



Food and Agriculture
Organization of the
United Nations



Milan Urban Food Policy Pact Monitoring Framework

July 2018 version

Indicator 25: Number of city residents within the municipal boundary with access to an (urban) agriculture garden

MUFFP framework of actions' category: Food production

Number of city residents with access to urban agriculture gardens/land. In order to account for geographic, economic and social differences across cities in access to gardens, the indicator will only reflect impact accurately if data is filtered by geospatial location, population density, income levels etc.

Overview table

MUFFP Work stream	Food production
MUFFP action	Promote and strengthen urban and peri-urban food production and processing based on sustainable approaches and integrate urban and peri-urban agriculture into city resilience plans.
What the indicator measures	<p>The indicator measures the accessibility of city residents (and specific target groups) to urban agriculture gardens/land. In order to account for geographic, economic and social differences across cities in access to gardens, the indicator will only reflect impact accurately if data is filtered by geospatial location, population density, income levels etc.</p> <p>Note: There may be situations where gardens exist, but people cannot access them due to cost, mobility or lack of adaptations for people with physical disabilities.</p> <p>Note: These can include city-designated gardens or urban agriculture gardens (community gardens, school gardens, allotment gardens) that are privately owned/managed or managed by social, community and other organisations. Data on the latter categories may be scarcer.</p> <p>Note: Urban agriculture is about food production, but also social, community benefits and environmental services. Depending on local policy interests, the indicator may focus on specific urban agriculture gardens or for example on gardens for food production only.</p>

Which variables need to be measured / what data are needed	<p>Metrics may include:</p> <ul style="list-style-type: none"> -Number of city residents within the municipal area -Number of agriculture gardens within the municipal areas -Spatial location of the gardens in relation to location of the growers household -Frequency of use (e.g. the definition of gardens and gardeners should reflect meaningful participation (such as criteria for minimum time commitment/time spend). Including gardens where people are only occasional visitors or have low involvement inflates data and distorts impact. <p>Possible additional data:</p> <ul style="list-style-type: none"> -Number (and type) of supporting policies -Number of growers/garden -Costs/fees of garden use. - Urban agriculture gardens surface area available per capita/household (or for different categories of households) -Number of people on garden waiting lists.
Unit of measurement (i.e. Percentages, averages, number, etc.)	Number or percentage of city residents
Unit(s) of Analysis (i.e. people under 5 years old, etc.)	Information may be disaggregated for specific target groups: low-income populations, slum inhabitants, elderly, migrants, specific ethno-cultural communities vs. newcomers, etc.
Possible sources of information of such data	<ul style="list-style-type: none"> -The city department/programme for (urban) agriculture, land use planning, cadastre, parks and gardens department, social development, health -NGOs, institutions
Possible methods/tools for data-collection	Data on number of urban agriculture gardens are likely available with different municipal support programmes. Spatial localisation of the gardens will require GIS mapping. Further analysis would require assessment of (supportive) policies, user fees and garden use/functioning.
Expertise required	GIS, policy analysis, survey design and administration
Resources required/ estimated costs	
Specific observations	
Examples of application	<p>In 2015, New York City committed in One New York: The Plan for a Strong and Just City to further build a more sustainable, resilient, and just food system where more of its food comes from regional and local growers, producers, and manufacturers. To achieve those goals, New York City is investing in infrastructure to strengthen its regional food system, supporting community based gardening and greening efforts to engage communities around food production, healthy eating, and community development, and encouraging the growth of local food producers and manufacturers to create good job opportunities in the food sector. As part of its Food Metrics Reporting, the city of New York monitors a set of related indicators, including the Number of registered community gardens on city-owned property. See: http://www1.nyc.gov/assets/foodpolicy/downloads/pdf/2017-Food-Metrics-Report-Corrected.pdf</p> <p>The city of Quito (Ecuador) set of its Urban Agriculture programme in 2002. The city monitors: Location of the urban agriculture gardens supported, surface area, type of gardens, number and type of users, production systems applied, technologies used and product destination.</p>

Rationale/evidence

The Milan Urban Food Policy Pact acknowledges that urban and peri-urban agriculture offers opportunities to contribute to synergies across food security and nutrition, ecosystem services and human well-being. Urban agriculture gardens are important green spaces and offer a myriad of environmental, economic and social benefits such as providing fresh products and plants as well as contributing to a sense of community and connection to the environment, providing an opportunity for satisfying labour, improving neighbourhood, air quality, bio-diversity, contributing to air cooling, and the well-being of residents and neighbourhoods.

Urban agriculture gardens contributes to household and community food security, allowing citizens to grow their own food, share, sell or to donate what they have grown. Urban agriculture gardens are one (complementary mechanisms) that may help increase accessibility for fresh food in local neighbourhoods.

Urban agriculture gardens are also promoted for stronger community cohesion, integration of migrant populations and for providing income and jobs where growers produce for the nearby market. Urban agriculture gardens provide other social benefits, such as the sharing of food production knowledge with the wider community and safer living spaces. Other benefits include mental or physical rehabilitation and therapy, as well as teaching a set of skills for job-related placement. Urban agriculture gardens may also be used for educational and recreational purposes.

One strong tradition in gardening in urban areas is cleaning up abandoned vacant lots and turning them into productive gardens. Alternatively, urban agriculture gardens can be seen as a health or recreational amenity and included in public parks, similar to ball fields or playgrounds. Historically, urban agriculture gardens have also served to provide food during wartime or periods of economic depression. Access to land and security of land tenure remains a major challenge for community gardeners.

This indicator specifically looks at accessibility of different types of city residents to different forms of urban agriculture gardens (municipal land, school gardens, allotment gardens, individual and institutional gardens). These urban agriculture gardens can be located on publicly-owned land or on private/institutional land through an agreement between the municipality and the land owner.

The indicators prioritises assessment of accessibility over mere availability of urban agriculture gardens per X number of residents. After all, there are many situations where gardens exist, but people cannot access them due to cost, mobility or lack of adaptations for people with physical disabilities. Amongst others, the location of an urban agriculture gardens may be a critical factor in determining accessibility: how often a garden is used and who visits it. Exposure to a garden is much more likely for individuals if they are able to walk or drive to the location, as opposed to public transportation. The length of travel time is also a factor. Those who live within a 15-minute or less travel distance are more likely to visit an urban agriculture garden as compared to those with a longer travel time¹. Such statistics should be taken into consideration when choosing a location for these gardens for a target population. Spatially locating the urban agriculture gardens in the city will also allow for relating availability to specific type of target groups (e.g. low-income populations, elderly, migrants). All these aspects need to be considered in data collection and interpretation (limitations of data) to determine barriers to gardening in people who wish to garden.

Urban agriculture gardens, publically or privately owned, are to a large extent impacted and governed by policies at the city level. Urban agriculture gardens may compete with the interests of developers.

¹ Blaine, Thomas W.; Grewal, Parwinder S.; Dawes, Ashley; Snider, Darrin. 2010. "[Profiling Community Gardeners](#)". 48 (6). Archived from [the original](#) on 5 May 2016.

In particular, zoning laws strongly impact the possibility of urban agriculture gardens. Policies can be enacted to protect urban agriculture gardens from future development. For example, New York State reached a settlement in 2002 which protected hundreds of community gardens which had been established by the Parks and Recreation Department GreenThumb Program from future development. In Rosario, Argentina, over 18 hectares of community garden parks are zoned by the Municipality and support (inputs, training, technical assistance, market outlets) is provided by the city's Urban Agriculture Programme to community growers.

Information on policies for allocation of gardens/plots and on costs (user fees) will provide further insight on the level of access for specific residents.

Glossary/concepts/definitions used

Urban agriculture gardens are defined as any gardens/areas of agricultural land within the municipal boundaries (Note that different cities may use different concepts and definitions for urban, sub-urban and peri-urban agriculture that may or may not fall within this concept). There are different types of urban agriculture gardens. Common types include:

- **Community gardens**, involving "any piece of land gardened by a group of people, utilising either individual or shared plots on private or public land". They are publicly functioning in terms of ownership, access, and management, as well as typically owned in trust by local governments or not for profit associations. Community gardens vary widely throughout the world. In North America, community gardens range from familiar "[victory garden](#)", areas where people grow small plots of vegetables, to large "greening" projects to preserve natural areas, to tiny street beautification planters on urban street corners (depending on local context cities may denominate these as nature gardens, pollination gardens, rain gardens).
- In the UK and the rest of Europe, community gardens or closely related "[allotment gardens](#)" which can have dozens of plots, each measuring hundreds of square meters and rented by the same family for generations. In the developing world, commonly held land for small gardens is a familiar part of the landscape, even in urban areas, where they may also function as [market gardens](#).
- **Micro-gardens** allow for use of small and built-up spaces (rooftops, backyards, patios, vacant patches of land along roadsides or waterfronts) to grow leafy vegetables, tubers and herbs and small animals².

Preparations

Staff/ organisations responsible for data collection and analysis should agree on type of data and level of analysis required or desired: will collection and analysis be limited to collecting data on the number of urban agriculture gardens for example, or will further data collection and analysis also be done on spatial location, support policies and garden functioning/performance? Once objectives are agreed upon, the methodological guidelines should be shared with the team responsible, and methodology, operational plan/time schedule/commitments, and reporting agreed upon. Spatial localisation of the gardens requires city maps and GIS; analysis of the functioning of the gardens will require development of survey guidelines.

Sampling

Data can be collected for the entire city or for specific low-income areas if reaching these target groups is a specific policy priority.

² The City of Antananarivo (Madagascar) urban agriculture programme aims at tackling food insecurity through the creation of micro gardens in low income neighbourhoods. So far, the programme has spread to 24 districts and reached 15,000 beneficiaries. See for a short video: https://www.youtube.com/watch?time_continue=142&v=tRnAcaNEAaw

Data collection and data disaggregation

Data on the total number (and type) of urban agriculture gardens are probably available with different municipal programs and departments (urban agriculture program, parks and gardens, cadastre and land use).

Spatial localisation of the gardens will require GIS mapping. Guidelines on such GIS mapping can be found in the Methodological Guidelines for Indicator 27 *Surface area of (potential) agricultural spaces within the municipal boundary*. Gardens can be localised in different areas of the city and/or in relation to residence locations of grower households.

Further analysis could involve assessment of number and type of (supportive) policies, user fees and garden use/functioning. Policy analysis would entail analysis of land use and zoning policies, urban agriculture and garden, or social support policies and programmes (financial support, input supply, training, technical assistance). Such policy analysis could be done in conjunction with data collection and analysis on Indicator 26 *Presence of supportive municipal policies that allow/promote agriculture production and processing within the municipal area*.

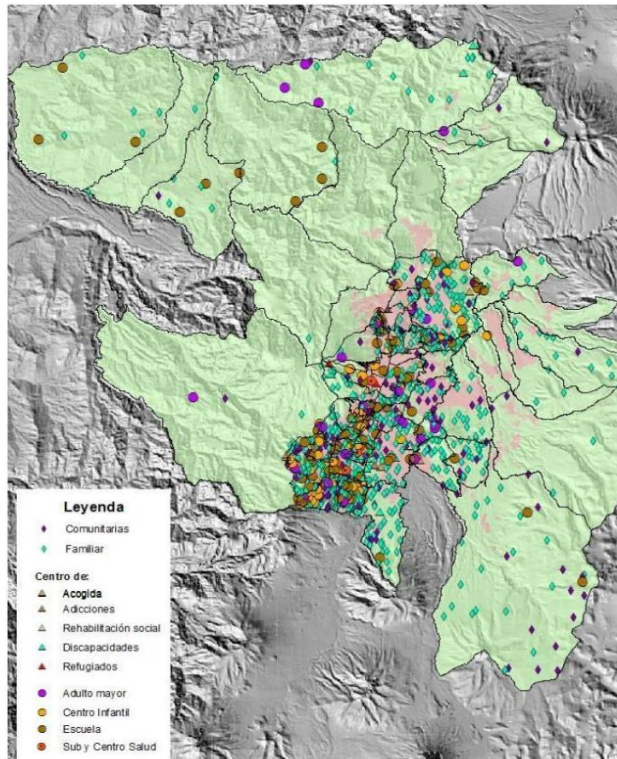
Data on the functioning of the gardens, land use/lease arrangements and user fees, number and type of growers involved, products grown and destination and social, economic and environmental impacts, etc. can be collected through garden surveys. A recently released [report on urban agriculture indicators](#) for Toronto may provide a source of inspiration. The listed indicators form the basis for how urban agriculture activity can be measured and tracked in a Toronto specific context. The indicators outline ways to measure the social, economic, health, and environmental benefits of growing food in the city.

