention on Biological Diversity
FAO	Food and Agriculture Organization of the United Nations
IUCN	World Conservation Union
NFAP	National Forestry Action Programme
NGO	Non-governmental organization
OPFA	Ontario Professional Foresters Act
UA	Urban agriculture
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment Programme
UPA	Urban and Peri-urban Agriculture
UPFG	Urban and Peri-urban Forestry and Greening

EXECUTIVE SUMMARY

In general, urban and peri-urban forestry and greening (UPFG) receives little attention on political agendas despite its importance to society in terms of the social, economic, aesthetic and environmental benefits. This is even more problematic in developing countries and countries with economies in transition, where urban development is too often accompanied by severe degradation of the environment (including trees and forests), increased poverty and food insecurity. This study succinctly describes the legal and institutional issues related to UPFG globally, illustrating these matters using case studies.

Legal and institutional aspects of urban, peri-urban forestry and greening provides an overview of existing UPFG laws and regulations and identifies the main issues that legislative bodies may have to consider with regard to UPFG. Introductory and concluding considerations are contained in the first and last sections of this six part paper. In part 2, the definition of UPFG is analysed, including its technical and legal features. UPFG is broadly defined to include shrubs, trees and forest as well as lower vegetation encompassing recreation parks, agroforestry, farming and forestry systems, the geographical administrative limit of urban local authorities (including the built-up areas) and surrounding environment. Part 3 briefly describes UPFG-related international instruments, both soft law and legally binding instruments. Part 4 deals with UPFG-related national and sub-national legal frameworks, including legislation on forestry, the environment, land-use planning, watershed protection and erosion control. Finally, part 5 analyses the institutional framework for UPFG in selected countries.

At national and sub-national levels, there is a clear need to further develop or improve existing legal frameworks. On the one hand, with some rare exceptions, UPFG is not comprehensively addressed in legislation at the country level, on the other, there are many general laws that refer to or have an impact on UPFG. Furthermore, at the municipal level, there are specific laws dealing with UPFG, such as those requiring permits for tree removal or providing for the protection of trees in and around the cities. However, there are many exemptions to these laws, mainly owing to the ownership status and the location of trees. Negative effects of trees, such as damage caused by growing roots to construction projects, are also addressed, although the liability for "hazardous trees" still remains unresolved in many municipalities.

In some countries, forestry acts address UPFG by including explicit provisions on urban and peri-urban forests as a category, but these provisions are still very uncommon. Most forestry acts regulate UPFG only partly as may be the case in urban and peri-urban areas where forests and green spaces are defined as "forests" according to the forest act, or where single trees are declared "protected trees" under the forest act.

UPFG is also addressed by environmental legislation in general terms. But mostly environmental acts refer to UPFG only very broadly, within the preamble or the objectives' provisions

Long-term land-use planning and stakeholder participation are key issues for the sustainable development of UPFG and the preservation of urban and peri-urban trees and green spaces. Urban, peri-urban forests and green spaces are a distinct category in some land-use planning acts. While municipalities are aware of the environmental importance of urban, peri-urban forests and green spaces, they are not yet always able to solve the planning conflicts in practice.

Urban and peri-urban agriculture (UPA) receives far more recognition than UPFG at the international level. The definition of UPA typically comprises forestry activities which may be combined with other forestry activities, for instance, with greenbelt protection plantations, which could play an important role in the land-use planning process.

The role of UPFG as an important source of fuelwood is sometimes acknowledged by forestry legislation, especially in developing countries, but most local-level laws do not yet recognize it. Collection of dead wood is usually not restricted in urban and peri-urban areas where it is accessible.

The role of UPFG in controlling soil erosion and the use of urban and peri-urban forests as a catchment cover is recognized by many environmental acts. These issues are of special importance for cities in mountainous areas, for which there may be specific provisions. The relevance of soil protection is rarely acknowledged explicitly in tree by-laws at the local level. Local authorities responsible for issuing permits may take into account the negative impacts of tree removal, as is the case in Mississauga (Canada).

Although incentives at all levels are crucial for the promotion of UPFG, they are seldom found in legislation. Forest acts, to the extent that they comprise

UPFG activities, provide for different kinds of incentives, such as taxation and financial tools, to encourage forestry activities. For UPFG, most of the existing incentives are still only political programmes or initiatives at the local level. This matter should be further developed.

The institutional framework of UPFG is very broad inasmuch as many areas of law affect UPFG. Many government decisions taken at the national level, such as those relating to air quality and drinking water standards, have impacts on sub-national level decisions. UPFG is restricted to the municipal level in many countries. Ill-defined institutional responsibilities lead to overlapping functions. Cooperation and coordination between the different authorities responsible for or affecting UPFG are therefore essential.

1. INTRODUCTION

The objective of this paper is to provide an overriding analysis of the relevant issues that need to be considered in order to understand the legal and institutional aspects of urban and peri-urban forestry and greening (UPFG). A brief overview of existing UPFG laws and regulations is given and issues that legislative bodies may have to consider with regard to UPFG are highlighted. Legislation of several countries was assessed to illustrate the broad framework, the gaps, the overlaps and the positive examples of laws and regulations. This study is not based on a thorough analysis; rather only the most relevant aspects of regulating legal and institutional instruments covered and specific institutional and legal issues affecting UPFG are disclosed.

The paper is divided into six sections of which the first and last contain introductory and concluding considerations. Section 2 provides a breakdown of existing UPFG definitions. An overview of UPFG-related international, national and sub-national legal frameworks is in Section 3. Many legal documents, such as resolutions, declarations and conventions, are related to UPFG on an international level. Even though these documents do not usually mention UPFG specifically, potentially, they can be applied, either because components of UPFT are explicitly addressed (such as "greening" and "open space") or very broad terms (such as "environment") are mentioned. The application and implementation of international legal framework has not yet been analysed with regard to UPFG. Section 4 looks at the institutional framework and deals with those UPFG-related at the national and sub-national levels, including legislation on forestry, the environment, land-use planning, watershed protection and erosion control. Section 5 examines the institutional framework against examples from six countries, regions or cities from different areas of the world: South Africa (Johannesburg), Canada (Ontario province and Toronto), Guangzhou and Hong Kong, Germany (Brandenburg), Philippines (Manila) and Zimbabwe.

2. DEFINITIONS OF URBAN, PERI-URBAN FORESTRY AND GREENING

2.1 Technical definitions

Definitions of UPFG vary in scope. Broad definitions consider an urban forest as the entire area influenced and/or utilized by the urban population.

Accordingly, urban forests would include natural woodlands within the zone of influence of urbanization, traditionally belonging to the realm of rural forestry. Therefore, broadly speaking, the urban forest is an ecosystem that not only includes vegetation¹ but also soil, water, animals, utilities, buildings, transportation systems and people. Elements are, *inter alia*, community gardens, street corridors, green visual linkages, vacant land and productive land in urban and peri-urban areas.

Box 1: One of the broad definitions used by Strom, 2000

Urban forestry addresses "the land in and around areas of intensive human influence, ranging from small communities to dense urban centres, that is occupied or potentially occupied by trees and associated natural resources."

Urban forestry is a relatively new, multidisciplinary approach in international forest research. It has been defined as *the art, science, and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic and aesthetic benefits trees provide society* (Helms, J.A. (ed.) 1998. The Dictionary of Forestry. Society of American Foresters)

The "national forestry action programme" (NFAP) of South Africa defines urban forestry as an integrated approach, where the planting, care and management of trees in urban and peri-urban areas is undertaken in order to secure economic, environmental and social benefits for urban dwellers.

On the other hand, narrow definitions of UPFG include all trees and related vegetation in and around places where people live. The focus here is on trees in a built-up environment which excludes urban farming (food production occurring within settlements). One example of a narrow definition is provided by Lindén, Löfström and Tyrväinen (Finland):

"Urban forests are located in or near urban areas the main function of which is recreation. This definition excludes, for example, man-made parks with lawns."

¹ This term as used in this paper does not refer to urban and peri-urban agriculture *per se*. UPA is only partly included, when it is combined with UPFG or when it consists of forestry activities within or around the boundaries of cities.

The focus here is on the urban and peri-urban forest found within a built-up environment, although an urban and peri-urban forest comprises natural woodlands within the zone of influence of urbanization as well. The term "urban" is often incorrectly perceived as the area containing a built-up core of mega cities while "peri-urban" refers to the residential and metropolitan area. The Latin system refers to municipalities and the Anglo-American to local governments. Geographical and administrative borders differ from each other, therefore, problems resulting from the dynamic of urban processes have to take natural resources into consideration, i.e. watersheds cannot only affect one, but two or more municipalities. A flexible understanding of the concepts of urban and peri-urban areas allows for comprehensive action by local authorities and partnership with other concerned entities.

In this paper, a broad definition of UPFG has been used, thereby including all urban and peri-urban vegetation² such as green spaces³ or urban and peri-urban vegetated areas, including agroforestry, farming and forestry.

One can debate whether urban vegetation management falls within the scope of landscape horticulture or forestry. Although arboriculture traditionally focuses on the management of individual trees and urban forestry on tree populations, the distinction between the two is blurred (Ball, 1997). Further confusion arises due to the fact that many urban foresters use "urban greening" and "urban forestry" interchangeably (Kuchelmeister, 1998).

Box 2: Location and nature of tree systems in the context of urban and peri-urban forestry and greening

Urban and peri-urban forestry and greening systems, according to the definition used in this paper, may be found for instance:

- on the suburban fringe, in suburbs, city residential, city centre
- in home gardens
- in parks, roof gardens, botanical gardens
as greenways along roads, railways, water courses

² See footnote 1.

³ Green space is defined as any vegetated land or water within or adjoining an urban area. It includes amenity grasslands, parks and gardens, green corridors (disused railway lines, rivers and canals), outdoor sports facilities, playing fields and children's play areas, derelict, vacant and contaminated land that has the potential to be transformed and countryside immediately adjoining a town which people can access from their homes.

- in playgrounds
- on farms such as woodlots, orchards, agroforestry and linear systems
- as street/highway corridor
- as greenbelts.

2.2 Legal definitions

Resulting analysis of current legislation shows that there is no specific legal definition of the term "urban and peri-urban forestry and greening" in the countries that were examined, except for one given by the Ontario Professional Foresters Act (OPFA) (Canada) defining "urban forest":

"tree-dominated vegetation and related features found within an urban area and includes woodlots, plantations, shade trees, fields in various stages of succession, wetland and riparian areas".