Data analysis/calculation of the indicator

Dividing the total number of municipal support urban agriculture gardens by the total number of city residents will provide the metric for this indicator.

Spatial localisation of urban agriculture gardens on a GIS map will allow for further determining both availability and accessibility of specific resident groups to the urban agriculture gardens. Where access by citizens to urban agriculture gardens is low, a map can be drawn on priority neighbourhoods for future establishment of new gardens. This can be cross-checked with the vacant and available agricultural and open area in the city (see respective indicator 27 *Surface area of (potential) agricultural spaces within the municipal boundary*).

The city of Quito localises the urban agriculture gardens supported by the Municipality on a map. Coverage in rural areas in the Metropolitan Districts is sought to be expanded.



Location of urban agriculture gardens supported by the Quito AGRUPAR programme (2017)

The city of New York identified priority neighbourhoods to make affordable, nutritious food more accessible to all New Yorkers. The map below reports on the (lack of) presence of grocery stores. Similar maps can be drawn for the presence of urban agriculture gardens.



Map of priority neighbourhoods, New York City, Food Metrics Report 2017.



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Milan Urban Food Policy Pact Monitoring Framework

July 2018 version

Indicator 26: Presence of municipal policies and regulations that allow and promote agriculture production and processing in the municipal area

MUFPP framework of actions' category: Food production

The indicator assesses the presence of supportive municipal policies and regulation that allow and promote urban and peri-urban agriculture production and processing. It will help define gaps or areas for improvement by revising/formulating new policies and regulations.

Overview table

MUFFP Work stream	Food production
MUFFP action	<p>Promote and strengthen urban and peri-urban food production and processing based on sustainable approaches and integrate urban and peri-urban agriculture into city resilience plans.</p> <p>Protect and enable secure access and tenure to land for sustainable food production in urban and peri-urban areas, including land for community gardeners and smallholder producers, for example through land banks or community land trusts; provide access to municipal land for local agricultural production and promote integration with land use and city development plans and programmes.</p>
What the indicator measures	<p>The indicator assesses the presence of supportive municipal policies and regulation that allow and promote urban and peri-urban agriculture production and processing. It will help define gaps or areas for improvement by revising/formulating new policies and regulations.</p> <p>Note that the mere presence of policies in itself will not enhance urban and peri-urban agriculture production and processing if such policies are not implemented or enforced.</p>
Which variables need to be measured / what data are needed	<p>Information to be collected on:</p> <ul style="list-style-type: none"> -Number and type of policies and regulations, -Level of implementation and enforcement, and -Information and communication.

Unit of measurement (i.e. Percentages, averages, number, etc.)	Metrics include: -Number (and types) of policies and regulations -Number (and types) of information and communication mechanisms and target groups
Unit(s) of Analysis	-Urban and peri-urban agriculture production units/enterprises -Urban and peri-urban agriculture processing units/enterprises
Possible sources of information of such data	-Self-assessment among representatives participating in the coordination body. Possibly validated by assessment of external actors. -Policy review and analysis (relevant government departments including agriculture, land use and planning, legal office, food safety, health, economic development. Previous research).
Possible methods/tools for data-collection	-Group discussion for self-assessment, most likely the cheapest approach -External evaluation -Ad hoc surveys to capture opinions of stakeholders and target groups -Key informants interviews
Expertise required	Policy formulation
Resources required/ estimated costs	
Specific observations	Any self-assessment is by nature not objective. This self-assessment first and for all seeks to enable a joint learning process of stakeholders involved and enable the revision and improvement of the municipal policies. Furthermore, collecting and analysis of information done collectively contributes to a capacity <u>development process</u> .
Examples of application	London (UK) incorporated urban agriculture in the London Development Plan which commits the city to support urban agriculture especially in locations near food-insecure and vulnerable urban communities, and obliges local authorities to include space for urban agriculture in local spatial planning (London Assembly 2010). Dar es Salaam (Tanzania) accepted urban agriculture (crop and livestock) as a major urban land use and included urban agriculture in land use zoning and the Strategic Urban Development Plan. Baltimore (USA) adapted its zoning regulations and included commercial urban agriculture as a conditional permanent land use category (urban agriculture defined as the cultivation, processing and marketing of food within the city: horticulture, animal husbandry, aquaculture, agro-forestry, vineyards and wineries). Minneapolis (USA) supports affordable land ownership and/or affordable long-term leases for small enterprise urban agriculture on various types of land and rooftops (Minneapolis-DHFS 2009). It also established a food business development centre that provides start-up funds, such as low-interest matching loans, and access to technical assistance tailored to starting entrepreneurs and cooperative food initiatives ¹ .

Rationale/evidence

The UN Habitat New Urban Agenda (October 2016) emphasises the need for cities to ‘strengthen food system planning’ and recognises that dependence on distant sources of food and other resources can create sustainability challenges and vulnerabilities to supply disruptions. The agenda includes a commitment to: ‘Support urban agriculture and farming, in order to build a more localised food system...’.

In the same line, the City of Milan under its Food Policy Priority n°1: Guaranteeing healthy food for everybody, Guideline 1.3 states that: “The Municipality shall actively work to promote and facilitate various forms of urban agriculture and horticulture, as well as the establishment and consolidation of

¹ Baker L. and H. de Zeeuw, 2015. Urban food policies and programmes. In: Drechsel and De Zeeuw (ed). Cities and agriculture-Developing resilient urban food systems, 2015. Earthscan-Routledge London and New York.
<http://www.ruaf.org/urban-food-policies-and-programmes-overview>.

networks and activities for creating social inclusion and providing food to the vulnerable population". Under Priority n°2: Promote the sustainability of the food system, Guideline 2.1 it states that: "The Municipality shall facilitate access to land through its institutional instruments, the co-promotion of specific services (e.g. mortgage credit, local land trusts, public lands, etc.) and the spread of multi-functional agriculture that contribute to the objectives set out here".²

Commercial urban and peri-urban agriculture production and the development of various types of commercial to social urban and peri-urban agriculture enterprises offer (new) opportunities for job and revenue creation for different actors in the food chain. Innovations are found in the development of new catering concepts (e.g. a restaurant or food shop using produce from the region), new product concepts (e.g. local product varieties or recipes) and new production-marketing concepts (e.g. restaurants growing part of their own food and urban farms selling produce on-farm).

Public policy can encourage such entrepreneurs through financial and public policy support. City governments can use a variety of policy and support instruments that focus on enabling affordable access to land, infrastructure, training and technical assistance, incubation funding and network creation to establish appropriate linkages with relevant public, private and civic societal actors. Communication and education, direct implementation or support to urban and peri-urban agriculture projects (production and/or processing) and provision of business support services (including granting access to land, markets, infrastructure and resources, but also encompassing training and advice) are complementary strategies delivered by many of these governments. These include legal and regulatory instruments, such as setting of procurement standards and targets (as done in Rome, Malmo and Ecuador), 'green' building regulations, zoning and agricultural land protection (as done in Toronto, Rosario and Belo Horizonte). Cities can enable access to or temporary use of public or private land and actively protect agricultural and open land for food production through land use zoning. Food growing areas, such as rooftop growing, community gardens, allotment gardens, can be made mandatory in new or renovated housing settlements and building projects. They also include financial instruments (like public or public-private investment funds, taxes and subsidies). The Toronto Enterprise Fund for example is a unique funding partnership between a not-for-profit network of community organisations and three levels of government. It supports and finances 'social enterprises'. Brasilia FD (Brazil) operated the PROVE programme that assisted urban producer groups to establish value adding enterprises by providing organisational and legal support, land, infrastructure, technical and business development advice and marketing support (e.g. establishing brands, farmers markets). Public investment in food transport and storage, marketing, waste management and provision may further stimulate urban food system enterprises development³.

As for any policy and regulation, level of implementation and enforcement will determine actual effectiveness. Information and communication on the policies and regulations are also key in this regard.

² Milan 2015-2020 food policy guidelines

<http://mediagallery.comune.milano.it/cdm/objects/changeme:71638/datastreams/dataStream3943587268670669/content?1482924699146>

³ See footnote 1. See also: RUAF Foundation, 2015. SMEs and sustainable urban food provisioning. RUAF Foundation and SUPURBFOOD. <http://www.ruaf.org/publications/smes-and-sustainable-urban-food-provisioning> and Dubbeling M., J. Carey and K. Hochberg, 2016. The role of private sector in city region food systems. RUAF Foundation, F&BKN and IWMI/ WLE.

<http://www.ruaf.org/sites/default/files/Private%20sector%20engagement%20in%20city%20region%20food%20systems%20Analysis%20report-final%282%29.pdf>

Glossary/concepts/definitions used

A **policy** can be described as a course of action adopted by government (business or organisation) to induce certain changes in the decisions and behaviour of actors in that society in order to achieve certain goals⁴.

A policy is also defined as the sum total of government, economic or business actions, from signal of intent to final outcomes (Adapted from Understanding Public Policy. Theories and Issues, Paul Cairney)

A policy is a set of ideas or plans that is used as a basis for making decisions, especially in politics, economics, or business (Collins Dictionary).

A **regulation** is a law, rule, or other order prescribed by authority, especially to regulate conduct.

Municipal policy instruments. Cities have different policy instruments available including legal/regulatory, economic/financial, communicative/educative and urban design instruments.

- **Legal or regulatory instruments:** The logic underlying legal instruments is that actors (such as citizens or industries) can be forced to adopt a certain desired behaviour through legal norms and regulations (like norms, laws, bye-laws, ordinances, etc.) and that it is possible to control whether these actors adhere to the given rules and norms. Actors who do not adhere to the rules will be sanctioned. An alternative legal instrument to issuing general bye-laws, norms and regulations, is the contract or covenant. The government and certain actors sign an agreement in which the social actors (e.g. urban farmers' organisations) agree to adhere voluntarily to certain norms and regulations, often in exchange for certain support by local government or other organisation (e.g. access to municipal land, obtaining a license for processing, technical support, etc.).
- **Economic/financial instruments:** The logic behind the application of economic instruments is the assumption that social actors will adopt a certain desired behaviour if this gives them some economic gains (or losses if they continue with the undesired behaviour). Local governments for example may grant tax incentives or subsidies if actors adopt the desired behaviour or levy special taxes for undesired behaviour (similar to the levy on cigarettes or alcohol). Such economic instruments also need a legal basis (see above), but the essential element here is not the law itself but the economic incentive or loss that orients (or is supposed to orient) a certain behaviour.
- **Communicative/educative instruments:** The assumption behind the use of communicative/educative types of instruments is that people will adopt a certain desired behaviour if they are well informed about the positive effects of the desired behaviour as well as the negative effects of the undesired behaviour. Accordingly, information, education and persuasion tools (media programmes, extension visits, training courses, leaflets, websites, etc.) will be applied to make people understand the importance of the desired change and to assist them in the change process. Related to urban agriculture, a municipality may provide technical training to urban producers and processing enterprises. Communicative/educative instruments are often used complementary to the other policy instruments mentioned, since the lack of an adequate communication and education strategy may strongly reduce the effectiveness of the other policy instruments used.

⁴ See footnote 1.

- **Urban design instruments:** The logic behind urban design instruments is that actors will adopt a certain desired behaviour if their physical environment has been designed in such a way that they are more or less automatically prompted to act a certain way: for example if public dustbins are widely available, generally people will throw less waste on the street. Examples related to urban agriculture are zoning (setting aside and protecting certain areas of the city for agriculture), combining or separating certain land uses depending on the degree of conflict/synergy, inclusion of space for home or community gardening in social housing projects, etc. Several cities have included land designated for urban agriculture in their urban land use plan, housing or in slum upgrading projects.

Urban and peri-urban agriculture enterprises engaged in production or processing include organisations that have a core strategy and mission to engage in economic, entrepreneurial activities through the production of goods, provision of services and/or marketing in the food system. It excludes non-governmental organisations, governments and civil society organisations.

Preparations

The following preparations refer to a self-assessment exercise:

1. In case a interdepartmental coordinating body exists: inclusion of an agenda item on monitoring food governance indicators on the agenda of one of the meetings of the interdepartmental/sectoral coordination body. During this meeting all governance related indicators (1-6) can be jointly discussed by all members of the coordinating body. The monitoring guidelines can be shared with all involved prior to the meeting.
2. In case such body does not exist: the indicator can be reported on by the contact person in the city for urban food policies and the Milan Pact. This person may decide to discuss the indicator and scoring sheet with other stakeholders involved in the formulation and implementation of urban food strategies/policies/projects and action plans. The exercise may contribute to a (future) reflection and planning process on the importance, role and set up of such a coordinating body.
3. The internal self-assessment can be validated with selected external stakeholders, especially where mechanisms of information sharing are concerned.

In case other evaluations methods are selected (external evaluation, key informant interviews) respective preparations should be taken.

Sampling

In case of a self-assessment exercise and if an interdepartmental coordinating or multistakeholder food body exist: Preferably all representatives in the coordinating body should participate in the monitoring exercise. They should collectively fill in the scoring sheet provided below.

In case such body does not exist: representatives from all relevant government departments, e.g. agriculture, land use and planning, legal office, food safety, health, economic development should be involved.

In addition, a randomly sampled number of external stakeholders (NGOs and academic organisations working in urban and peri-urban agriculture and enterprise development) and target groups (producers and processors) could be engaged in a participatory analysis of existing policy instruments, gaps and opportunities/needs for improvement.

Data collection and data disaggregation

During a monitoring/review meeting the following scoring sheet can be discussed and filled. Individual members may first want to make their own assessment before discussing this in a larger group. Alternatively, a facilitator could guide group discussion from the start and facilitate the assessment in an interactive and participatory way. Specific observations made during the meeting (for example on levels of consensus or differences in opinions and scores) can be added in the final column and used for future reference or further discussions. Also recommendations for improvement can be added here.

Scoring sheet

Characteristics	Self-assessment and scoring			Total score	Disaggregation of information	Specific observations/recommendations
Presence of municipal policies and regulations that allow and promote urban and peri-urban agriculture production and processing	Yes =1 point	No=0 points			-Number and type of policies and regulations -Add the policy documents and summarise their content -Distinguish for different types of polices	
Level of implementation: is the municipal policy/implementation actually implemented or enforced?	Yes, completely = 2 points	Partially = 1 point	No= 0 points		-Discuss for each of the policies or regulations. -Indicate reasons for partial or non-implementation -Indicate what stakeholders are (or should in future be) engaged in <u>implementation</u>	
Information and communication: Information and communication on the (various) policies and regulations is widely shared within the city government and potential beneficiaries	Yes, completely = 2 points	Partially = 1 point	No= 0 points		Number and type of information and communication mechanisms and target groups	

Note: It may be relevant to further critically assess the one or more municipal policies themselves in order to highlight areas of improvements of the actual policy. The analysis table provided in the guidelines for Indicator 3 *Presence of an urban food policy, strategy or action plan* may be used as a framework to do so.

Data analysis/calculation of the indicator

Based on the scoring and further (disaggregated) information provided, participants in the monitoring/review meeting may identify gaps or areas for strengthening or improvement:

- How can the existing policies be better implemented, funded and communicated?
- What changes in the existing policies are proposed? Or what steps can be taken to elaborate a new policy?
- What is the likelihood of success of the proposed changes?
- What process should be followed to implement these changes? Steps to be taken? Stakeholders to be involved? Critical time-lines? Resources required?
- Which lobbying strategies should be put in place, by whom and when??

The self-assessment exercise can be repeated once a year to monitor uptake of agreed improvements/changes.

References and links to reports/tools

Godoy Garraza, G. y M. Manzoni, 2012. Agricultura familiar y acceso a la tierra urbana y periurbana : marco normativo y estrategias jurídicas. 1a ed. - Jujuy : Ediciones INTA, 2Argentina. Report accessible in Spanish from: <https://inta.gob.ar/documentos/agricultura-familiar-y-acceso-a-la-tierra-y-urbana-y-periurbana>



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Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 27: Surface area of (potential) agricultural spaces within the municipal boundary

MUFPP framework of actions' category: Food production

The indicator monitors the surface area of land within the municipal boundary used for agriculture, zoned/destined for agriculture (although possibly not used at this moment) as well as open vacant and built up spaces that could potentially be used for agriculture.

Overview table

MUFPP Work stream	Food production
MUFPP action	<p>Apply an ecosystem approach to guide holistic and integrated land use planning and management in collaboration with both urban and rural authorities and other natural resource managers by combining landscape features, for example with risk-minimizing strategies to enhance opportunities for agroecological production, conservation of biodiversity and farmland, climate change adaptation, tourism, leisure and other ecosystem services.</p> <p>Protect and enable secure access and tenure to land for sustainable food production in urban and peri-urban areas, including land for community gardeners and smallholder producers, for example through land banks or community land trusts; provide access to municipal land for local agricultural production and promote integration with land use and city development plans and programmes.</p>
What the indicator measures	The indicator monitors the surface area of land within the municipal boundaries used for agriculture, zoned/destined for agriculture (although possibly not used at this moment) as well as open vacant and built up spaces that could potentially be used for agriculture. It seeks to spatially locate these areas and use these data for future land use planning, preservation and protecting of agricultural lands from (unplanned) urban growth, while securing user rights for farmers and maintaining important services such as local production, urban water quality and supply, and flood retention (or other reduced climate risks).
Which variables need to be measured / what data are needed	Data on: -Surface areas -Spatial location -Land ownership, accessibility, use, suitability and feasibility.
Unit of measurement (i.e. Percentages, averages, number of people, etc.)	Surface area in m ²
Unit(s) of Analysis (i.e. people under 5 years old, ect.)	1. Land used for agriculture, 2. Land is zoned/destined for agricultural use, although the land may actually not currently be used

	3. Potential agriculture growing spaces
Possible sources of information of such data	-The city department/programme for (urban) agriculture, land use planning, cadastre, parks and gardens department. -Cadastral maps, satellite and aerial images.
Possible methods/tools for data-collection	GIS mapping and field observations
Expertise required	Analysis of satellite and aerial images, GIS, agronomy
Resources required/ estimated costs	
Specific observations	
Examples of application	A 2015 study from the University of Wisconsin in Madison used a combination of ArcGIS mapping and field visits to generate a community garden site suitability index that sorted and inventoried undeveloped land potentially available for community gardens ¹ .

Rationale/evidence

Rapid urbanisation, building up remaining agricultural and open spaces within the city and extending into peri-urban and rural areas, is challenging traditional approaches to food and nutrition security, as well as traditional thinking on how cities are fed. Urban expansion goes hand in hand with an increase in the demand for natural resources (land, water), which provide vital food and ecosystem services to cities, as well as with increased challenges in terms of economic efficiency, land use and land rights. Large scale conversions of agricultural land to non-agricultural uses have caused, and may also cause in the future, problems in cities and rural areas with regards to drainage systems and flood retention, disruption of the drinking water supply, temperature increases, environmental pollution, and increased vulnerability to disruptions in safe and nutritious food availability and supply, especially in areas affected by climate change.

Cities are beginning to realise the importance of preserving and protecting vacant and agricultural areas, and are starting to influence planning policy to protect or enable the use of these areas for localised food production), but also to preserve and protect agricultural areas with views to climate change adaptation (mitigation increasing urban temperatures, enhancing storm water infiltration) and other social and environmental benefits. In many cases, this is coupled with efforts both to enhance the access of (vulnerable) urban consumers to sufficient, healthy, and safe food as well as to improve the livelihoods of urban, peri-urban and rural small-scale and family farmers².

Calculation of available agricultural surface area within the municipal boundaries requires agricultural land use mapping (through GIS and field observations). Such land use mapping can be undertaken in order to:

1. Identify the locations and surface areas where various types of agricultural activities are undertaken in the municipal area (e.g. **land used for urban and peri-urban agriculture**),
2. Identify the locations and surface areas where **land is zoned/destined for agricultural use**, although the land may actually not currently be used
3. Identify locations and surface area of **potential agriculture growing spaces** in the municipal area (including vacant open spaces, rooftops, parks, road sides) and classification of their accessibility,

¹ Eanes, Francis and Ventura, Stephen J. (2015) "Inventorying Land Availability and Suitability for Community Gardens in Madison, Wisconsin," Cities and the Environment (CATE): Vol. 8: Iss. 2, Article 2.

<http://digitalcommons.lmu.edu/cgi/viewcontent.cgi?article=1166&context=cate>

² Dubbeling M., C. Bucutariu, G. Santini, C. Vogt and K. Eisenbeiß, 2016. City region food systems and food waste management- Linking urban and rural areas for sustainable and resilient development. GIZ, RUAF Foundation and UN FAO. Bonn and Eschborn. <http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016>

suitability, current use and feasibility for agriculture according to a number of criteria. This will enable to increase the access of the city residents to available and suitable spaces for food production, processing and marketing.

Note that land used or zoned for agriculture or land that can potentially be used for agriculture can be land that is publically owned, or owned by private land owners/institutions. Different land use arrangements may also have been put in place (ownership, lease arrangements). Cities can decide to focus on specific ownership types or other land use categories depending on data availability and political priorities.

Surface areas may be deducted from desk analysis of land registers, maps and images. However, information on location and characteristics of these areas will be needed for further land use planning.

Preferably, information should also be collected and “mapped” on other socio-economic and environmental variables so that different data sets can be studied in relation to each other, for example: poverty/malnutrition rates in specific neighbourhoods, sources of contamination (main roads, industry), areas where wastewater or solid waste is recycled or marketing takes place (to locate agricultural production close to these areas for example), etc.

Ideally, agricultural land use mapping would not only be undertaken by the city but also by communities in their own areas. This would help them look at their surroundings with new eyes and see new possibilities. It may yield information that can be useful to them in their communities. And it will mean that the community context is either already known or easier to find out. Data collected by communities could be aggregated by the city for the entire municipality.

Glossary/concepts/definitions used

Land **zoning** involves the regulation of the use and development of specific areas of land. It concerns the process of dividing land in a municipality into physical districts, or zones, according to the present and potential use of the properties in each zone, and then allows or prohibits certain types of land uses within certain zones (e.g. residential, industrial, agricultural). The type of zone determines whether planning permission for a given development is granted. Zoning may specify a variety of conditional uses of land. It may also indicate the size and dimensions of land area as well as the form and scale of its land use. These guidelines are set in order to guide urban growth and development. Thus, zoning is a technique of land use and urban planning. Legally, a zoning plan is usually enacted as a by-law with the respective procedures.

Zoning can have a variety of impacts on the urban food system. For example, some zoning codes might prohibit commercial agriculture in residential zones, making it impossible to have community gardens or urban farms that seek to sell (part of) their produce in those areas. Zoning rules might also have an impact on the food system by not listing certain activities, such as food sales, as a legal commercial activity in certain zones, which would make selling food, such as at a farm stand, illegal. Zoning rules might also say what kinds of structures are allowed, which could exclude the construction of greenhouses. In addition, zoning might set limits on which animals, such as chickens or bees, can be kept in specific areas³.

Vacant spaces: Open non-built up areas that could potentially be used for agriculture including for example open green spaces like urban parks, roadsides, flood zones, areas below electricity lines and

³ Although comprehensive plans and zoning are the most common forms of land use regulation, cities can use other legal mechanisms that can be used to protect land for food production either within or surrounding the municipality. In addition to planning and zoning, agricultural land may be protected through land trusts and conservation easements. See for some USA examples: https://www.chlpi.org/wp-content/uploads/2013/12/good-food-good-laws_toolkit-10.23.2017.pdf

peri-urban greenbelts.

Built-up spaces: The 'Built-up area' of a city is defined as the contiguous area occupied by buildings and other impervious surfaces. It includes areas already built upon (buildings, hardened surfaces) that could be used for agriculture production using specific production technologies, such as rooftop gardening; use of planting boxes, etc.