While this definition does not specifically include peri-urban areas but refers to vegetation that is typically found in peri-urban areas, like woodlots and tree plantations, it does not necessarily mean that "peri-urban forests" are excluded, as this also depends on the scope of the term "urban area", which may include peri-urban areas as well.

The fact that legal definitions of the term "UPFG" are rare and that one is not used in most laws illustrates fragmented and not exhaustive regulation. There are different laws that include definitions of components of UPFG and refer to UPFG partly or very generally (see the sections below). Table 1 illustrates this in forestry legislation by reviewing different definitions of the term "forest" in the forestry legislation for different countries and subsequently how UPFG fits into the concept of "forest".

Table 1: Scope of the term "forest" in different countries

Country	Relevant sections of Forest Acts	Content of relevant laws regarding the definition of forest	UPFG as part of forestry? Relevance of the forestry laws to UPFG
Canada/ Ontario	Forestry Act (Revised Statutes of Ontario 1990); Trees Act of Ontario 1996; Professional Foresters Act, Ontario, 2004	The forestry act does not provide laws on UPFG; the trees act provides rules on trees on boundary lines, trees conservation, municipal reforestation; the professional foresters act defines "urban forest"	The trees act provides special rules on UPFG; the professional foresters act refers explicitly to urban forest and provides several rules on this matter.
China	Forestry Law of the People's Republic of China, 1998	The definition of different types of forest includes also protection forests, which can be protective belts or road protection belts and forests for special uses, e.g. like environmental protection; article 11 attributes the duty to the government at various levels to organize all the citizens to plant trees as an obligatory duty and conduct afforestation activities.	The Forest Act provides rules on UPFG as well; it especially mentions in its definition of forest types trees and forests that are typical in urban and peri-urban areas.
Germany	Forestry Act of Germany, 1975	Forests are all tracts of land where forest trees grow, including functionally related parts (e.g. clearings and openings, forest roads). Woodlots and tree nurseries are not regarded as woodland. Trees outside closed woodlands (i.e. amenity trees planted in built-up areas) are not forests in the sense of the law, regardless of the tree cover.	There is no provision for the protection of trees outside forests. Among the definitions of the different types of forest there is none for urban forests or single trees in urban areas. Since the term UPFG is very broad, the Forest Act might be applicable to UPFG in peri-urban areas.

Country	Relevant sections of Forest Acts	Content of relevant laws regarding the definition of forest	UPFG as part of forestry? Relevance of the forestry laws to UPFG
Turkey	Forest Law No. 6831, 1983	Tree and woodland communities, which are grown by human efforts, are regarded as forest, together with their lands; privately owned lands containing trees and woodland species, which do not grow naturally in the neighbouring forest or any kind of trees or woodlands on privately owned land and smaller than three hectares, are not considered as forest (see article 1, and also 32).	The forest defined by the Forest Act does not refer to UPFG; UPFG might be regulated by the Forest Act in tree and woodland communities especially in peri-urban areas.
Zimbabwe	Forest Act of Zimbabwe, 1996	Single trees can be protected from cutting according to section 39 of the Forest Act if such trees have been declared by the minister to be protected through statutory instruments according to section 38.	This includes trees in municipalities as well. The Forest Act with its definition on forests does not refer to UPFG; UPFG might be partly protected by the Forest Act, when the minister declares trees as protected or when UPFG is under the regime of the Forest Act in peri-urban areas.

3. INTERNATIONAL FRAMEWORK

There is no legally binding global agreement that deals specifically with urban and peri-urban forestry. However, there are numerous conventions that, although not focussing on UPFG as such, do have some influence on it.

Instruments relevant to UPFG were the results of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro (Brazil) in 1992, Agenda 21, the Rio declaration on environment and development and the non-legally binding authoritative statement of

principles for a global consensus on the management, conservation and sustainable development of all types of forests. Other results and accomplishments of UNCED included the Framework Convention on Climate Change and the Convention on Biological Diversity. Another relevant set of documents came out under UN-Habitat. However, the contribution of these instruments to sustainable urban and peri-urban forestry management is limited to the specific aspects they cover.

3.1 UN-Habitat

The United Nations Human Settlements Programme, UN-Habitat, is the United Nations agency for human settlements. It is mandated by the UN General Assembly to promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all. The main documents outlining the mandate of UN-Habitat are the Vancouver Declaration on Human Settlements, the Habitat Agenda, the Istanbul Declaration on Human Settlements, the Declaration on Cities and Other Human Settlements in the New Millennium and Resolution 56/206.

The Habitat Agenda is the main political document emanating from the Habitat II conference held in Istanbul (Turkey) in June 1996. Adopted by 171 countries, at what was called the "City Summit", the agenda contains over 100 commitments and 600 recommendations on human settlements issues. The two main themes of the Habitat II conference or "City Summit" are "adequate shelter for all" and "sustainable human settlements development in an urbanizing world", which have direct implications for the day-to-day life of every human being.

The Habitat Agenda is of importance for the promotion of UPFG. The challenges of urban poverty and environmental degradation have many dimensions that are best handled through a multi-faceted, multi-sectoral response. The major international response, thus far, on the part of UN-Habitat addresses the crisis in terms of shelter and associated problems such as health risks, poor environmental care, insecurity and weak urban governance. There is no comparable international initiative that addresses the urban crisis in food and nutrition security, the deterioration in urban natural resources, or a possible response through agriculture.

The preamble of the Habitat Agenda specifically addresses the issue of steadily increasing rural-to-urban migration, particularly in developing countries, which has put enormous pressure on urban infrastructure and services already under serious stress. Conflicts deriving from growing city suburbs have increased due to rising rural migration to cities. Haphazard occupation of this land, which is devoid of urban infrastructure, creates problems for any planning in terms of green areas.

In this preamble it is recognized that the expansion of squatter settlements and improper land use is one of the most serious problems confronting cities and towns and their inhabitants. The expansion of cities is especially problematic because it reduces peri-urban forests and trees. This problem arises particularly in the case of an existing shelterbelt around the city, which is endangered by expanding cities. The problem can be solved by appropriate land-use planning, which takes the natural expansion of cities into account. Such planning has to be sustainable.

Chapter III, E, of the Habitat Agenda contains the commitment for financing shelters and human settlements. This must be taken into account in ensuring livelihoods of urban dwellers, particularly in developing countries, because urban and peri-urban forests contribute by providing wood for construction purposes.

**Box 3: Chapter IV.C of the UN Habitat Agenda:
Sustainable human settlements development in an urbanizing world**

2. Sustainable land use

112. Green spaces and vegetation cover in urban and peri-urban areas are essential for biological and hydrological balance and economic development. Vegetation creates natural habitats and permits better absorption of rainwater by natural means, which implies savings in water management.

Green areas and vegetation also play an important part in reducing air pollution and in creating more suitable climatic conditions, thereby improving the living environment in cities. Healthy and environmentally sound agricultural activities and the provision of common land should be integrated into the planning of urban and peri-urban areas.

Chapter 6 of the Istanbul Declaration on Human Settlements asserts that the minimization of rural-to-urban migration is an issue at which the signing countries want to work. This is very important for the expansion of cities and might obviate the danger for trees on the fringe of the city.

In Chapter 7 of the Istanbul declaration, the signing countries are committed to improving the living conditions in human settlements and have acknowledged the need to address global and environmental trends to ensure the creation of a better living environment for all people. Even though UPFG is not mentioned explicitly in the resolution, there is no doubt that it is a base for sustainable environment in and around human settlements.

In section 4 the Istanbul declaration addresses both the lack of adequate urban planning and environmental degradation as being obstacles to improving the quality of life within human settlements. Indeed, rapid and uncontrolled urbanization, particularly the development of squatter settlements and slums, poses a major challenge to urban planning. The maintenance of a healthy and viable urban living environment, particularly in developing countries, is a major issue in urban areas.

While there is clearly a great interest in the role of forestry in urban areas in developed countries, urban and peri-urban forestry has received limited attention by politicians and decision-makers in developing countries, and particularly by the populations who are more concerned with day-to-day survival

However, tree planting for shelterbelts around cities, street trees for shade and the improvement of amenities have been carried out across the world. Due to a lack of space, knowledge or awareness, no large-scale landscape development has been possible in the urban areas of many developing countries.

The Istanbul declaration is of special relevance to UPFG, because it addresses many issues in order to promote sustainable urban and peri-urban forestry. Section 11, in particular, addresses open spaces, which can include green spaces as well and are a component of UPFG (see footnote 4).

Box 4: Istanbul Declaration on Human Settlements: General Assembly Resolutions 51/177 of 16 December 1996 and 53/242 of 28 July 1999

Paragraph 11. We shall promote the conservation, rehabilitation and maintenance of buildings, monuments, open spaces⁴, landscapes and settlement patterns of historical, cultural, architectural, natural, religious and spiritual value.

3.2 Agenda 21, Chapter 11, "Combating Deforestation"

Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations system, governments and major groups in every area in which human activities impact on the environment (UN, 2003).

Parts A and B of Chapter 11 of Agenda 21 on combating deforestation refer several times to either urban forestry or components of UPFG explicitly by using the terms "greening", "areas under tree cover" and "buffer and transition zones", which for example can be found as greenbelts around cities. Chapter 11 is divided into four programme areas. The part most relevant to UPFG is programme area B, "Enhancing the protection, sustainable management and conservation of all forests, and the greening of degraded areas, through forest rehabilitation, afforestation, reforestation and other rehabilitative means." which for instance, calls for the expansion of areas under tree cover, in appropriated areas, through tree planting. It recognizes the greening of suitable areas as an effective way of increasing public awareness and participation in protecting and managing forest resources and addresses the consideration of land use, tenure patterns and local needs. The greening of appropriate areas is recognized as a task of global importance and impact.

⁴ Open space is not defined by the declaration. In general "open space" means any land that is either set aside in terms of any law, zoning scheme or spatial plan, for the purpose of public recreation, conservation, the installation of public infrastructure or agriculture, or predominantly undeveloped and open and has not yet been set aside for a particular purpose in terms of any law, zoning scheme or spatial plan.

Chapter 11, paragraph 13(h), refers specifically to urban forestry in the context of the achievement of the objective to promote greening. The term greening is used to include urban and peri-urban forestry.

Box 5: Agenda 21, Chapter 11, "Combating Deforestation"

Activities

A) Management-related activities

11.13. Governments should recognize the importance of categorizing forests, within the framework of long-term forest conservation and management policies, into different forest types and setting up sustainable units in every region/watershed with a view to securing the conservation of forests. Governments, with the participation of the private sector, non-governmental organizations, local community groups, indigenous people, women, local government units and the public at large, should act to maintain and expand the existing vegetative cover wherever ecologically, socially and economically feasible, through technical cooperation and other forms of support. Major activities to be considered include:

(...)

Stimulating development of **urban forestry** for the greening of urban, peri-urban and rural human settlements for amenity, recreation and production purposes and for protecting trees and groves; (...)

3.3 Rio's "forest principles"

The commonly known "forest principles" are a declaration that is a "non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests" adopted at UNCED. As stated in the preamble of the "forest principles", their "guiding objective (...) is to contribute to the management, conservation and sustainable development of forests and to provide for their multiple and complementary functions and uses".

The principles/elements of the "forest principles" refer to greening by stating, "Efforts should be undertaken towards the greening of the world." It is important to note the intent in the distribution of responsibilities to sub-national level, because the preamble establishes that states would have to

pursue the application of the principles set forth in the "forest principles" at the appropriate levels of government in accordance with their respective national law. Other interesting features from the point of view of UPFG are:

- the integration of all aspects of environmental protection and social and economic development;
- the sound management and conservation of all types of forests – which is of concern to governments and communities;
- the promotion of international cooperation;
- the recognition of "the vital role of all types of forests in maintaining the ecological processes and balance at local, national, regional and global levels (...)"
- the linkage between forest conservation and management and pollution control.

3.4 Convention on Biological Diversity

The Convention on Biological Diversity (CBD) was negotiated under the auspices of the United Nations Environment Programme (UNEP). It was opened for signature at UNCED (June 1992) and came into force on 29 December 1993, ninety days after the thirtieth ratification.

CBD aims at the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising from the utilization of genetic resources. The convention is relevant to UPFG because green areas play a vital role in urban biodiversity. Suburban wetlands can be some of the most productive natural ecosystems and can provide important habitats for fauna. Incorporating green areas in networks will improve biological conservation and biodiversity; greenbelts and greenways (linear parks) can serve as biological corridors (IUCN, 1994).

While much biological diversity can be conserved within parks and reserves, the ecology of many plants and animals requires that the ecosystem in which they live be maintained beyond the boundaries of established protected areas (Inter-American Development Bank). This is an issue that should be addressed in discussions on the sustainable management and conservation of UPFG, as UPFG could be an effective tool in slowing down biodiversity loss.

CBD defines biodiversity as "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems". Parties to the Biodiversity Treaty "affirm sovereign rights over the biological resources found within their countries, while accepting responsibility for conserving biological diversity and using biological resources in a sustainable manner", according to an IUCN assessment of the treaty.

Difficulties and problems could arise in implementing the convention, because one of the cross-sectoral problems lies in defining the importance of biodiversity in urban areas, as well as in maintaining ecological relationships between green areas within urban areas. Some sections have an impact on UPFG; the convention promotes biological diversity in urban and peri-urban areas with regard to green spaces and urban forests.

3.5 United Nations Convention to Combat Desertification

The United Nations Convention to Combat Desertification (UNCCD) acknowledges the impact of desertification on arid and semi-arid and dry sub-humid zones. Article 1 defines "land degradation" and refers also to the reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of forest and woodlands.

UNCCD has an impact on UPFG, insofar as there is an overlapping between UPFG and the term "forest" used in UNCCD.

Article 1 lists the reasons for land degradation. Land degradation is caused by land use processes or a combination of processes arising from human activities and habitation patterns, such as soil erosion caused by wind and/or water, deterioration of the physical, chemical and biological or economic properties of soil and long-term loss of natural vegetation. These are all processes that can be caused by the unsustainable management of UPFG. Industrialization and urbanization increase the demand for forestland. Deforestation is one of the most striking negative results of urbanization.

3.6 United Nations Framework Convention on Climate Change and the Kyoto Protocol (UNFCCC)

It is recognised that UPFG could address a city's air pollution through tree planting using higher growth rates of broad-leaved evergreen trees. By shading and cooling the air through transpiration, trees help to offset the "heat island effect" of urban areas. Trees are also effective in reducing air pollution by filtration and absorption and can filter out as much as 75-80 percent of particulate pollutants, such as dust, from the urban atmosphere (Khan, *et al.*, 1989). However, the benefits of trees in improving air quality are only significant when trees are in large groups, as it is the amount of leaf volume rather than the size of green areas that controls the effects. On the metropolitan scale, UPFG cleans the air and returns carbon to the soil.

Under UNFCCC the international community has committed itself to reducing net greenhouse gas emissions. The Kyoto Protocol to the convention would give developed countries specific reduction targets. These targets could be met by reducing emissions or by promoting sinks. Reductions could be accomplished either internally or through cooperative action involving other parties to the convention. Forests would thus appear to have a major role to play in the international response to climate change. As UPFG overlaps with the term "forest", UNFCCC and the Kyoto Protocol are of relevance to UPFG, as illustrated below, even if this role has to be considered as one subordinate to forests in their natural understanding. Under Article 4, all parties must promote sustainable management of sinks and reservoirs. Again, UNFCCC specifically mentions forests and is prepared to adapt to the impacts of climate change and develop appropriate plans for areas that might be affected by flooding, drought or desertification. Although UNFCCC does not expressly mention forests with this requirement, they are a special concern. This article is of special relevance for cities situated in mountainous areas or for municipalities affected by flooding problems. Article 10 of the Kyoto Protocol clarifies some of these requirements.

3.7 Conclusion

There are several international conventions, declarations and resolutions that have an impact on UPFG, but none of these conventions address UPFG in a

comprehensive manner. Even when the broadest definition of UPFG is used, only certain components of it are dealt with.

The enormous environmental problems afflicting some large metropolitan areas, in particular mega-cities, underscore the impelling need to intensify urban forestry programmes on an international level to begin with. Such efforts cannot solve all the complex problems of these cities. However, they can be quite effective in reducing the harmful effects of urban environmental decline and in making the life of urban inhabitants more rewarding.

4. THE LEGAL FRAMEWORK AT NATIONAL AND SUB-NATIONAL LEVELS

4.1 Introduction

There is no specific legislation on UPFG at the national level in the countries analysed but there are several general laws including provisions specific to UPFG at the national or regional level. Therefore, when looking at legislation that pertains to urban forests, it is necessary to examine forestry and environmental legislation in addition to several other laws and regulations. Such laws can be found in legislation that specifically refers to one or more UPFG components or, very generally, to trees within a municipality. The dependency of urban and peri-urban forest legislation on the general legal structure, the existence of regulations in different areas of law and the contradictions that exist within some general laws make the protection of urban and peri-urban forests even more difficult to implement.

Due to the lack of specific UPFG legislation, its components are mainly addressed under a nation's forest act or enabling laws. This is due to the fact that UPFG falls primarily within the jurisdiction of municipalities because of its localization in urban areas.

4.2 Regulations and by-laws on trees

At the municipal level, there are many more specific regulations on UPFG, such as regulations on the protection, conservation and preservation of trees. In many countries these regulations require permits for urban tree removals, often supplementing the protection given to historic, rare, scenic and other

specially designated trees (Profous and Loeb, 1990). For example, in Germany at the municipal level in the Land Brandenburg, trees with 60 cm girth in 100 cm height are protected. However, there are many exemptions from this law depending on the location of the tree and the purpose of the plantation. "Therefore a lot of trees are not protected at all. Difficulties in maintaining protected trees occur because of construction work. Therefore trees get cut or their roots get damaged (Bund Brandenburg)."

Section 11 of the Forest Act of Ontario (Canada) allows for the passing of a by-law by a county, regional municipality, district municipality or any municipality separated from the county. The enacted by-laws restrict and regulate the destruction of trees by cutting, burning or other means in woodlands. The municipalities in Ontario have the power to draft by-laws to protect trees on public and private property. In the case of the latter, this has been in place for some time with respect to woodlands. For example, it is only for trees in certain areas in the municipality of Toronto, described in a schedule of the by-laws, that the trees by-law requires a permit for injuring or damaging of individual trees independently of ownership. Other by-laws refer to certain areas within the municipality as well, like the ravine protection by-law and the filling and grading by-law. The only trees from the areas described that are protected independently are those within the city's boundaries with a diameter of more than 30 cm at one and four-tenths above ground level. Therefore, not all trees in Toronto are protected from cutting, injury or destruction.

In Johannesburg, the Council of the municipality may issue a 'tree preservation order' for any trees or a group of trees in a public open space according to the open spaces by-law on the one hand; on the other, however, any tree on any public road within the municipality is preserved by the public road and miscellaneous by-laws.

This exemplifies the plethora of fragmentary protection of UPFG by various codes, by-laws and orders in each country, but leads to the conclusion that there is no comprehensive legal protection for UPFG.

The regulations have to focus on two main issues:

1. Control of the removal of trees
2. Control of the management of trees

When analysing the second point it is important to differentiate between private and public ownership because the management of trees may depend on the form of ownership as well.

In China, for instance, certain types of trees have been declared state property and must therefore be preserved. Furthermore, the law states that all urban trees are protected and new trees are planted in order to maintain an ecological balance, improve the environment and beautify the city. Removal of trees requires permission from the appropriate local government authority (Article 11, Forest Act).

The content of by-laws depends on different factors such as forest cover of the country and region in general and forest cover of the municipality. For example, in Ontario, municipalities face different levels of forest cover as well as pressure upon that forest cover. In those areas where the forest cover is limited and located mostly on private land, the tree by-laws and enforcement efforts are most developed. One analysis of the existing by-laws of different municipalities in Ontario concluded that in areas with large tracts of forest and where publicly held land predominates, state actors have little interest in instituting by-laws to restrict cutting on private lands (Gibbon and Summers, 2002).

The variety of by-laws regarding urban forestry at municipal level in Toronto is illustrated by Box 6.