Land **accessibility** refers to the agricultural land use possibilities or limitations related to physical and legal/planning access to a specific area of land (ownership, tenure and user rights, land prices, planned land use).

Agricultural land use **suitability** helps to understand if a given area of land allows for agricultural production based on its agronomic characteristics and limitations.

Agricultural land **feasibility** (or **adequacy**) relates to issues like protection from theft, relative location in relation to households, to markets or input supply.

Preparations

A meeting should be organised with all staff that will be involved in this activity in order:

- To familiarise them with land use mapping and these methodological guidelines (why, what, when, how)
- To agree on the objectives of the monitoring exercise and the type of data and information to be collected
- To define the methodology to be applied for data collection and analysis
- To agree on work planning: who will do what, when and how; required and available means,
- How to coordinate these activities.

Counting with the following basic information will help further data collection and analysis:

- City history development, changes and trends in land use (loss of agricultural land and ecologically valuable land as a result of urban expansion in the past 5-10 years; rate of city expansion and direction of urban growth, new urban projects and plans)
- Municipal boundaries, general urban and zoning plan, land use categories and maps, normative and legal framework regarding land tenure and use, soil regulations in different areas (see also Indicator 26. *Presence of municipal policies and regulations that allow and promote urban and peri-urban agriculture production and processing*).
- Location of different neighbourhoods, green, residential and industrial areas, main infrastructure and water sources
- Location of agricultural and vacant land areas that can potentially be used for agriculture.

This information and data is generally available from statistical, cartographic and cadastral data sources available in different municipal departments (Cadastre, Urban Planning, Public Services and Works, Parks and Green Areas, etc.).

Finally, if beyond mere surface areas, spatial, location, land accessibility, suitability, use and feasibility will be assessed, agreement should be reached on concepts used to ensure homogenous analysis by different members of the monitoring team.

Sampling

Data can be collected for the entire city (municipal boundaries) or for specific low-income areas if reaching these target groups is a specific policy priority.

Data collection and data disaggregation

Surface areas of agricultural land used, zoned or potentially available could be calculated from desk research only (analysis of land use registers, maps and zoning plans; analysis of satellite/aerial images). Spatial localisation of agricultural land will however require further GIS mapping.

1. Analysis of land registers, maps and images

Where information on surface areas of agricultural land is not available in land registers (cadastre for example), up-to-date maps, satellite images and aerial photos (available from Google Earth) can be used for data collection and spatial localisation. Take the most up-to-date available set of aerial photographs or satellite images on a scale of 1:2.500- 1:12.500 (if available) to allow for a clear and high resolutions of the images. The team may decide to only identify surface areas larger than 1000 m² because of logistical and technical reasons (difficulty in studying very small areas; smaller areas change use more frequently).

The team should agree on the different land categories to be surveyed:

- (1) Land already used for different types of agriculture (crop production, tree production, livestock, aquaculture),
- (2) Land zoned/destined for agriculture: this includes areas that are destined, but not actually used for agriculture
- (3) Open or vacant land areas that can potentially be used for agriculture
- (3) Built-up areas such as rooftops, park areas, road, railway and water borders where agriculture can be integrated into (multifunctional) land use.

Digitising information collected in GIS maps will allow for further data analysis and future actualisation of information.

2. Field observations

Once the different land categories and areas are mapped, selected areas can be visited for ground verification through field observations as well as to allow for further data collection on land accessibility, suitability, use and feasibility.

Areas can be selected on the basis of the following criteria:

- Large(r) surface areas
- Their representation for the major types of land areas (land already used for agriculture, zoned, open and vacant areas and built-up that that can potentially be used for agriculture)
- Areas that have the best chance to be maintained as agricultural areas in future (refer to zoning, land use and city development plans)
- Vulnerable (farming) households form a major category of households in the area.

Field observations can include collection of further information to validate the cartographic information and describe land use characteristics (surface area, slope). Location and land use of the areas can be verified by visual observations and measurements. GPS (Geographic Positioning System) techniques can be used to check measurements. Using maps in a scale 1:2000, will facilitate community involvement in spatial identification of areas and validation of information concerning ownership of the site, security of tenure, access to water, past and current land use, safety etc (see further below).

Further analysis could involve assessment of **land accessibility**. Questions that can be asked here include:

- Who owns the land?
- What is its current status (freehold, leasehold, etc.)?

- What are the norms and standards for this area of land (public domain, reserved for development, etc.)?
- Are there any project or planning regulations for the future such as a new road, a garbage dump or the extension of a development?
- What are the physical constraints to accessing this area of land such as topographical constraints (slopes) or hazard prone areas such as risk of flooding?

Land **suitability** can be assessed by answering the following questions:

- What are the land qualities for agriculture? For what kind of agriculture?
- Is it suitable for cultivation? For what kind of products?
- Is water available? In terms of quality and quantity.
- What is the level of contamination of the soil and water sources?

Agronomic field observations (quality and texture of the soil, current vegetative growth, availability of organic matter etcetera) may yield further information.

Current and past uses of the land addresses the social dimension of the mapping and are important to consider even if the land is currently not used for agriculture, or only partially cultivated. Questions that can be asked include:

- What is it being used for?
- What was it being used for before?
- How many people/farmers/families are cultivating today? Who are they? Where do they live?
- What are the farming practices?

Land **feasibility** requires assessment beyond accessibility and suitability. One can look more particularly at the following:

- Is this land safe (from thefts and possible crimes), and is there anything to be done to increase the safety?
- Is the area well-located close to where (potential) growers and farmers live? Are there good transportation systems?
- Are inputs supply and market locations favouring supply and market efficiency?

Data analysis/calculation of the indicator

1. GIS mapping

Spatial localisation of current, zoned and potential agriculture areas can be done using Geographic Information System-GIS (GIS MapInfo or ARCVIEW info Software (or other locally available) packages. Information can be interpreted by local specialised government departments or institute. This will also allow for further determining both availability and accessibility of specific resident groups to these areas (see also Indicator 25 *Number of residents in the city with access to an urban agriculture garden*).

The GIS maps will constitute a tool for urban planners and technical staff to facilitate strategic planning of (agricultural) land areas.

Most larger cities already possess GIS systems or cartographic databases on municipal land use. However, in many cases agricultural land use is not officially considered in land use categories defined by the planning departments and cadastre. In that case, new “thematic maps” (the maps or layers that constitute the basic architecture of the GIS) have to be included to incorporate information on actual and prospective agricultural land use, location, soil classification according to their agronomic characteristics etcetera.

2. Elaboration of prospective land use maps with the community and public actors.

Use of currently vacant open and built-up spaces for future (either temporal or permanent) agricultural use can be analysed and plans made on for example:

- The development of agro-silvo-pastoral practices on areas with limited agronomic capacities,
- The cultivation of ornamental plants in health-risk prone areas,
- The cultivation of specific plants that conserve the soils and combat erosion in coastal areas or on river sides,
- The use of flowers or shadow plants to generate aesthetic environments and attract bird and insect life,
- The production of food plants (vegetables, fruits, etc.) in park and communal areas close to urbanisations.

Information collected may be organised in a format similar to the one below:

Area of land		Characteristics	Accessibility			Suitability and feasibility			Prospective land use
			Owner ship	Tenure situation	Planned land use	Quality of the soil	Availability of water	Relative location	
1.Area 1 Location		Surface area Slope Current land use							
2.Area 2 Location									
3.Area 3 Location									
.....									
.....									

3. Action planning

Action planning by organisation of separate or mixed focus group meetings with urban farmers and different local government departments (planning, cadastre, parks and green areas, agriculture, housing) will allow to further identify problems and solutions related to for example insecure land tenure and preservation of agricultural land areas, such as policy measures needed to improve security of user rights, inclusion of agricultural areas in municipal land use and zoning plans, etc.

4. Reporting

The results of agricultural land use mapping can be reported by using:

- (GIS) maps that show trends in city development and growth (and loss of agricultural land)
- (GIS) Land use maps that show the location and characteristics of land used and zoned for different agricultural activities as well as the various types of vacant land areas.
- Opportunities & proposals for the agricultural use of vacant and built-up land areas (prospective land use maps),
- Policy measures needed (bye-laws, ordinances, economic and fiscal incentives) to improve secure access and tenure to agricultural or vacant land,
- Possibilities and proposals for integration of agriculture land use in land use, city development and zoning plans.



**Food and Agriculture
Organization of the
United Nations**



Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 28: Proportion of total agricultural population –within the municipal boundaries- with ownership or secure rights over agricultural land for food production, by gender

MUFPP framework of actions' category: Food production

The indicator monitors ownership and rights over agricultural land. By specifically promoting data disaggregation by gender, this indicator is particularly useful in terms of framing gender differences in land ownership and control.

Overview table

MUFPP Work stream	Food production
MUFPP action	<p>Apply an ecosystem approach to guide holistic and integrated land use planning and management in collaboration with both urban and rural authorities and other natural resource managers by combining landscape features, for example with risk-minimizing strategies to enhance opportunities for agroecological production, conservation of biodiversity and farmland, climate change adaptation, tourism, leisure and other ecosystem services.</p> <p>Protect and enable secure access and tenure to land for sustainable food production in urban and peri-urban areas, including land for community gardeners and smallholder producers, for example through land banks or community land trusts; provide access to municipal land for local agricultural production and promote integration with land use and city development plans and programmes.</p>
What the indicator measures	The indicator monitors ownership and rights over agricultural land. By specifically promoting data disaggregation by sex, this indicator is particularly useful in terms of framing gender differences in land ownership and control.
Which variables need to be measured / what data are needed	<ul style="list-style-type: none"> • Total agricultural population within the municipal boundaries • Number of households or people with land ownership and secure rights over agricultural land for food production • Number of women with ownership or rights over agricultural land
Unit of measurement (i.e. Percentages, averages, number of people, etc.)	<ul style="list-style-type: none"> • Percentage of people with ownership/secure land rights as per the total agricultural population • Percentage of women with ownerships/secure rights as part the total of people with ownerships and secure land rights
Unit(s) of Analysis (i.e people under 5 years old, ect.)	Data disaggregation by sex: share of men/women among owners or rights-bearers of agricultural land, by type of tenure

Possible sources of information of such data	-Administrative records (cadastre or land registry) -Household and agricultural surveys
Possible methods/tools for data-collection	Analysis of administrative records and existing surveys; implementation of new surveys
Expertise required	Survey design, implementation and analysis
Resources required/estimated costs	
Specific observations	
Examples of application	This indicator already exists. Until now, the indicator has been collected mainly through livelihood and national household income and expenditure surveys (like FAO and World Bank LSMS-ISA ¹ surveys). The indicator is available for specific countries, but has not been applied yet at city-level. It is also worth mentioning that the importance of a sex-disaggregated indicator on land is acknowledged in the Minimum Set of Gender Indicators approved by UN Statistical Commission, where a place-holder indicator 'proportion of the (adult) population who own land, by sex' figures as one of the 52 indicators. Furthermore, the EDGE (Evidence and Data for Gender Equality) initiative is conducting methodological work on standards for the collection of reliable sex disaggregated data on land ownership.

Rationale/evidence

The overarching goals of improving the governance of tenure of land and natural resources is achieving food security, shared prosperity and sustainable development, based on the recognition of the centrality of land to food production and the requirement of promoting secure tenure rights and equitable access to land and natural resources for people, communities and others. There is an inextricable link between land access, tenure security on one hand, and equity, income/food security on the other. Many of the poorest and food insecure groups are those with the most insecure land tenure rights, including female headed households, orphans, migrant farm workers, peri-urban slum dwellers, and the internally displaced persons. Secure tenure rights to land and natural resources are a key for poor populations to access the very basic resources that would allow them to develop and sustain their livelihoods². This holds true for both rural as well as urban and peri-urban producers.