Box 6: By-laws currently in effect within the City of Toronto

- City street by-law, 2000
- Private tree by-law, 1995
- Ravine protection by-law, 2002
- Filling and grading by-law, 1995

Most of the analysed urban tree by-laws and regulations do not contain provisions on liability for damages from "hazardous trees" incurred by people or properties. In some cases, this is due to the application of general laws on the liability of the state, region or municipality or, in others, because

of an existing gap in legal liability. The latter is the case in many municipalities in China (Jim, 2002).

The issues to be addressed in the context of liability for "hazardous trees" are: 1) injury to persons by trees; 2) destruction of property, e.g. houses, streets, electricity cables, by roots or damaged trees. The chapter of the Toronto Municipal Code regarding trees specifically refers to dangerous trees. It does not provide any provision on liability, but with the objective of preventing damages it gives the right to the responsible authority to enter any property on which a tree is located and which is likely to create an immediate hazard to persons or property, for the purpose of inspecting and examining the tree.

4.3 Forestry legislation

As UPFG involves forestry activities, one may think that forest acts play a primary regulatory role in respect of UPFG. This may partly be the case in peri-urban areas, but it is rarely so in urban areas. The relevance of forest acts in urban and peri-urban areas stems from their provisions referring specifically to urban (and peri-urban) forest. For example, the Forest Act of South Africa has a provision on community forestry in urban areas.

Box 7: National Forest Act of South Africa, section 32

In this section, community forestry includes, in addition to the definition of that term:

- a. small-scale plantation forestry by persons disadvantaged by unfair discrimination;
- b. the planting of trees by any person or organ of state for aesthetic reasons or to improve the quality of life; and
- c. the sustainable use of a natural forest or woodland by a community other than in terms of an agreement referred to in section 30, in a rural or an urban area and whether in or outside of a state forest.

Another example is the Forestry Law of China, which refers to the greening of the country's territory and addresses afforestation of components of urban and peri-urban forests located on both sides of railways and highways.

Another reason why forest legislation is relevant to UPFG concerns the definition of the term "forest". The application of provisions of forest legislation to UPFG depends largely on how the term "forest" is defined by the forest act of each country. Some forest acts include in their definition of forest all kinds of trees, including urban and peri-urban trees (see table 1). In this case urban and peri-urban trees and green spaces may be covered by the forest act. UPFG is mainly dealt with under the forest act in peri-urban areas where there are no other prevailing laws, such as laws on urban parks and greenbelts.

4.4 Environmental legislation

UPFG is part of the urban and peri-urban ecological system and can play an important role in the urban environmental management system. Some of the benefits deriving from urban forests are energy conservation through transpirational cooling (Akbari and Taha, 1992), shade, wind reduction, sequestering of gaseous air pollutants (McPherson, 1991) and provision of wildlife habitat (De Graaf, 1985). Planting of vegetation is increasingly utilized as an effective means of reducing air pollution. This has been an objective of urban forestry projects in Kuala Lumpur (Malaysia) and Manila (Philippines) (Kuchelmeister, 1998).

The environmental acts of the countries reviewed do not refer to 'urban forestry' or to the broader term UPFG, but they explicitly mention parts of UPFG like, for example, the Philippine Environment Code, which refers to 'forestry' (Chapter III) and to 'priceless trees' (Section 59) to be preserved by every person. According to definitions of environment provided by the Environmental Acts (Germany, Canada, China, Philippines and South Africa), UPFG is part of the environment and therefore falls under the environmental act.

For example, the definition of "environment" (box 8) in the National Environment Management Act of South Africa applies to UPFG by mentioning land, plants and any part or combination of them, as well as the interrelation among and between them.

The definition of "ecosystem" refers to parts of UPFG as well as parks or orchards, which are a functional unit according to the definition in the box below.

Box 8: National Environmental Management Act of South Africa, No. 107 of 1998

Section 1.

(1) In this Act, unless the context requires otherwise:

"ecosystem" means a dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit;

"environment" means the surroundings within which humans exist and that are made up of (i) the land, water and atmosphere of the earth, (ii) micro-organisms, plant and animal life, any part or combination of (i) and (ii) and the interrelationships among and between them, and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being [...].

According to the definition of "environment", the Environmental Protection Law of China refers specifically to the total body of all natural elements and artificially transformed natural elements in urban areas.

Of special importance are the laws that delegate powers, giving the possibility to legislative bodies at a lower level to make regulations on special environmental issues. In the preamble or list of objectives of environmental acts, governments commit to promoting or providing the basics for the protection of the environment by different means, such as the establishment of standards or environmental quality guidelines or codes of practice. By doing so, they are also committed to promoting UPFG as part of the environment.

Summarizing UPFG under the definition of "environment" has further consequences, as all laws that are related to the "environment", such as the Municipal Demarcation Act 1998 of South Africa, address the issue of UPFG as well. For example, this Act states that by determining a municipal boundary the objective must be to establish an area that would enable the municipality to fulfil its constitutional obligations, including the promotion of a safe and healthy environment. Also, in determining a municipal boundary, the environmental characteristics of the area need to be taken into account. Again, the environment is addressed and, as part of it, UPFG as well.

The principles of nature conservation laid down in the Federal Nature Conservation Act of Germany specifically mention nature conservation in built-up and congested areas. Existing natural assets such as forest, hedges and other ecologically important plant formations have to be conserved and developed according to the law. Their protection and development are principles of nature and landscape conservation according to the Nature Conservation Act. The Environmental Protection Law of China provides for the protection of vegetation and the natural landscape in urban and rural construction.

Again, a distinction has to be made between national and local levels. At the national level, environmental acts regulate the matter of UPFG in a very general way, or address it only with the preamble and the objectives. There are specific acts on trees belonging to the category of environmental legislation, like the Philippines Republic Act No. 3571, which prohibits the cutting, destroying or injuring of planted or growing trees, flowering plants and shrubs or plants of scenic value along roads, in squares, parks, school premises or in any other public pleasure ground. Conversely, at the provincial/regional level, specific UPFG legislation, such as the Tree Act of Ontario, may be found. Finally, at the local level, there are tree regulations that belong to the category of environmental regulations as well. The open spaces by-law of Johannesburg states that the open space management principles and the national environmental management principles must be considered and applied by all persons.

4.5 Land-use planning and land ownership

"Urban development is a land use and urban areas are part of the natural system. Developed lands become part of the natural system, no matter how incompatible it might be (Grey and Deneke, 1992)."

There are different land use issues related to UPFG depending on the country and city and their conditions. For example, a case study on UPFG in the metropolitan region of Rio de Janeiro (Brazil) figured out that mineral extraction activities have aggravated the degree of conflict over land use. "Exploitation of granite has caused formation of numerous risk-prone areas and degradation of the soil and natural drainage systems, making it even more difficult to recuperate these areas. Although the mining firms are legally

obliged to repair the damage caused by their activity, this rarely happens." (FAO, 1999)

UPFG, or parts of it, are explicitly mentioned in planning acts referring to high scenic value, to trees or woodlands in particular or green space in general (as do the Regional, Town and Country Planning Act of Zimbabwe, the Construction Planning Act of Germany, the Law of the People's Republic of China on Urban and Planning and the Planning Act of Ontario (Canada) in combination with the Provincial Policy Statements of Ontario). The importance of planning is illustrated by a case study in Quito (Ecuador) that points out that many of the existing problems in the urban forest system could be easily resolved by a more universal commitment to planning at the strategic and negotiation level. The absence of sufficient prior planning often led to disastrous results. For example, planning efforts consistently underestimated the pace of growth of the metropolis (FAO, 1997).

The Regional, Town and Country Planning Act of Zimbabwe takes the issue of long-term planning into account and stipulates that a study of the planning area for the local planning authority be undertaken before preparing any master or local plan.

Another important issue in land-use planning is the level of decision-making and the participation of different stakeholders in the decision-making process.

In Germany, municipalities have an important position in land use policy and planning. Federal and regional government planning is relatively weak compared to local planning. Although federal government approval of local land use plans is required, municipalities can make their land use decisions under this premise. The objective of the land use plans is defined in section 5 of the Construction Planning Act. Forest and woodlands as well as areas for nature protection and landscape development, green spaces such as gardens, graveyards and parks are distinct categories in land use plans. Urban trees are not mentioned as a category in land use. Environmental legislation can also play an important role in land-use planning. For example, the Nature Conservation Act of Germany/Brandenburg refers to landscape plans that need to be integrated into land use plans and to open-space plans that have to be integrated into master plans. The landscape and open-space plans for settled and unsettled areas have to determine and describe the purpose of areas and the relevant conservation, maintenance and development

measures. This kind of planning is particularly important in the case of the establishment and protection of parts of nature such as hedges, bushes, parkways and protection belts, groups of trees or single trees.

The cases and legislation analysed herein show that municipalities are aware of the environmental importance of green space but yet are not always able to solve the planning conflicts effectively at the implementation level. Therefore, urban tree planting decisions must be made with a long-term view taking urban development into consideration. Of special importance in this regard is the participation of different stakeholders in the decision-making process. Planning has to be decentralized in order to take into account the various situations that might differ from one municipality to another. While acknowledging the need for continuity with rural forestry, urban and peri-urban planning and zoning systems must provide the framework for forestry activities in cities. It is essential that the role of a functional green infrastructure be clearly articulated, so that the full environmental, economic and social benefits of urban forestry and its contribution to sustainable development are understood and appreciated.

Ownership is of particular significance to the management of the urban forest. Even in smaller towns, the urban and peri-urban forest might be owned by a number of private property owners, municipalities, regions or states. Such a diversity of ownership and responsibility both facilitates and complicates the management of UPFG.

For example, the diversity of ownership and stakeholders of urban forests complicates management in Asia. Public green spaces like parks, highway corridors, street/roadside trees and others are mainly the responsibility of the government (Republic Act No. 3571), while private green spaces such as those in residential, commercial and industrial areas and on institutional premises are the responsibility of individual owners. In some cases, concerned government authorities have control over the development and management of private green space (IUFRO, 2004). The Forestry Law of China has provisions regarding the ownership of trees. In China, trees planted by urban inhabitants, staff and workers in the courtyards of their privately owned houses shall be individually owned by them. Instead, forest trees planted according to collective or individual contracts to afforest barren hills and wastelands owned by the people as a whole or by collectives shall be owned by the collective or individual (Articles 22 and 23 of the Forestry Law).