In many urban, peri-urban and rural areas of cities, agricultural activities -including animal husbandry, horticulture, aquaculture, fruit production- are practiced in various locations, around the house (backyard, rooftop gardening), in open areas in the city and on peri-urban farms. Food production may take place on private land (owned, leased), on public land (parks, conservation areas, along roads, streams and railways, leased), or semi-public land (schoolyards, grounds of schools and hospitals). Incentives for producers to invest are often compromised by the lack of security concerning land tenure and the fear of eviction. Why erect terraces, improve and fertilise the soil, or build irrigation systems if there are no guarantees that benefits will be reaped from those investments? Studies have shown that the lack of such arrangements is the main obstacle to the development of sustainable food production in urban and peri-urban areas, including land for community gardeners and smallholder producers, with negative effects on women in particular. Land tenure does not mean automatic land ownership. Integration of urban and peri-urban agriculture into city development and land use plans, taxation rules and legal frameworks are therefore necessary to provide security and incentives for producers.

¹ Living Standards Measurement Study-Integrated Surveys on Agriculture. <http://surveys.worldbank.org/lsms/integrated-surveys-agriculture-isa>

² <https://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-1.pdf>

Achieving tenure security at scale, and sustaining this, may require adjustments of policy and legal framework and implementation practice for land administration and land information systems. Cities have explored a variety of arrangements for granting permanent or temporary land access and tenure. Identifying land for food production (see also Indicator 27 *Surface area of potential agricultural spaces in the municipal area*) is often only the first step. If urban growers cannot buy land outright, it is important that they can create an arrangement in order to stay on the land long enough to invest in its productivity. Strategies that can be used include:

- (1) **Support land lease and purchase programs.** Once land has been identified, municipalities can establish programmes to lease city-owned plots to urban and peri-urban growers at a low or reasonable cost. Many cities run garden lease programmes where individuals, families associations and community organisations can lease a plot for a nominal fee or are granted temporary user rights, often based on specific land use agreements. Leases often run for renewable periods of 1-5 years, but do not automatically guarantee security of tenure. New York City's GreenThumb programme, housed within the Department of Parks and Recreation ("DPR"), is the largest community gardening program in the USA, with over 500 city-owned gardens in its network. DPR guarantees the renewal of licenses for gardens on its land; however, gardens are still at risk as the city may revoke a license with 45 days' notice. If the city does revoke a license, it is required to make efforts to relocate the garden. It must provide the licensee with a list of all available city-owned vacant land within one-half mile of the existing garden. The licensee may select any lot from that list as a relocation site.
- (2) **Establish a community land trusts focused on urban farming.** Community land trusts (CLTs) can be used to promote urban agriculture. A CLT is a non-profit corporation committed to ensuring that land is used in the best interests of a community, while using charitable donations to cover its costs. A trust acquires land and maintains ownership of it permanently, which can be helpful in alleviating land tenure issues. The CLT can then lease (or sublease) its property to urban farmers. In Providence, USA, the Southside Community Land Trust has operated for over 30 years, focusing on urban farming. The Trust takes an active role in farming its properties, recruiting community members to farm over a dozen gardens. Among other programmes, the Trust trains beginning farmers in business development and farming practices, and participating farmers become eligible to lease land owned by the Trust³.
- (3) **Establish a land bank** for urban and peri-urban food production. Based on land use mapping, Rosario (Argentina) created a Municipal Agricultural Land Bank (a cadastral-based land registry) and brings those in need of agricultural land in contact with the owners of vacant land. The city also leases vacant land from private landowners to sub-lease it to community groups interested in using the land productively. A third effective instrument used in Rosario is the increase of municipal taxes on idle urban land and reduction of taxes for landowners who make idle land available for farming (temporary or permanent)⁴. Baltimore (USA) also maintains a land bank of available vacant city-owned land and provides such land to commercial small-scale urban farmers in five-year leases (BCPC 2013)⁵.

³ Good laws, good food: Putting local food policy to work for our communities, 2017. Harvard Food Law and Policy Clinic and John Hopkins Centre for a Liveable Future, USA. https://www.chlpi.org/wp-content/uploads/2013/12/good-food-good-laws_toolkit-10.23.2017.pdf

⁴ Baker L. and H. de Zeeuw, 2015. Urban food policies and programmes. In: Drechsel and De Zeeuw (ed). Cities and agriculture-Developing resilient urban food systems, 2015. Earthscan-Routledge London and New York. <http://www.ruaf.org/urban-food-policies-and-programmes-overview>. Viljoen, A., Schlesinger, J., Bohn, K. and A. Drescher, 2015. Agriculture in urban design and spatial planning. In: Drechsel and De Zeeuw (ed). Cities and agriculture-Developing resilient urban food systems, 2015. Earthscan-Routledge London and New York. <http://www.ruaf.org/urban-food-policies-and-programmes-overview>.

⁵ Baker L. and H. de Zeeuw, 2015. Urban food policies and programmes. In: Drechsel and De Zeeuw (ed). Cities and agriculture-Developing resilient urban food systems, 2015. Earthscan-Routledge London and New York. <http://www.ruaf.org/urban-food-policies-and-programmes-overview>.

The indicator “Proportion of total agricultural population with ownership or secure rights over agricultural land for food production, by sex”, is related to the Sustainable Development Goal 1, target 1.4: *“By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.”* It is also related to Goal 5 (Achieve gender equality and empower all women and girls) and Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable).

By specifically promoting data disaggregation by sex, it gives a clearer picture of gender and social inequalities in land ownership/control, than for instance looking at the incidence of female ownership/control over land in the entire population of a country or city. An increase in the percentage of women owning/controlling land indicates that, within the population of interest (i.e. the landowners/rights bearers), progress is made towards achieving equal rights over land among men and women.

Glossary/concepts/definitions used

The term **‘agricultural land’** is used to indicate land used for farming, livestock and forestry activities for food production within the municipal area.

The term **‘agricultural population’** is intended in a broad sense – i.e. all including people for whom farming is their principle source of livelihood, or those who practice food production as a complementary livelihood strategy. They can have ownership and rights over land or not.

People use a wide range of strategies to gain **access to land**. These include:

- Purchase
- Adverse possession or prescription (the acquisition of rights through possession for a prescribed period of time). In some countries, this may be the only method for small farmers to gain formal access to vacant or abandoned land and to bring it into productive use.
- Leasing, or gaining access to land by paying rent to the owner
- Sharecropping, or gaining access to land in return for paying the owner a percentage of the production
- Inheritance, or gaining access to land as an heir
- Squatting illegally on land.

Access to land may be granted to individuals or to organised communities and associations of producers.

A **landowner** is the legal owner of the land. Broadly speaking, legal ownership or legal owner-like possession describes land rights that provide statutory security of tenure. This may be done through a formal land title system, but may also include certain forms of customary land tenure arrangements where land rights are registered or certified in some way. The following types of tenure arrangements may be included under this heading:

- Ownership is certified through a title, which gives the individual the right to determine the nature and extent of the use of the land.
- Land is held under conditions that enable it to be operated as if legally owned. E.g., the land is operated under hereditary tenure, perpetual lease, or long-term lease, with nominal or no rent.
- The land is held under a tribal, communal, or traditional form of tenure, which is legally recognised by the state. Such arrangements usually involve land being held on a tribal, village, kindred or clan basis, with land ownership being communal in character but with certain individual rights being held by virtue of membership in the social unit. Such arrangements can

be formalised through the establishment of legal procedures to identify the community's land and to manage the land rights of community members.

Definitions of ownership may vary across countries and surveys. For instance, documented ownership means that ownership is verified through title or deed, while reported ownership relies on individuals' own judgment. Reported ownership may be more appropriate in countries where a formal registration system is not in place. Additionally, and particularly where private ownership of land is not applicable, it is more appropriate to investigate rights over land using proxies able to capture individuals' capability to control and take decisions over the land. This may include settings where customary rights prevail as opposed to individual ownership. Proxies of such "bundle of rights" may include the right to sell, to bequeath or the right to decide how to use the land. Since the definition of ownership and land rights has to take into account what is more relevant in the country, the indicator will need to be complemented with metadata that specify what definition(s) of ownership or rights over land is/are employed.

Land tenure: The arrangements or rights under which people, communities and others gain access to land, fisheries and forests is defined and regulated by societies through systems of tenure. Land tenure refers to laws, policies, customs and institutions that define and govern people's rights to use, control and transfer land⁶. These tenure systems determine who can use which resources, for how long, and under what conditions. The systems may be based on written policies and laws, as well as on unwritten customs and practices. Tenure systems increasingly face stress as the world's growing population requires food security, and as environmental degradation and climate change reduce the availability of land, fisheries and forests. Inadequate and insecure tenure rights increase vulnerability, hunger and poverty, and can lead to conflict and environmental degradation when competing users fight for control of these resources.

The FAO World Census of Agriculture encourages to use four country-specific types of tenure whilst ensuring the possibility to classify ex-post under the following broad categories:

- 1) Legal ownership or legal owner-like possession;
- 2) Non-legal ownership or non-legal owner-like possession;
- 3) Rented land from someone else;
- 4) Various other types of land tenure.

Security of tenure is the certainty that a person's rights to land will be recognised by others and protected in cases of specific challenges. All forms of tenure should provide all persons with a degree of tenure security, with states protecting legitimate tenure rights, and ensuring that people are not arbitrarily evicted and that their legitimate tenure rights are not otherwise extinguished or infringed. People with insecure tenure face the risk that their rights to land will be threatened by competing claims, or even lost as a result of eviction.

Secure tenure rights are use or ownership rights to land that are legally recognised, even if no formal document is issued, customary rights being the most prominent example and it does not require ownership (i.e. long term leases or short term ones that are routinely renewed as well as group rights qualify). Security implies that an individual cannot be deprived of his or her land rights involuntarily. This normally requires that duration, subject, and object of rights are clearly defined. For the latter, physical markers, a map or sketch (not necessarily a high precision survey) that shows the parcel's position relative to others is normally needed.

⁶ <http://www.fao.org/economic/ess/ess-wca/wca-guidelines/en/>; and UN-FAO and Committee on World Food Security, 2012. Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security. <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>

Security of tenure can however not always be measured directly and, to a large extent, it is what people perceive it to be. The attributes of security of tenure may change from context to context. For example, a person may have a right to use a parcel of land for a 6 month growing season, and if that person is safe from eviction during the season, the tenure is secure. By extension, tenure security can relate to the length of tenure, in the context of the time needed to recover the cost of investment. Thus the person with use rights for 6 months will not plant trees, or invest in irrigation works or take measures to prevent soil erosion as the time is too short for that person to benefit from the investment. The tenure is insecure for long-term investments even if it is secure for short-term ones.

The importance of long-term security has led some to argue that full security can arise only when there is full private ownership (e.g., freehold) as, under such tenure, the time for which the rights can be held is not limited to a fixed period. It is argued that only an owner enjoys secure rights, and holders of lesser rights, such as tenants, have insecure tenure because they are dependent on the will of the owner. It is then implied that security of tenure comes only with holding transfer rights such as the rights to sell and mortgage. Equating security with transfer rights to sell and mortgage is true for some parts of the world but it is not true in many others. People in parts of the world where there are strong community-based tenure regimes may enjoy tenure security without wishing to sell their land, or without having the right to do so, or having strictly limited rights to transfer (e.g. transfers may be limited to heirs through inheritance, or sales may be restricted to members of the community).

The sources of security may also vary from context to context:

- An important source is the community and its specific groups such as local farmers' organisations and water users' associations. When neighbours recognise and enforce a person's rights, that person's security increases. In many customary tenure arrangements, people gain property rights through membership of social communities. Maintaining property rights validates membership in the group just as much as membership facilitates the acquisition and safeguarding of property rights.
- Governments represent another source of security as they may provide political recognition of some rights.
- Another source may be the administrative state and the formal legal system. The state may provide security in general by affirming the rights that people hold as well as through specific measures such as providing protection against trespass. Security is often seen to come from protections provided through land registration and cadastral systems.

The total security enjoyed by a person is the cumulative security provided by all sources. In many cases, increasing security from one or more sources will result in an increase in total security. In many development projects, providing or improving legal security is considered the most important way of increasing security of tenure. Examples of land tenure reforms include the upgrading of informal rights to legally enforceable rights; the upgrading of state-issued permits to leases that provide greater protection to the land users; the introduction of provisions for communities to become the legal owners of their traditional land holdings instead of the rights being vested in the State; and better definition of property rights through improvements to formal land administration systems. Rights may also be reduced or eliminated if the state starts to enforce existing rules that prevent access to resources. For example, more rigid enforcement of state policy on forest conservation may result in villagers being evicted from land which they have been using for agricultural and grazing purposes.