Ownership has a variety of effects. For example, because of a public urban-land ownership in China, the public management system has lowered citizens' participation, which led to apathy and caused vandalism of amenity vegetation (Jim, 2000).

4.6 Urban agriculture

Urban agriculture has been defined as "... an industry that produces, processes and markets food and fuel, largely in response to the daily demand of consumers within a town, city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes, to yield a diversity of crops and livestock" (UNDP, 1996).

Urban and peri-urban agriculture (UPA) occurs within and surrounding the boundaries of cities throughout the world and includes products from crop and livestock agriculture, fisheries and forestry in the urban and peri-urban area. It also includes non-wood forest products, as well as ecological services provided by agriculture, fisheries and forestry. Often, multiple farming and gardening systems exist in and near a single city (FAO, 1999).

UPA and UPFG overlap when urban (and peri-urban) agriculture is combined with forestry activities within or around the boundaries of cities. The overlapping of those two aspects might create difficulties in defining the policies and regulations for each of them, in view of the fact that they have some key issues in common, such as in land-use planning, access to land and land use management. For example, land use management and land-use planning are core issues for sustainable development of UPA and UPFG.

Case studies on urban agriculture conducted in Quito (Ecuador), Toronto (Canada) and Harare (Zimbabwe) show that there are no specific regulations concerning urban agriculture within the legal framework of the municipality, despite the existence of laws and regulations on issues influencing urban agriculture, such as land use and water availability. In some North American cities, an examination of suburban development plans and official plan documents revealed that planning for urban agriculture was lacking in suburban development planning (Weckerle, 2001).

On the other hand, there is a strong link between UPA and UPFG. For example, green belt plantations surrounding cities can play a vital role in protecting gardens and infrastructure against winds and sand encroachment (FAO, 2001). These links have to be considered in the planning of municipalities and surrounding peri-urban areas. For instance, the regulation governing the establishment of buffer zones within forestlands of the Philippines stipulates that the policy of the government shall be to ensure the sustainability of the remaining forest resources through the establishment of buffer zones between the boundary of production forests and areas used for agricultural purposes. This may be an issue in peri-urban areas.

With increasing poverty in the urban areas of developing countries, city planners and national policy-makers such as those in eastern and southern Africa now recognize the central role of urban and peri-urban agriculture in the wider urban economy (see Report of the Ministers' Conference, 2003). Active programmes exist in most cities of South Africa including the national urban greening fund and the national urban greening strategy of the Department of Water Affairs and Forestry. The final draft of the public open spaces by-law of Johannesburg considers urban agriculture and stipulates the rules under which people may apply for permission to farm in an urban agricultural public space.

Governmental and non-governmental bodies in many regions of the world have adopted several declarations in support of urban agriculture. Examples of these include the declarations of Dakar⁵, Hyderabad⁶, Quito⁷ and Villa Maria del Triunfo⁸. These declarations are a commitment to contribute to the development of urban agriculture (UA). Local governments are now taking a leadership role in deliberating policy directions and action plans to

⁵ Declaration adopted at a city consultation that took place in Dakar in March 2002 and brought together a variety of stakeholders from seven municipalities participating in the Francophone Network for Urban Agriculture in Sub-Saharan Africa.

⁶ This declaration on wastewater use in agriculture is a result of a workshop held in November 2002 and co-sponsored by IDRC and the International Water Management Institute.

⁷ The culmination of activities in sustainable development of UPA led to the signing of the Quito declaration drawn up and supported by the ninety participants at the international seminar "Urban Agriculture in Cities of the 21st Century" that took place in Quito, Ecuador, in April 2000.

⁸ It was signed during a regional consultation of representatives of local governments, their associations and other stakeholders held in Lima, Peru, in September 2002.

better integrate UA in the urban landscape, e.g. by incorporating UA in their urban development plans. These declarations affect UPFG to the extent that UPA and UPFG often overlap and interlink with each other. On the one hand, the mentioned declarations on UPA, and on the other the lack of specific declarations on UPFG, indicate that policy-makers at international level are more aware of UPA as a more important issue to be addressed than UPFG.

4.7 Fuelwood-related legislation

The urbanization process has important implications for household energy consumption patterns in general and wood energy use in particular. Population growth could also lead to increased competition for available resources. Population growth does not only imply increased wood energy consumption but also increased pressure on the availability of fuelwood in areas where fuelwood supply is not abundant. Hence, the relevance of fuelwood to UPFG.

Charcoal can play an important role, especially in peri-urban areas. It should also be borne in mind that there is an interrelation between charcoal and fuelwood consumption. The increasing demand for energy, from both rural and urban migration, results in an increasing use of charcoal. Growing fuel shortage leads to overcutting of the remaining trees and woodlands in the neighbourhood, thus further damaging their potential to supply the energy needs of future generations.

Gathering or cutting wood as firewood in urban and peri-urban forests and green space is mainly regulated by forestry legislation and the by-laws and regulations of municipalities. Furthermore, there are relevant provisions such as for parks, greenbelts and protected areas. There are few forestry laws that contain specific provisions on fuelwood. Most of the analysed forestry legislations give a definition of forest products or forest produce referring to firewood as one of them (Philippines, South Africa, Zimbabwe). The Forestry Law in China contains a definition on firewood forests. Access and usage rights related to fuelwood are particularly important in urban and peri-urban areas.

Most of the forestry laws enumerate the activities the local population is allowed to undertake in the exercise of their usage rights in state forests and in forests belonging to local communities. In any case, there is the possibility

of acquiring licences that permit the collection of firewood. Free access to state forests is generally provided by all forest acts. The use of the forest for cutting fuelwood is prohibited without a licence or permit in all state forests of the analysed legislations. The collection of dead wood is allowed in most countries such as Germany, China and South Africa, whereas in the Philippines the Forest Act prohibits gathering, collecting or removing firewood from any forestland, disposable public land or private land without a permit.

Again, the provisions differ from country to country and municipality to municipality. In all countries considered, the provisions studied prohibit the cutting or injuring of trees in public places without permission; however, the collection of dead wood as well as public access is not prohibited. Trees in private places may be used by the owners for fuelwood as long as there is no special protection of such trees or that they are in the area in which the private land is situated.

Table 2 has to be read bearing in mind the analysis of Table 1. Table 2 gives an overview of provisions in forestry legislation and various municipal enactments relevant for fuelwood. It does not include provisions from other relevant or prevailing laws, such as those regarding parks, green belts and trees along highways and other roads.

Table. 2: Examples of the analysed provisions on fuelwood in the context of UPFG

Country	Forestry act and related laws	Enactments relevant for municipalities and municipal enactments
Canada		The good forestry practices by-law of the City of Ottawa prohibits the destruction or injuring of trees in sensitive natural areas in the City of Ottawa without a permit, but this by-law explicitly does not apply to owners of the land who have destroyed or injured trees for fuelwood in accordance with good forestry practices. The trees by-law of Toronto only refers to specific areas, as do other by-laws of Toronto. Therefore, trees in places not protected by these laws may be used for fuelwood.
China	The Forestry Law of China gives a definition on firewood forests, which are forest trees that are mainly used for producing fuelwood. Article 19 prohibits the cutting of firewood in young growth areas and in forests for special uses. Consequently, the conclusion that can be drawn is that in other forest categories fuelwood may be cut by everybody insofar as the forest resource is owned by the "whole people".	
Germany	Access to state forest is provided; collection of dead wood is possible	Trees that are preserved by the tree protection regulation of Brandenburg do not differentiate between private and public trees. Any cutting of parts of the tree or the tree itself is prohibited. It is only in case of danger to people's lives and health or danger to things of high value that measures can be taken.

Country	Forestry act and related laws	Enactments relevant for municipalities and municipal enactments
South Africa	Even though the Forest Act does not mention firewood, it refers to it in its definition of forest produce. Access to state forests is provided by the Forest Act but only for recreational, educational, cultural or spiritual fulfillment. In state forests, for the cutting of any forest produce, which means fuelwood according to the definition, a licence is required. This means on the other hand that dead wood may be collected in state forests. State forests may be leased for cutting fuelwood and agreements to sell fuelwood may be made.	Some of the provisions give the right to local communities to use and care for public open spaces in their area (draft public open spaces by-laws of Johannesburg). The provision of the public road and miscellaneous by-law of Johannesburg on any tree on any public road within the municipality forbids any damage to trees (no lop, top, trim, cut down or removal of such trees) unless the person has permission.

4.8 Erosion control and watershed protection

An issue related to the use of trees and forests in controlling soil erosion is that of their use as a watershed catchment cover. In many countries, strict control is exerted over urban water supply catchment areas that are normally kept under tree cover.

Drastic changes occur in watershed hydrology when agricultural or forested areas are converted to urban land use. In order to minimize adverse hydrologic effects of urbanization, city planners can retain partial watersheds, for instance by reserving areas along streams, around lakes, or other areas, as greenbelts to be maintained in their natural state (Grey and Deneke, 1992).

All forestry legislation studied contains provisions on the protection of soil by sustainable forest management and forest protection. These provisions limit clear cutting and deforestation activities in forests and promote afforestation with regard to soil erosion prevention. Some countries have specific provisions on forest and trees in relation to the location and planning of roads and access structures or the protection of land along the

edge of rivers and streams. For example, the Forest Act of the Philippines states that twenty meter strips of land along the edge of normal high waterlines of rivers and streams are needed for forest purposes and may not be classified as alienable and disposable land.

Protection of the suburban and rural areas that serve as the source of city water is a traditional urban forestry linkage, but to be successful such projects must be integrated into urban planning. For example, according to the Nature Conservation Act in Germany/Brandenburg, landscape plans and open-space plans have to be made – particularly for the edges of overground waters. One of the objectives of the establishment of landscape and open space plans is the prevention of soil erosion, the conservation of soil, improvement of the groundwater situation and the restoration of watercourses.

Once again, environmental legislation plays a key role. Soil and watershed protection is addressed by all environmental acts that were analysed. The Environmental Protection Act of China singles out the protection of waters in urban and rural construction. The Environment Act of the Philippines dedicates one whole chapter to forestry and soil conservation, stipulating the protection of critical watershed areas as a management policy on soil conservation. Soil conservation on riverbanks is part of a flood control programme.