Tenure insecurity may be caused by social changes. HIV/AIDS, for example, is impacting the security of women in parts of Africa. Widows may lose access to land in a legal sense if they are unable to inherit rights from their husbands, and in a practical sense if they are forced off the farms by male relatives⁷.

⁷ <http://www.fao.org/docrep/005/y4307e/y4307e05.htm>

Preparations

Concepts and definitions of ownership and rights over land should be established locally. Adequacy of concepts and language to specific population groups should be ensured. Security of tenure should also be defined locally. Shorter term (1-2 years) versus longer-term leases could be distinguished. Generally for longer-term land and productivity investments (soil improvements, irrigation, tree-growing) minimum lease arrangements of 3 or more years are recommended.

Sampling

If data are not available from the municipal cadastre or land register, data can be collected by household surveys. Household surveys are usually done on a sample basis and should –where possible– be statistically representative. Statistical representative sampling may be very hard, given the extreme weakness of local scale statistics, particularly at the sub-urban scale and so drawing a robust sample frame is extremely difficult. Household surveys can be area-based (not pre-identifying agricultural population) or population-based (implemented among a sample of pre-identified agricultural population).

If the research aims to provide an overview of the entire city, a variety of neighbourhoods and areas (urban, peri-urban and rural) will have to be included. Once geographical areas are selected, household number estimates can be deducted from the latest aerial photos, followed by an interval sample (e.g. surveying every 5th or 10th household based on this). Household representativity can be ensured by using a sample frame of 10% of the total number of households.

Acknowledging the relevance of land rights for specific population groups, like migrants or indigenous, cities can also work towards: i) including specific population groups in the survey sample frames; ii) collecting information on ethnicity and background and using it as disaggregation variable for this indicator. Oversampling might be required to guarantee representativeness of such population groups.

Data collection and data disaggregation

Data disaggregation will be done by 1. Gender and 2. Type of tenure.

1. Gender

The indicator is divided in two parts: (a) it measures the incidence of people with ownership or secure rights over agricultural land among the total agricultural population; while (b) it focusses on the gender parity measuring the extent to which women are disadvantaged in ownership or rights over agricultural land. Part (a) and part (b) cannot be seen as two different indicators, they rather provide complementary information. Plus, they can be computed using (almost) the same data. Where gender disaggregated data is available, land may be held either individually or jointly and in cases of joint ownership, a simple arithmetic average over male and female users will be used.

2. Land tenure

In order to disaggregate data by type of tenure, the data collection methodology should always include a question on land tenure. Note again that there are different formal and informal tenure systems around the world and the distinction between legal and non-legal tenure is often blurred. When available, the indicator shall also be disaggregated by documented tenure rights.

The indicator can further be disaggregated spatially (e.g. by area), and depending on other available survey information by age, socio-economic profiles, poverty status, or wealth/income category providing insight into the social equity dimensions including the incidence of land problems and distribution of benefits amongst different social groups and changes in this over time.

With regards to data collection, both existing administrative data (e.g. the municipal cadastre or land registration) and survey data (household and agricultural surveys) will be the main data sources for this indicator. Data can be collected periodically (about every 2-4 years) which is a reasonable frequency to capture significant changes in land ownership.

1. Administrative records

Administrative records are a low-cost way of accessing data. Production of land records and maps is a core function of public registries and reporting on the number of registered parcels or the number and area of parcels mapped is not difficult in principle and, where household surveys are available, can be cross-checked against survey information. Administrative records can be used to provide information on number of households/individuals with formally documented rights. Land registry records provide data on the number of individually registered parcels. This information is in most cases linked to information on land ownership (type of ownership) and information on (the number of) individuals owning the land and is in some cases also disaggregated by gender or type of land use (residential, agric., industry/business). In the case of registered group rights, identifying the number of owners should equally be possible.

2. Surveys

Representative multi-topic household surveys will provide (gender disaggregated) information, separately for residential and non-residential land, on (i) the share of individuals with (specific forms of) secure tenure rights; and (ii) the share of individuals who perceive their rights to be secure.

Data can be extracted from existing World Bank, UN FAO and UN Habitat surveys that provide data on the extent to which plots in the main city or the entire country are registered (see World Bank's 'Doing Business; survey Registering Property Indicator). This is currently being followed up to obtain data on the number of parcels and total area mapped. The World Bank and UN-Habitat also have access to an extensive archive of more than 2,000 nationally representative household surveys (some, such as Urban Inequities Survey, MICS and DHS publicly available), mostly for developing countries at multiple points in time. A review of these indicates that existing surveys in many countries provide information on land access and on agricultural land ownership. Although data are mainly collected at national level, cross-checking with urban/rural and city-level data maintained by UN Habitat is being done⁸. Additional data sets may have been developed by civil society, academia or private sector.

In case new, locally appropriate, surveys have to be developed these should include questions on:

- Socio-economic household data
- Livelihood and income sources
- Land data
- Land ownership
- Forms of tenure
- Security of tenure
- Perceptions of tenure security (Households understanding on whether the documentation that they hold is legally recognised or perceived to be secure).

⁸ UN Habitat has been monitoring security of tenure at urban level for more than 20 years in a sample of 1000 cities worldwide, (as part of Habitat Agenda, Urban Indicators Program (1996-2002) and MDGs/SDGS Slum indicator component 2002-2016). This exercise has been undertaken for data from over 124 countries from the developing regions. The results of this analysis are available in the Urban Indicators database maintained by UN-Habitat. These data were derived from census and survey data that were conducted in the last 10 years. Additional data came from specially designed survey tools (Urban inequities survey) that were implemented in selected countries. UN-Habitat is currently updating this data with other spatial measures, and perceived land rights estimations.

Data analysis/calculation of the indicator

The indicator consists of an outcome indicator, disaggregated by sex and type of tenure as much as possible, namely the share of the total agricultural population who have secure tenure rights to land, by sex. The indicator can be calculated as follows:

Part (a)

$$\left(\frac{\text{People with ownership or secure rights over agricultural land}}{\text{Total agricultural population}} \right) \cdot 100$$

Part (b)

$$\left(\frac{\text{Women with ownership or rights over agricultural land}}{\text{Total owners or rights bearers over agricultural land}} \right) \cdot 100$$

In case the indicator can be disaggregated by type of tenure, the following analysis can be made, namely the share of the agricultural population who have (i) secure tenure rights to land (SecRight); (ii) legal documents to their land (LegDoc); and (iii) perceive their tenure to be secure (PercSec). In cases where information is reported separately for residential and agricultural land (or for different types of agricultural land held by an individual), the index will be aggregated over all parcels with equal weight given to each land use class and parcels weighted by their area share⁹.

Regular reporting on this indicator will inform city governments and non-state actors to what extent municipal (or other subnational) legal and institutional frameworks recognise and support different land tenure categories, and implementation capacity to protect such rights in practice, as well as progress made (allowing assessment of specific outcomes and practical priorities for further improvements), in order to identify the scope for additional action required, and provide for equity between men and women in rights to hold, inherit and bequeath land. It hopefully also leads to greater readiness to engage with multiple stakeholders in data analysis and in achieving better understanding of the strengths and weaknesses of existing land governance policies and practices.

⁹ See footnote 1.



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Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 29: Proportion of agricultural land in the municipal area under sustainable agriculture

MUFFP framework of actions' category: Food production

The indicator measures the total agricultural area in the municipality (also referred to as urban and peri-urban agriculture) under sustainable agriculture as per the total area of agricultural land in the municipal area.

Overview table

MUFFP Work stream	Food production
MUFFP action	<p>Apply an ecosystem approach to guide holistic and integrated land use planning and management in collaboration with both urban and rural authorities and other natural resource managers by combining landscape features, for example with risk-minimizing strategies to enhance opportunities for agroecological production, conservation of biodiversity and farmland, climate change adaptation, tourism, leisure and other ecosystem services.</p> <p>Protect and enable secure access and tenure to land for sustainable food production in urban and peri-urban areas, including land for community gardeners and smallholder producers, for example through land banks or community land trusts; provide access to municipal land for local agricultural production and promote integration with land use and city development plans and programmes.</p>
What the indicator measures	<p>The indicators measures the total agricultural area in the municipality (also referred to as urban and peri-urban agriculture) under sustainable agriculture as per the total area of agricultural land in the municipal area</p> <p>Note: Depending on specific city interests and political priorities, a city may be interested in specifically monitoring the proportion of agricultural land being farmed as agro-ecological or organic agriculture (or conservation agriculture, climate smart agriculture, nature-based farming, multifunctional farming or any other locally relevant denomination of "sustainable agriculture").</p>
Which variables need to be measured / what data are needed	<p>Total surface area of agricultural land within the municipal area/boundaries</p> <p>Total surface area of agricultural land under sustainable agriculture</p> <p>If data are available: Geo-spatialisation and location of agriculture areas/areas under sustainable agriculture</p>
Unit of measurement (i.e. Percentages, averages, number of people, etc.)	<p>Total surface area</p> <p>Percentage</p>

Unit(s) of Analysis (i.e. people under 5 years old, etc.)	Agricultural area under sustainable production If data are available/desired: Categorisation of land by land ownership/land use types or production systems
Possible sources of information of such data	-Agricultural land (management) records held by the municipal or national department for agriculture or cadastre. -Agricultural or farm surveys or household surveys with an agricultural components -Land use and GIS maps
Possible methods/tools for data-collection	Analysis of existing records or surveys or new survey design and implementation
Expertise required	Agronomy GIS
Resources required/ estimated costs	
Specific observations	
Examples of application	

Rationale/evidence

This indicator is related to SDG Goal 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture), Target 2.4: 'By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality'¹.

Many cities promote ecological gardening methods and allow only environmentally friendly methods to control bugs, plant diseases and weed infestation in the city's urban agriculture and community gardens. For example, the urban agriculture programme in Havana (Cuba) prohibits the use of agrochemicals in the city and supports the establishment of decentralised low-cost facilities for compost production and the production and supply of bio-fertilisers and bio-pesticides (packaged in small quantities) to urban farmers through a network of 52 agricultural stores that also provide technical services, advice and training to the city's farmers. The Havana urban agriculture programme has calculated that producing 1 million tonnes of vegetables applying agro-ecological production methods saves over US\$41 million in the costs of fertilization and pest control as compared to conventional agriculture². In Quito (Ecuador) and Rosario (Argentina), production practices stimulated by the municipality are also based on agroecology principles which lead to greater autonomy by reducing dependence on energy, knowledge, inputs and intermediaries³.

Since 2000, Mexico City's government has increased its support to agriculture in the Federal District, with the main objective of protecting the ecosystem services that suburban and peri-urban areas provide to the city, and to a lesser extent, to ensure a local food supply. The Federal Environmental Law promotes organic farming systems and prohibits the use of agrochemicals and synthetic fertilisers in a demarcated conservation zone. Training, technology development, agro-processing and marketing

¹ The related indicator is: 2.4.1 Proportion of agricultural area under productive and sustainable agriculture.

² FAO, 2014. Growing greener cities in Latin America and the Caribbean. An FAO report on urban and peri-urban agriculture in the region. <http://www.fao.org/3/a-i3696e.pdf>. For some African case studies see: <http://www.fao.org/docrep/016/i3002e/i3002e.pdf>

³ See case studies on Quito and Rosario in: Dubbeling M., C. Bucatariu, G. Santini, C. Vogt and K. Eisenbeiß (2016). City Region Food Systems and Food Waste Management Linking Urban and Rural Areas for Sustainable and Resilient Development. Deutsche Gesellschaft für Internationale Zusammenarbeit / GIZ, RUAF Foundation, Food and Agriculture Organization of the United Nations / FAO. Available from <http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016> and <http://www.fao.org/3/a-i6233e.pdf>. See also footnote 2.

support are provided to the producers. Another programme, for the promotion of traditional food culture, provides subsidies to farmers who preserve local maize varieties under traditional production systems with low environmental impact. Meanwhile, the city's Secretariat for the Environment has instituted Mexico's first system of organic certification of produce, known as the Green Seal, and has set standards for organic agriculture in the conservation zone.⁴

Other cities provide incentives for agricultural practices that maintain water quality, enhance biodiversity, protect fish and wildlife habitat and historic resources, maintain flood conveyance and storage, reduce greenhouse gas emissions, and prevent erosion of valuable agricultural soils while maintaining the functions needed for agricultural production.