Damaged watersheds pose serious problems to environments and people, both upstream and downstream. The cost of this damage can be perceived in eroded soil, landslides, diminished water quality and quantity, loss of biodiversity and severe ecological balances. Degraded watersheds are among the greatest constraints to sustainable development (FAO, 2001). For cities situated in mountainous areas, this issue is of particular importance. For example, Nepal reflects this concern in its legislation. It has special legislation for soil and watershed conservation, listing measures for the purpose of such conservation (e.g. construction and maintenance of waterworks, afforestation, planting of grasses or other vegetation, protection of forests, cultivation of crops and fruits, maintenance of the fertility of the soil, etc.) and also the actions that are prohibited in areas where natural disasters have occurred or may occur.

The relevance of soil protection is sometimes recognized by the codes and by-laws of municipalities. For example, the tree permit by-law of Mississauga

(Canada) and the filling and grading by-law of Toronto indicate as a criterion for the review of a permit application that there must not be a negative impact on flood or erosion control, or slope stability. The Toronto ravine protection by-law recognizes the environmental benefits such as erosion prevention and water retention of woodland.

4.9 Incentives

Incentives are very important for the protection and management of UPFG. A key factor for sustainable UPFG is the consideration and involvement of the different stakeholders. The mobilization of funds, community support, assistance and greater commitment has to be stimulated. The contribution of citizens, NGOs and the private sector to UPFG must be encouraged with appropriate incentives, e.g. for citizens to manage their private green space or to contribute to the management of public green space. Forestry legislation or municipal financial and planning tools that encourage redevelopment, revitalization and improvement of a municipality's existing built-up areas and neighbourhoods provide most of the incentives. A number of municipalities offer financial assistance in the form of grants or loans. Others provide indirect incentives through the waiving of fees and charges. Still others provide incentives through more flexible planning and zoning requirements. Examples of the incentives analysed in legislation, regulations or secondary literature in the field of UPFG are:

- Necessity of application for tree removal or relocation of city-owned trees ensures that the applicant will conform to the requirements in order to obtain a permit. Application of different tools for permit approval:
 - 1) Applicants assume all costs involved, which include tree value, removal and replacement costs. The collected money should be reused for UPFG.
 - 2) Permit approval for tree cutting with compensatory measures such as replanting trees or other plants is required. In the event this requirement is not fulfilled, the permit holder has to pay a fine. To ensure this procedure a tree replacement plan may be required from the applicant. Replacement plans, woodland management or rehabilitation plans can be ensured by a written undertaking or, in the case of prior violation or requirement, the applicant must post a letter of credit (tree protection policy of

the Economic Development, Culture and Tourism, Parks and Recreation Division of the Urban Forestry Services of Toronto).

- Time limits for permits, and the requirement to apply for a new permit, ensures that the applicant will conform to the requirements in order to obtain a new permit (Tree Protection Regulation of Brandenburg, Germany).
- Development of an overall citywide landscape plan to coordinate and encourage private sector contributions to the greening endeavour.
- Licensing of forest produce or lease of forest or woodlands, e.g. to guarantee reforestation by lease.
- Taxation and financial tools for the promotion of UPFG activities, i.e. exemptions from payment of taxes, refunds, waivers and reductions (for example this could encourage the voluntary implementation of UPFG "best management" practices by private owners).
- Free technical advice from government foresters and farm technicians for use of sustainable UPFG practices by private owners.
- Financial support, financial help or any government subventions for UPFG activities of municipalities, NGOs and private owners.
- Involvement of local communities, e.g. training to meet requirements of federal, state and local laws.
- Information and education of private property owners by NGOs, private institutions and governments to generate UPFG action (for example in South Africa the NGO "FTFA" – Food and Trees for Africa – organizes support programmes and education of children and adults to start their own gardens as part of an urban greening project, and trains volunteers to become community-based educators on greening the environment themselves. In this way the NGO spreads awareness about the importance of greening).
- Sale of fuelwood can offer a new source of income, increasing the incentive to manage woodlands. This can have a positive impact on woodland ecology and public amenity.
- Guidelines for greenery provisions in different types of land-use zones or roads for public developers and private owners. This may help in understanding that requirements have to be met in order to preserve and promote urban and peri-urban forests and green spaces.

5. INSTITUTIONAL FRAMEWORK

UPFG is influenced by different areas of law and managed by public policies set at various levels of government. These laws and policies may not mention UPFG specifically, but they can still affect trees in urban and peri-urban areas. Therefore, there is a public policy at almost all levels of government that can impact on UPFG.

From an institutional point of view, UPFG is, in most cases, part of the responsibility of the ministry with forests within its remit, when UPFG is part of the forest – as often happens in peri-urban areas (see Table 1). Environmental protection departments at the national or regional level have a regulatory authority to protect water and air quality. This may include provisions that address erosion control, buffers, rivers and tree protection. Sometimes these responsibilities come under a natural resources department, as is the case in Canada. Transportation departments plan and oversee road building and maintenance. They may also establish regulations related to tree plantings and maintenance along highways, etc.

The government at the national level indirectly impacts on regional and local governments through decisions made by the legislator or the courts. For example, local governments must follow air quality and safe drinking water standards established by the national government.

UPFG falls mainly under local government jurisdiction. At this level, UPFG is part of the responsibility of various departments. The distinction has to be drawn between departments that are directly responsible and those indirectly responsible. Among those indirectly responsible for UPFG is the department for planning and zoning. The relevant department oversees several activities relating to UPFG, such as land-use planning and zoning. Another example of a municipal department or division whose responsibilities and activities impact urban forestry, is the sanitation department which is responsible for waste management, including the management of garden waste and the recycling or disposal of urban tree residues. Ownerless waste can be found in parks, gardens and other public places. Waste disposal in such places has to be regulated and organized. Therefore the departments directly responsible for UPFG should be required to communicate with other departments indirectly responsible for UPFG.

In many countries UPFG discipline is very much restricted to the level of the municipality. In Canada, for instance, the provinces and federal government

have little involvement. Therefore, at these levels there is little in the way of direct policies.

In the Philippines, the Metro Manila Development Authority (MMDA) is responsible for the greening, landscaping and beautification of the major thoroughfares, while the Parks Department or Environmental Services or Clean and Green Office (whichever exists in each city/municipal government) is responsible for the municipal (*barangay*) roads, watercourses, city parks, gardens and squares within its own jurisdiction. Other parks are managed by the Department of Tourism through its affiliated agencies, the Protected Areas and Wildlife Bureau (PAWB), and by NGOs such as the Park Development Foundation incorporated in Quezon City. Other agencies including the Department of Environment and Natural Resources (DENR), the Department of Public Works and Highways (DPWH) and the Department of Education, Culture and Sports (DECS) are members of the inter-agency committee responsible for planning and implementing greening programmes (IUFRO, 2004).

In China, the management of urban and peri-urban forests is assigned to various levels as well. Small streets and lanes are the responsibility of the local bureaux, while the larger thoroughfares fall under the City Parks bureau. Species selection and decision-making that concern the choice of species for planting is done by the City Planting Office in consultation with the district bureaux and the Institute of Landscape and Gardening (Jim, 2000). Figure 1 shows the framework for UPFG at different levels of government in China. Figure 2 illustrates the urban forest management system in Guangzhou City.

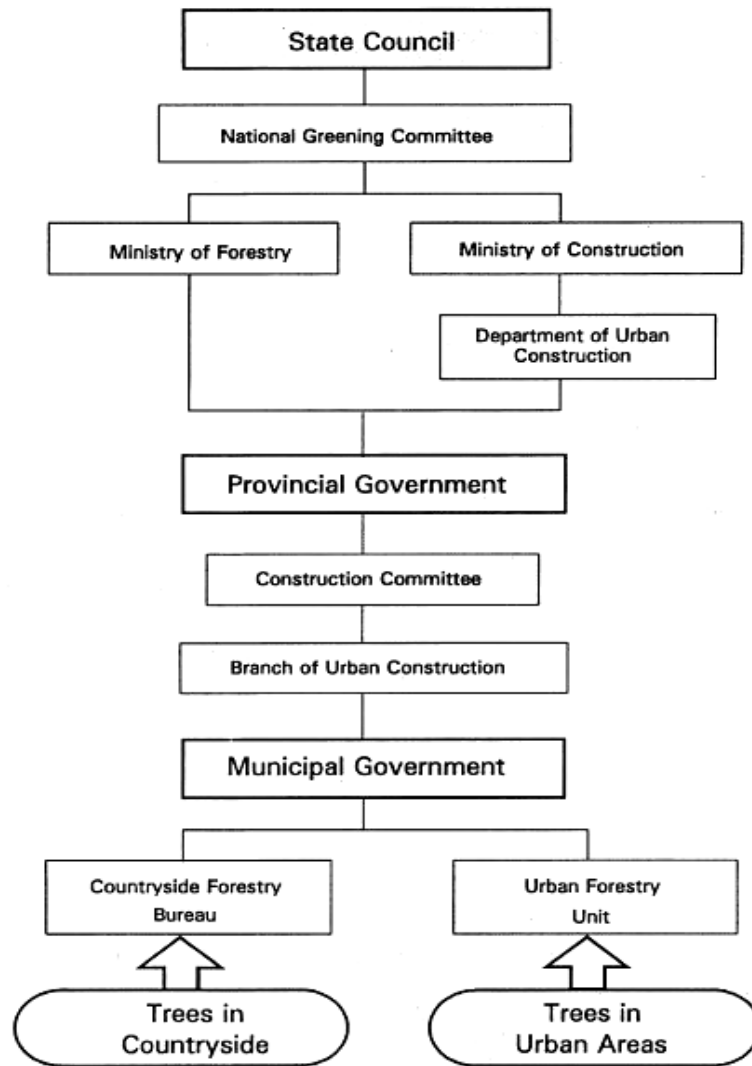


Figure 1 (Jim and Liu, 2000)