Glossary/concepts/definitions used

Agricultural land in the municipal area is understood as land used for various types of agricultural activities within the municipal boundaries. This land may be city owned land, private, or institutionally owned.

There has been considerable discussion over the past thirty years on how to define “**sustainable agriculture**.” It is well established that sustainability needs to be considered in terms of its social, environmental and economic dimensions. This indicator tries to principally capture the environmental dimension of sustainability. It looks at agricultural production and management practices that:

1. Minimise the risk for environmental contamination by promoting agro-ecological, organic or conservation agriculture
2. Protect and improve the natural resource base (soil, water) in order to ensure sufficient productivity for the foreseeable future
3. Conserve and enhance biodiversity and wildlife habitat
4. Maintain other ecosystem services and/or enhance climate adaptation (climate smart agriculture).
5. Reduce or remove Green House Gas emissions.

Note: Depending on specific city interests and political priorities, a city may be interested in specifically monitoring the proportion of agricultural land being farmed as agro-ecological or organic agriculture (or conservation agriculture, climate smart agriculture, nature-based farming, multifunctional farming or any other locally relevant denomination of “sustainable agriculture”).

Organic agriculture can be defined as: an integrated farming system that strives for sustainability, the enhancement of soil fertility and biological diversity whilst, with rare exceptions, prohibiting synthetic pesticides, antibiotics, synthetic fertilizers, genetically modified organisms, and growth hormones. Organic farming relies on fertilisers of organic origin such as compost manure, green manure, and bonemeal, and places emphasis on techniques such as crop rotation and companion planting. Biological pest control, mixed cropping and the fostering of insect predators are encouraged. In general, organic standards are designed to allow the use of naturally occurring substances while prohibiting or strictly limiting synthetic substances. Organic agricultural methods are internationally regulated and legally enforced by many nations, based in large part on the standards set by the International Federation of Organic Agriculture Movements (IFOAM), an international umbrella organisation for organic farming organisations established in 1972.

Agroecology provides a broad approach to sustainable urban food policies, going beyond organic farming towards a perspective of food justice and ecosystem services provided by food systems.

⁴ Baker L. and H. de Zeeuw, 2015. Urban food policies and programmes. In: Drechsel and De Zeeuw (ed). Cities and agriculture-Developing resilient urban food systems, 2015. Earthscan-Routledge London and New York. <http://www.ruaf.org/urban-food-policies-and-programmes-overview>.

Sustainable production practices are promoted and embedded in broader programmes of food sovereignty and justice, and equitable access to resources and benefits⁵.

Conservation agriculture (CA) is defined by FAO as a form of agriculture that aims to achieve sustainable and profitable agriculture and subsequently aims at improved livelihoods of farmers through the application of the three CA principles: minimal soil disturbance, permanent soil cover and crop rotations⁶.

Climate-smart agriculture (CSA) is defined by FAO as an approach that helps to guide actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate. CSA aims to tackle three main objectives: sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change; and reducing and/or removing greenhouse gas emissions, where possible⁷.

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth⁸.

Biodiversity is the variability among living organisms. It includes diversity within and among species and diversity within and among ecosystems. Biodiversity is the source of many ecosystem goods, such as food and genetic resources, and changes in biodiversity can influence the supply of ecosystem services.

Preparations

By defining sustainability across its environmental (and if desired also across other social and economic) dimensions, cities can select those dimensions for monitoring that best capture the priorities most relevant to them.

If data are not available from existing records or surveys, new farm/agricultural surveys will need to be designed in order to cover the selected dimensions of sustainability.

Sampling

If agricultural land records provide the required information, no sampling is required. If information has to be collected through agricultural, farm or household surveys, the following sampling method can be applied:

Agricultural and farm surveys: A list of different farm and agricultural production systems should be drawn up. These can include:

- Urban agriculture and community gardens supported by government and no-government organisations
- Urban and peri-urban commercial farms (depending on the local context these farms could be categorised as horticulture, other crop, livestock and mixed farms amongst others).

A sample of 10% of each of these farm and production systems is recommended.

⁵ See for a discussion on urban agro-ecology, practice and policy examples: [Urban Agriculture Magazine no 33](#) - Urban Agroecology, 2017. RUAF Foundation and the Centre for Agroecology Water and Resilience (CAWR).

⁶ <http://www.fao.org/ag/ca/>

⁷ <http://www.fao.org/climate-smart-agriculture/en/>

⁸ <https://www.millenniumassessment.org/documents/document.300.aspx.pdf>

Household surveys: Household representativity can be ensured by using a sample frame of 10% of the total number of households in the municipal area.

Data collection and data disaggregation

The total agricultural area within the municipal area can be computed from agricultural and land records and registers or from Indicator 27: *Surface area of (potential) agricultural spaces in the municipal area*.

Data on sustainable production, if not available in these records or earlier surveys, should be obtained from farm/agricultural surveys or household surveys with an agricultural component. Survey data can be validated by additional field observations and verifications.

Depending on specific local interests, data can be disaggregated for surface areas that involve one or more of the following –or other to be defined- management practices:

1. Minimise the risk for environmental contamination by promoting agro-ecological, organic or conservation agriculture
2. Protect and improve the natural resource base (soil, water) in order to ensure sufficient productivity for the foreseeable future
3. Conserve and enhance biodiversity and wildlife habitat
4. Maintain other ecosystem services and/or enhance climate adaptation (climate smart agriculture).
5. Reduce or remove Green House Gas emissions.

If farm or household surveys are used, depending on the survey information, data can also be disaggregated for size and type of agricultural system/enterprises; gender and age of the farm/garden manager and public versus private farming areas.

Data analysis/calculation of the indicator

The indicator is computed by the following formula:

$$\begin{aligned} &\textbf{Proportion of agricultural land in the municipal area under sustainable agriculture} \\ &= \text{Area under sustainable agriculture} / \text{Total agricultural area} \end{aligned}$$

Changes would be measured against a baseline, which would show trends over time.



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Milan Urban Food Policy Pact Monitoring Framework

July 2018 version

Indicator 30: Number of urban and peri-urban food producers that benefited from technical training and assistance in the past 12 months

MUFPP framework of actions' category: Food production

The indicator monitors the number of food producers (horticultural growers, smallholders and farmers) in and close to the city that have received technical training and assistance over a given time period (e.g. last twelve months).

Overview table

MUFPP Work stream	Food production
MUFPP action	Help provide services to food producers in and around cities , including technical training and financial assistance (credit, technology, food safety, market access, etc.) to build a multigenerational and economically viable food system with inputs such as compost from food waste, grey water from post-consumer use, and energy from waste etc. while ensuring that these do not compete with human consumption.
What the indicator measures	The indicator monitors the number of food producers (horticultural growers, smallholders and farmers) in and close to the city that have received technical training and assistance over a given time period (e.g. last twelve months).
Which variables need to be measured / what data are needed	<ul style="list-style-type: none"> -Total annual number of urban and peri-urban food producers (horticultural growers, smallholders and farmers) -Total number of food producers that benefited from technical training and assistance -Type of beneficiaries -Type of training and technical assistance provided If desired: <ul style="list-style-type: none"> -Type of training providers (e.g. municipality? NGOs, universities, etc.)
Unit of measurement (i.e. Percentages, averages, number, etc.)	Number of food producers (horticultural growers, smallholders and farmers)

Unit(s) of Analysis <i>(i.e people under 5 years old, etc.)</i>	Data disaggregation by type of food producers (share of men/ women; youth/adults; other socio-economic categories; type of food produced; location; scale of production) and by type of technical assistance and/or service provider
Possible sources of information of such data	-Records from national government, local government, non-governmental organisations, private sector training and technical assistance programmes
Possible methods/tools for data-collection	Analysis of records of technical training and assistance programmes Food producers survey
Expertise required	Survey design and implementation
Resources required/ estimated costs	
Specific observations	Important to decide clearly on who the food producers are – the suggestion is to focus on those who derive some sort of economic livelihood from working on the land and producing food. There will be others who are involved with urban food growing or farming but it may be for more social or leisure reasons, not for economic reasons.
Examples of application	Several cities monitor the number of beneficiaries of technical training and assistance programmes for food producers. This monitoring is however mainly limited to their own municipal programmes and services. Additional effort is needed to collect data from other levels of government and organisations.

Rationale/evidence

Urban and peri-urban food production can, in all its diversity, serve as a future innovator of resource-efficient production, which will be instrumental for all agriculture systems and indispensable to increasingly, resource-challenged (i.e., land, water, energy) cities throughout the world. The diversity of urban and peri-urban agriculture models provide opportunities for both capital- and labour-intensive production systems.

Urban and peri-urban food producers however require technical skills to set up and manage productive, sustainable and resource efficient production systems. While urban and peri-urban agriculture today ranges from the small garden plots to medium-sized community farms to even larger scale commercial operations, technological, financial and social innovations are increasingly redefining urban and peri-urban food production to meet competition for resources, address constraints related to scarce and high priced land and more efficient water and energy usage, to safeguard environmental and human health, or to meet changing consumer demand. The lack of such skills continues to be one of the key barriers keeping producers, and in particular women, youth and small-scale producers, from innovating and improving their production systems.

A vibrant, sustainable food production system needs workforce development to ensure that there are properly trained and educated male and female, youth and adult, small, medium and large-scale producers whose skills are regularly updated. Stronger partnerships with non-governmental organizations and private sector firms are crucial for developing the requisite skills.

Glossary/concepts/definitions used

Urban and peri-urban primary food production (urban agriculture)

For this indicator, primary urban food production can also be called urban agriculture. This can be defined shortly as the growing of plants and the raising of animals within and around cities. The most striking feature of urban agriculture, which distinguishes it from rural agriculture, is that it is integrated into the urban economic and ecological system: urban agriculture is embedded in -and interacting with- the urban ecosystem. The RUAF Foundation provides useful definitions of types of actors, locations and products that typify urban agriculture.¹

Urban food producers - horticultural growers, smallholders and farmers

Urban and peri-urban food producers are people who produce food from urban or peri-urban land for economic purposes. In many countries this group have the lowest incomes of all urban dwellers. Some cultivate/manage very small areas of land; they may only grow vegetables or they may have enough land to keep small numbers of livestock. Some cities have larger farms within or around the edges of city boundaries. For this indicator, the particular group of urban food producers are those who derive some kind of livelihood from trade/sales of their food products.

Technical assistance is non-financial assistance taking the form of sharing information and expertise, instruction, skills training, transmission of working knowledge, and consulting services. The aim of technical assistance is to maximise the quality of food production systems and impact by supporting administration, management, development, capacity building, etc. Ideally, the technical assistance focuses on particular needs and priorities identified by the beneficiaries. Technical assistance to urban and peri-urban food producers can take the form of instruction and training in areas like:

- Agro-ecological or organic production methods
- New production technologies (hydroponics, vertical farming, greenhouse production)
- New production systems and crops/products (sprouts, spirulina)

¹ What is urban and peri urban agriculture? RUAF Foundation <http://www.ruaf.org/urban-agriculture-what-and-why>

- Waste recycling
- Crop rotation and associations
- Soil and water management
- Weeds, pest and disease management
- Food safety and environmental management
- Climate smart agriculture/conservation agriculture
- Business planning and management
- Processing
- Marketing
- Etc.

Youth (aged 15-24 years) and **adults** (aged 25 years and above).

Small, medium and large-scale producers: use local categories.

Preparations

The team responsible for monitoring this indicator should agree on:

1. Type of data disaggregation and categories that will be used (see further below)
2. Data collection method
3. If surveys are to be used, information should be collected first on the total number of food producers (for sampling purposes) and a survey instrument has to be designed. Training of survey enumerators may be needed.