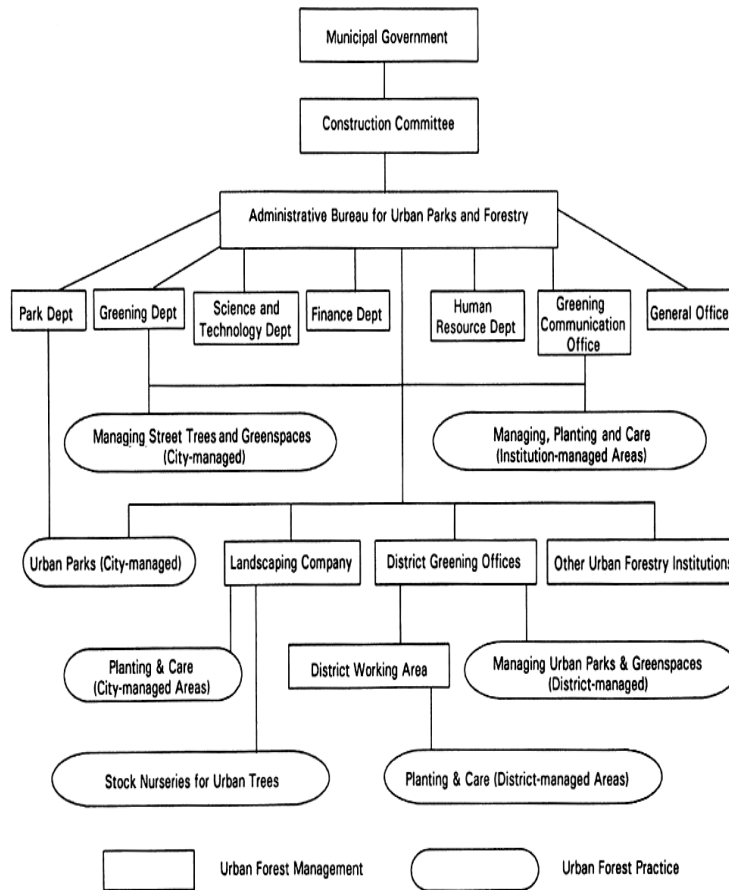


Figure 2 (Jim and Liu, 2000)

UPFG falls only partly under the jurisdiction of municipalities, since municipalities have the jurisdiction only within their boundaries, but UPFG can be found quite often beyond these borders, in urban and peri-urban areas as well. As already described above, beyond the borders of a municipality, UPFG might be assigned to different departments, such as the forestry department or the transportation department.

UPFG requires cooperation and coordination between the different authorities responsible for UPFG or matters having an impact on it, because a variety of laws affect it. UPFG falls under local government jurisdiction and should be part of their integrated development plans and land development objectives. The variety of the different bureaux or departments involved and the relevant problems arising therefrom are briefly illustrated in box 9, taking Hong Kong as an example.

Box 9: Coordination of greening efforts in Hong Kong

In Hong Kong six government bureaux (out of 16 policy-formulation bureaux) and 15 departments (out of 38) are involved in greening issues. The division of tree administrative duties is based on a basket of criteria, including land ownership, land administration, land-use planning, land use, development agent, land user, planting agent, vegetation management agent and so forth (Works Branch, 1994a; 1994b). Each relevant department has to follow nebulous policies and guidelines that include many uncertainties and overlaps. Both government and private land users have to deal with a bewildering array of often ambiguous and sometimes conflicting duties, rules and requirements. The departments often operate in isolation, oblivious of one another's information base and decision rationales. There is a lack of commonality in greening orientation, outlook and *modus operandi*. The rather rigid compartmentalization of the government machinery into sharply defined realms with little tradition of cooperation between departments does not help the complex tree cause which inherently needs widely based governance.

Source: Jim, 2002.

Local governments can contract with private companies for services, such as road building and tree maintenance, to improve the administration of UPFG. An alternative way for the administration of UPFG within municipalities exists in Johannesburg. There, the City Council runs a self-contained business called "Johannesburg City Parks" to manage its regional parks, open spaces and cemeteries. "Johannesburg City Parks" is owned by the City Council. It is the agency responsible for the maintenance and development of Johannesburg's regional parks, open spaces and cemeteries. How this agency works and why it was created is described in box 10 below.

Box 10: What is the "Johannesburg City Parks" agency and how does it work?

As the city tries to run on more efficient, business-like lines, various services have been reorganized into self-contained "utilities" and "agencies". Utilities have been formed for services that can be charged directly to individual consumers, such as electricity and water, while agencies have been created to look after the city's roads and parks. These agencies then charge the city council for services rendered. "Johannesburg City Parks" is run by a managing director and a board of directors that report to the city manager.

Why is this a benefit to the ratepayer? Previously parks services were fragmented across Greater Johannesburg's five councils. This led to confusion about who was responsible for what and resulted in different standards across the Johannesburg region. There was a definite under-supply of developed parks in township areas. The idea is that, with the agency being run on strictly business lines, more parks will be built and maintained within the existing budget.

Source: www.johannesburg.gov.za

UPFG, by its very nature, requires the participation of citizens, NGOs, institutes and the private sector. Johannesburg has a number of greening projects, which belong to the category of city projects and require citizen participation, e.g. "greening the city's rooftops", "a green corner of the inner city: Jubert Park", "greening of dusty Soweto", "metro plans to protect the city's open spaces" and "alien plants you shouldn't have in your garden".

Research on urban forestry is conducted by academic institutions, which are either universities or other research bodies. One of the forestry faculties offering courses in urban forestry to interested students is the Faculty of Forestry, University of Toronto.

Then there are also a number of national and regional associations, organizations and institutions in many countries, such as the Ontario Professional Foresters Association (OPFA). OPFA is responsible for the licensing of professional (urban) foresters in Ontario. It is a member-based,

non-profit, non-political organization with more than 850 members from government, education and the private sector. This organization represents professional foresters in Ontario. Owners receive a variety of services and benefits from OPFA. For example, by employing the services of a registered professional forester, who has the diverse knowledge and experience to advise on the technical, ecological and financial aspects of managing a woodland, owners can get the most value and enjoyment from their urban and peri-urban forest, both now and in the future.

Similarly, organizations and institutions at the international level involved in UPFG, working on a range of environment and development issues, as well as those dedicated solely to forestry or urban and peri-urban forestry issues. The Institute of Environment and Recreation Management (Africa), for example, is a local government association at the international level responsible for management processes involving urban greening as well. This institute is supported by some 200 municipalities, 350 municipal officials, the Department of Water Affairs and Forestry, Food and Trees for Africa, various technical schools, universities, associations and other institutes.

The above analysis of stakeholders involved in UPFG at local, regional, national or international level reveals that most of them deal precisely only with urban forestry: peri-urban forestry is rarely included in their tasks. A reason for this is the way the term "urban" is perceived. In most cases the focus is only on urban forestry. Occasionally peri-urban forestry and greening are also included when the term "urban" is broadly interpreted.

6. CONCLUSION

Specific legislation on UPFG at the national level does not exist in any of the countries analysed. At the municipal level however, by-laws on tree protection are quite common, although the majority only provide for partial protection of trees, depending on their dimension or location. Yet, legally, public trees are better protected than private trees. Tree protection through by-laws depends on various factors. In general:

- 1) only trees in specific and enlisted areas are comprehensively protected;
- 2) only trees with special measurements are protected; and,
- 3) public trees benefit from greater protection than private trees.

UPFG is affected by many laws. Legislation that does influence UPFG mainly includes laws on the environment, land-use planning, forestry and municipalities.

Environmental acts provide general protection of UPFG mostly at the national level, with UPFG being part of the environmental system.

UPA typically includes some UPFG activities, with inevitable overlaps between the two of them. Conversely, the combination of activities pertaining to UPA and UPFG is key to the sustainable management of both of them. An example is the protection of UPA by buffer zones, especially in peri-urban areas.

Forest acts apply to UPFG when urban, peri-urban forests and green spaces (mostly situated in peri-urban areas) are embraced in the definition of the term "forest" and in cases where there are no other prevailing laws dealing with urban forests, like those regulating city parks.

Land-use planning laws that apply to areas within and around municipalities play a key role in UPFG. Long-term planning involving all stakeholders is crucial for the sustainable development and conservation of UPFG. Without proper planning, greenbelts around cities may be destroyed as a result of unforeseen or uncontrolled urban expansion.

As far as the institutional framework is concerned, mandates of different entities may overlap, in particular at the local level, because of many cross-sectoral issues involved and the fact that many tasks related to UPFG are not yet well circumscribed. Communication, coordination and collaboration among the various stakeholders are key issues facing the institutional set-up of UPFG. There is an increasing trend towards the recognition of UPFG as an important policy matter. Many institutions, both public and private, including local governments, are involved in UPFG work internationally. However, further efforts are required to strengthen the institutional set-up of UPFG, particularly in developing countries. Moreover, UPFG needs to be specifically recognized at the international level. A great deal of work has yet to be done in order to achieve these goals.

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ANNEX 1 Additional information

A. Selected legislations around the world

Canada

Forestry Act, Revised Statutes of Ontario, 1990
 Ontario Planning and Development Act, 1994
 Public Lands Act, 1990
 Planning Act of Ontario, 2004
 Professional Foresters Act, 2004
 Trees Act of Ontario, 1996
 Toronto Municipal Code, Chapter 331, Trees
 Wilderness Areas Act of Ontario, 1990, amended in 1997
 Tree permit by-law 0624-2001 of Mississauga, 2001
 Private Land Forest Practices Regulation, B.C. Reg. 318/99
 Good forestry practices by-law no. 2003 of the City of Ottawa, 2003
 City street by-law of Toronto (Chapter 813, article II), 2000
 Filling and grading by-law No.1995-0255 of Toronto, 1995
 Private tree-by-law (former City of Toronto, Chapter 331, article III), 1995
 Ravine protection by-law No. 838-2002 of Toronto, 2002

China

Forestry Law of the People's Republic of China, 1998
 Environmental Protection Law of the People's Republic of China, 1989
 The Law of the People's Republic of China on Environmental Impact Assessments, 2002
 Law of the People's Republic of China on Urban Planning, 1990

Germany

Construction Planning Act (Baugesetzbuch), as amended 27.8.1997
 Nature Conservation Act of Brandenburg
 Regulation on the Protection of Trees in Brandenburg, 2004

Turkey

Forest Law No. 3302 of 1986, Law No. 3373 of 1987 and Law No. 2896 of 1983.

Nepal

Soil and Watershed Conservation Act, 1982, date of consolidation/reprint: 1992.

Philippines

Forestry Reform Code of the Philippines, 1991

Philippine Environmental Code, 1988

Republic Act No. 3571 to prohibit the cutting, destroying or injuring of planted or growing trees, flowering plants and shrubs or plants of scenic value along public roads, in plazas, parks, school premises or in any other public pleasure ground, 1963

Regulation governing the establishment of buffer zones within forest lands, DENR Administrative Order No. 13, 1992

South Africa

Mountain Catchment Areas Act, 1995

National Forest Act, No. 84 of 1998

National Water Act, 1998

National Environmental Management Act, 1998

Public open spaces by-laws of the City of Johannesburg Metropolitan Municipality, Final Draft 2004

Public road and miscellaneous by-laws of the City of Johannesburg Metropolitan Municipality, 2004

Waste management by-laws of the City of Johannesburg, 2003

Zimbabwe

Communal Land Act, 1996

Forest Act, 1996

Regional Town and Country Planning Act of Zimbabwe of 1976, Act 22/1976, as amended last in 1992 by Act 3/1992.

B. Websites

(last visited in August 2004)

www.fao.org (Forestry Department, FAO)

<http://faolex.fao.org/faolex/index.htm> (FAOLEX, FAO)

www.bund-brandenburg.de (Neue Baumschutzverordnung)

www.joburg.org.za (Environment, Green Spaces, Culture and Recreation)

www.ruaf.org (Cities Feeding People)

www.un.org (Introduction to Agenda 21; UN-Habitat)

ANNEX 2

Legal, policy and institutional issues of urban and peri-urban forestry and greening

Suggested elements for the collection of information on laws and regulations

In collecting information on the legal and institutional aspects of UPFG⁹, attention should be given not only to existing laws, regulations and by-laws in a particular city and in the country in general, but also to informal instruments such as policy documents, strategies and programmes, as well as relevant customary rules. In doing so, the following checklist should be considered:

1. Laws, regulations and by-laws related to UPFG

(e.g. urban agriculture, energy and fuelwood, environment, urban development, land-use planning, watershed management, climate change, soil conservation) such as:

- a) Forestry laws
- b) Land-use planning (zoning regulations); laws that require minimum reservations for tree lawns or planting verges along roads, pathways, waterways and others?
- c) Urbanism regulations such as restrictions for buildings in terms of their size, height and occupancy, distance from property lines or roads and minimum parcel size that can be developed within residential, commercial and industrial zones in order to create open spaces for trees

⁹ The most accepted definition of urban and peri-urban forestry [and greening], which is also used by FORC, is given by Grey and Deneke (1986), "Urban and peri-urban forestry is defined as the planned, integrated and systematic approach to the management of trees in urban and peri-urban areas for their contribution to the physiological, sociological and economic well-being of urban society. Urban forestry is multifaceted; it deals with woodlands, groups of trees and individual trees where dense conglomerations of people live, involves a wide variety of habitats (streets, parks, derelict corners, etc.) and is concerned with a great range of benefits and problems". Another widely accepted definition: Urban forestry is a relatively new, multidisciplinary approach in international forest research. It has been defined as "*the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic and aesthetic benefits trees provide society*" (Helms, J.A. (ed.) 1998. The Dictionary of Forestry. Society of American Foresters)

- d) Laws on other natural resources sectors such as: (i) environment; (ii) watershed management (especially cities in mountain areas); (iii) urban and peri-urban agriculture; (iv) fuelwood; (v) waste management.
 - e) Laws, regulations and by-laws regarding other sectors such as (i) public participation (consultations, governance, etc.); (ii) education, extension and communication; (iii) research.
 - f) Under which legislations are tree by-laws enacted? (e.g. Municipal Act, Forest Act, Environmental Protection Act).
- 2) Are international legal instruments (such as UNCCD, CBD, Rio's "forest principles") implemented in the context of urban and peri-urban forestry?**
- 3) Analysis of tree by-laws at the municipal level**
- a) Describe the general standards that are used in tree by-laws/ordinances (for example for tree planting, tree care, tree species, tree selection, transplanting, tunnelling for utilities, landscape strip and buffer)?
 - b) Are the tree protection or conservation ordinances integrated into existing local government regulations, such as the land-development and rezoning processes?
- 4) Institutional framework and dialogue**
- a) Legislation, regulations and by-laws on decentralization, municipalities and local institutions
 - b) Descriptions of responsibilities and competences related to UPFG, such as on (i) planning of greening programmes; (ii) management of all public green spaces/urban forests; (iii) species selection.
 - c) With regard to management's responsibilities, is there any differentiation in the legislation between greening, landscaping and beautification of major thoroughfares, municipal roads, watercourses, city parks, gardens and plazas?
 - d) Who are the key officials and staff at the local government level in the UPFG field? What responsibilities do they have?
 - e) What departments have responsibilities for issues related to urban forestry?
 - f) Can local governments contract with private companies for services such as road building and tree maintenance?

- g) How do national governments, municipalities, other local authorities, NGOs, the private sector and civil society cooperate together?

5) Policy environment and legal aspects

- a) What are the relevant policies and how are they implemented? For example: (i) tree planting; (ii) policies addressing air pollution in the city through tree planting practice that uses higher growth rates of broad-leaved evergreen trees; (iii) policies that take into consideration the shading and cooling of the air through transpiration and that trees help to offset the "heat island effect" of urban areas.
- b) What kinds of legal and policy incentives exist for the management of UPFG in your city/country?
- c) Existing guidelines and strategies for policy- and decision-makers?

6) Current activities and studies

- a) Are there any activities promoting forestry at urban and peri-urban level? Such as (i) promoting technology transfer (e.g. wastewater reuse); (ii) environmental communication programmes and strategies; (iii) research (e.g. pollution).
- b) Specific studies on legal issues regarding forestry activities in or around cities.

7) References/Bibliography

8) Annexes

List of analysed laws

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1. Wildlife and national park legislation in Asia, 1971 (E*)
2. Wildlife and national park legislation in Latin America, 1971 (E* S*)
3. Vicuña conservation legislation, 1971 (E* S*)
4. Legal systems for environment protection: Japan, Sweden, United States, 1973 (E*)
5. Agrarian law and judicial systems, 1975 (E* F* S*)
6. Agricultural credit legislation in selected developing countries, 1974 (E*)
7. An outline of food law, 1983 (E* F S*)
8. Legislación de aguas en América Central, Caribe y México – Vol. I, 1983 (S)
9. A legal and institutional framework for natural resources management, 1983 (E S)
10. Water law in selected European countries (Belgium, England and Wales, France, Israel, Italy, Spain, Turkey) – Vol. I, 1979 (E* F S*)
11. Fundamentos teóricos para una legislación tributaria en el sector agropecuario, 1976 (S*)
12. International food standards and national laws, 1976 (E F*)
13. Derecho agrario y desarrollo agrícola: estado actual y perspectivas en América Latina, 1978 (S*)
14. Legal and institutional responses to growing water demand, 1977 (E* F* S*)
15. Systematic index of international water resources treaties, declarations, acts and cases by basin – Vol. I, 1978 (E/F/S*)
16. Seed legislation, 1980 (E F* S)
17. Water law in selected African countries, 1980 (E* F S)
18. Reforma agraria y desarrollo rural integrado, 1979 (S*)
19. Water legislation in South American countries, 1983 (E* F S*)
20. Legislation on wildlife, hunting and protected areas in some European countries, 1980 (E* F* S*)
21. Coastal state requirements for foreign fishing has been replaced by FISHLEX database published in the FAO Legal Office home page: www.fao.org/Legal
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23. The law of international water resources, 1980 (E* F S)
24. Irrigation users' organizations in the legislation and administration of certain Latin American countries, 1983 (E S)
25. Legislation on wildlife and protected areas in Africa, 1984 (E F)
26. The UN Convention on the Law of the Sea: impacts on tuna regulation, 1982 (E F)
27. Regional compendium of fisheries legislation – West Africa (CECAF Region), 1983 (E/F*)
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30. Water law in selected European countries (Cyprus, Finland, the Netherlands, Union of Soviet Socialist Republics, Yugoslavia) – Vol. II, 1983 (E)
31. The role of legislation in land use planning for developing countries, 1985 (E)
32. Agricultural census legislation, 1984 (E*)
33. Legislation on productivity in agriculture: a comparative outline, 1985 (E F S)
34. Systematic index of international water resources treaties, declarations, acts and cases by basin – Vol. II, 1984 (E/F/S*)
35. Regional compendium of fisheries legislation (Western Pacific Region) – Vols. I and II, 1984 (E)
36. Legislation controlling the international beef and veal trade, 1985 (E* F S)
37. La législation forestière au Cap-Vert, en Ethiopie, en Gambie, au Mali et en Mauritanie, au Niger, au Rwanda et au Sénégal, 1986 (F)
38. The environmental impact of economic incentives for agricultural production: a comparative law study, 1990 (E F S)
39. Propiedad, tenencia y redistribución de tierras en la legislación de América Central y México, 1986 (S)
40. International groundwater resources law, 1986 (E F S)
41. Land tenure systems and forest policy, 1987 (E F)
42. Regional compendium of fisheries legislation (Indian Ocean Region) – Vols I and II, 1987 (E)
43. Pesticide labelling legislation, 1988 (E F S)
44. La réforme du droit de la terre dans certains pays d'Afrique francophone, 1987 (F)
45. Legal aspects of international joint ventures in agriculture, 1990 (E)

46. The freshwater-maritime interface: legal and institutional aspects, 1990 (E)
47. The regulation of driftnet fishing on the high seas: legal issues, 1991 (E F)
48. Les périmètres irrigués en droit comparé africain (Madagascar, Maroc, Niger, Sénégal, Tunisie), 1992 (F)
49. Analyse préliminaire de certains textes législatifs régissant l'aquaculture, 1993 (F S)
50. Treaties concerning the non-navigational uses of international watercourses – Europe, 1993 (E/F/S)
51. Pesticide registration legislation, 1995 (E F)
52. Preparing national regulations for water resources management, 1994 (E)
53. Evaluation des impacts sur l'environnement pour un développement rural durable: étude juridique, 1994 (F)
54. Legislation governing food control and quality certification – The authorities and procedures, 1995 (E F)
55. Treaties concerning the non-navigational uses of international watercourses – Asia, 1995 (E/F)
56. Tendances d'évolution des législations agrofroncières en Afrique francophone, 1996 (F)
57. Coastal State requirements for foreign fishing, 1996 (E), has been replaced by FISHLEX database published in the FAO Legal Office home page: www.fao.org/Legal
58. Readings in African customary water law, 1996 (E/F)
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