Sampling

If data are not available from programmatic records (national government, local government, non-governmental organisations, private sector training and technical assistance programmes), surveys among food producers can monitor the type and frequency of technical training and assistance received in the past 12 months. Additional survey questions can provide information on the service providers, costs of training and assistance, use and application of past training and assistance or still unmet needs and demands.

If a specific policy priority, surveys could be implemented among specific target groups (e.g. youth, women, small-scale producers etc.) or in specific areas of the city.

In general, a 10% sample (10% of all food producers) will provide reliable data.

Data collection and data disaggregation

Data disaggregation can be done by 1/ type of beneficiary and 2/ type of technical training and assistance.

1. Type of beneficiary

Indicate the different number and types of beneficiaries that received technical training and assistance:

- Youth vs. adults
- Men vs. women
- Small scale, vs. medium-scale or large scale farmers
- Any other category (e.g. horticulture vs. livestock farmers; community gardeners vs. commercial producers etc.).

2. Type of technical training and assistance

Both the type of service as well as its content can be recorded:

- Type: Information sharing; practical instruction, skills training, consulting services
- Content: what was the technical training or assistance about?
- If desired: Type of service provider

Data can be collected from:

1. Analysis of records

Look at records from national government, local government, non-governmental organisations, private sector training and technical assistance programmes on number and type of beneficiaries, type and content of training/assistance and if available amount and source of funding for the technical training and assistance programmes.

2. Food producer surveys

If no records are available, a survey among a sample of urban and peri-urban food producers would yield the needed information. This survey could integrate questions that would also provide data for other indicators, like land ownership and tenure regimes (see indicator 28 *Proportion of total agricultural population with ownership or secure rights over agricultural land for food production, by sex*), area under sustainable agriculture (Indicator 29 *Proportion of agricultural land in the municipal area under sustainable agriculture*))

Data analysis/calculation of the indicator

The indicator is computed by calculating the total number of urban and peri-urban food producers that received some form of technical training and assistance in the past 12 months. As different service providers (e.g. local government, a NGO) may have provided training/assistance to the same beneficiaries, adding up numbers from different institutional records may lead to double-counting. Where possible, this should be corrected.



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Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 31: Number of municipal food processing and distribution infrastructures available to food producers in the municipal area

MUFFP framework of actions' category: Food production

The indicator monitors the number (and type of) municipal infrastructure for storage, processing and distribution of food located in the municipal area, including storage buildings, processing plants, transport facilities and (wholesale and consumer) markets.

Overview table

MUFFP Work stream	Food production
MUFFP action	<ul style="list-style-type: none"> - Seek coherence between the city and nearby rural food production, processing and distribution, focussing on smallholder producers and family farmers, paying particular attention to empowering women and youth. - Support short food chains, producer organizations, producer-to-consumer networks and platforms, and other market systems that integrate the social and economic infrastructure of urban food system that links urban and rural areas. This could include civil society-led social and solidarity economy initiatives and alternative market systems.
What the indicator measures	<p>The indicator monitors the number (and type of) municipal infrastructure for storage, processing and distribution of food located in the municipal area, including storage buildings, processing plants, transport facilities and (wholesale and consumer) markets.</p> <p><i>Note: The indicators focusses in first instance on municipal infrastructure as this information may be more readily available. It is acknowledged that other private or civil society funded/managed infrastructures may also be available for municipal food producers. If information is available, these other local infrastructures could also be considered.</i></p>
Which variables need to be measured / what data are needed	<p>Data are needed on:</p> <ul style="list-style-type: none"> - Availability of local food processing and distribution infrastructure - If of interest: data on types of infrastructure, location and other characteristics, and data on users of these services
Unit of measurement (i.e. Percentages, averages, number of people, etc.)	Number of infrastructures
Unit(s) of Analysis	Data can be disaggregated for different types of infrastructure, for locations and other characteristics (equipment, volumes, price of services), and the type of

<i>(i.e people under 5 years old, etc.)</i>	food producers/actors that are making use of these (share of men/ women; youth/adults; other socio-economic categories)
Possible sources of information of such data	-Economic/market government department -Food business registers -Agriculture department/programmes -Earlier research
Possible methods/tools for data-collection	If data are not available from government and other organisation records, information may be collected through food producer surveys (how and where do food producers process and distribute their products).
Expertise required	If surveys are used: survey design and implementation
Resources required/ estimated costs	
Specific observations	Food infrastructure may be provided by both public and private actors, information on the latter may be more difficult to collect
Examples of application	

Rationale/evidence

A recent (2016) study on the 'Role of private sector in city region food systems'¹ highlights that one of the critical factors in enabling a food business to supply markets in the city area is its surrounding hinterland, thus its ability to process and distribute, whether by its own means or through other local businesses. Food processing and distribution infrastructure can either individually or collectively be owned or offered by other private sector or the government.

Ability to access processing infrastructure: For farmers and growers wanting to sell their products in city markets, from farm gate sales to supplying hospitals for example, access to processing facilities is key. For eggs, vegetables and fruit, those processing facilities can be relatively basic (depending on the market) and farmers and growers may require a facility for grading, packing and possibly washing. Dairy and meat products require more costly and complex processing facilities. Farmers either set up their own processing units on farm or are reliant on a (usually small to medium size) processor that provides services for direct selling farmers as well as usually serving other bigger customers. Setting up on-farm processing facilities has many advantages (ability to sell directly, control over quality, etc.) and many challenges. Challenges include the requirement for capital investment which is difficult if the farm is leased and not owned or if grant support is not available. Other challenges can include skills shortage, insufficient cold room space and meeting the food safety standards.

Efficient use of capital inputs (sharing infrastructure) will make the system more competitive. A case study on Rotterdam, The Netherlands, describes how a recent trend is emerging where processing facilities are downscales and decentralised again. Examples include micro-breweries, mobile fruit juice pressing facilities, mobile slaughterhouses and even micro dairy processing facilities that use up-to-date technology for monitoring and quality control. Thus it becomes easier for farmers to add value to their products by including processing and distribution, potentially even marketing and sales at farm level, or work cooperatively with other farmers (e.g. dairy farmers of Midden Delfland). The latter jointly bought pasteurisation equipment and started to bottle and brand their own milk and market it directly to consumers in the Rotterdam area.

Access to distribution infrastructure: Urban and peri-urban food producers selling to city markets generally either rely on their own distribution or on wholesalers who operate in the city. Cities like

¹ Dubbeling M., J. Carey and K. Hochberg, 2016. The role of private sector in city region food systems. RUAF Foundation, the Food Business Knowledge Platform and IWMI/CGAIR WLE programme. <http://www.ruaf.org/projects/role-private-sector-city-region-food-systems>

Medellin, Colombia, and several others, support development of food storage and distribution infrastructures (such as ‘food hubs’). Product aggregation from different producers that leads to a diversified ‘basket’, and synergies between different short food chain supply channels and outlets have proven to be a success factor in a number of cases.

Apart from the availability (e.g. number) of local food processing and distribution infrastructure, the extent to which producers have access to suitable processing and distribution facilities (i.e. in terms of distance, volumes, quality, equipment, skills, and specialisations) is key. As is the degree of vulnerability of such infrastructure to increasing temperatures, flooding and other (climate related) risks².

This indicator is closely related to Indicator 32 (*Proportion of local/regional food producers that sell their products to public markets in the city*) and data for both indicators can be collected by using market or field survey instruments.

Glossary/concepts/definitions used

Food processing and distribution infrastructure: infrastructure for storage, processing and distribution of food, including storage buildings, processing plants, transport facilities and (whole sale and consumer) markets.

Food hubs, as defined by the USDA are “centrally located facilities with a business management structure facilitating the aggregation, storage, processing, distribution, and/or marketing of locally/regionally produced food products.” A defining characteristic of food hubs is source identification, food safety and marketing benefit that allows consumers to trace the origin of products they buy. One of the primary goals of food hubs is to give small and medium-sized farmers access to larger or additional markets. Food hubs also fill gaps in food systems infrastructure, such as transportation, product storage, and product processing. A food hub may be set up as a non-profit organisation, a for-profit business, or a cooperative.

Municipal food processing and distribution infrastructure: infrastructure run entirely by the municipality or run through subsidiary companies (municipal-owned companies). Note: The indicators focusses in first instance on municipal infrastructure as this information may be more readily available. It is acknowledged that other private or civil society funded/managed infrastructures may also be available for municipal food producers. If information is available, these other local infrastructures could also be considered.

Preparations

The team responsible for monitoring this indicator should agree on:

1. Type of data disaggregation and categories that will be used (see further below)
2. Data collection method (analysis of records or food producer survey)
3. If surveys are to be used, survey questions and instrument have to be designed. Training of survey enumerators may be needed.

Sampling

In case data are collected by means of a food producer survey, a 10% sample (10% of all food producers) is minimally needed.

² http://icic.org/wp-content/uploads/2017/01/Rockefeller_ResilientFoodSystems_FINAL_post.pdf?x96880

Depending on policy or monitoring priorities, surveys could be implemented among specific groups of producers (e.g. youth, women, small-scale producers etc.) or in specific areas of the city.

Data collection and data disaggregation

Data disaggregation can be done by 1/ Type of food infrastructure; 2/ Characteristics like location, volumes, equipment, costs of services; and 3/ Number and type of food producers accessing/using the infrastructure (e.g. youth vs. adult producers, men vs. women, small scale, vs. medium-scale or large scale producers, any other category (e.g. horticulture vs. livestock farmers; community gardeners with license to sell vs. commercial producers etc.)).

Data can be collected from existing records and registers (economic or market department, food business registers, agricultural programmes) or through food producer surveys (how and where they process, store and distribute their products). This survey could integrate questions that would also provide data for other indicators, like land ownership and tenure regimes (see indicator 28 *Proportion of total agricultural population with ownership or secure rights over agricultural land for food production, by sex*), area under sustainable agriculture (Indicator 29 *Proportion of agricultural land in the municipal area under sustainable agriculture*), the number of producers that benefitted from technical training and assistance (Indicator 30 *Number of food producers that benefited from technical training and assistance in the past 12 months*), or proportion of local/regional food producers that sell their products to public markets in the city (Indicator 32).

Data analysis/calculation of the indicator

The indicator is computed by calculating the total number of local food processing and distribution infrastructure available to urban and peri-urban food producers.

Depending on the type of survey used, further analysis of information on for example location, access of producers to such infrastructure, infrastructure needs and requirements, vulnerability to climate change, etc. can be done.



Food and Agriculture
Organization of the
United Nations



Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 32: Proportion of local/regional food producers that sell their products to public markets in the city

MUFPP framework of actions' category: Food production

The indicator monitors the share of local/regional food producers that sell (part of) their products to one or more public market outlets in the city.

Overview table

MUFPP Work stream	Food production
MUFPP action	<ul style="list-style-type: none"> - Seek coherence between the city and nearby rural food production, processing and distribution, focussing on smallholder producers and family farmers, paying particular attention to empowering women and youth. - Support short food chains, producer organizations, producer-to-consumer networks and platforms, and other market systems that integrate the social and economic infrastructure of urban food system that links urban and rural areas. This could include civil society-led social and solidarity economy initiatives and alternative market systems.
What the indicator measures	<p>The indicator monitors the share of local/regional food producers that sell (part of) their products to one or more public market outlets in the city.</p> <p><i>Note 1: The focus is first on public markets for ease of data collection. If information is available, other –private- market outlets could be included in the indicator.</i></p> <p><i>Note 2: If data are available, an additional and complementary indicator could measure the “Percentage of local/regional food that is sold to public markets in the city”. It is expected however that data needed for this indicator are not readily available</i></p>
Which variables need to be measured / what data are needed	<ul style="list-style-type: none"> - Total number of local/regional food producers - Total number of food producers that sell their products in public markets in the city. If desired: type of food producers; type and location of market outlets
Unit of measurement (i.e. Percentages, averages, number of people, etc.)	Proportion/percentage of local/regional food producers selling their produce in public markets in the city
Unit(s) of Analysis (i.e. people under 5 years old, etc.)	Data can be disaggregated by type of food producers (share of men/ women; youth/adults; other socio-economic categories) and by market outlet (municipal markets, supermarkets, groceries, institutional procurement, consumer boxes)

Possible sources of information of such data	-Economic/market government department -Agriculture department/programmes -Different market stores/locations -Earlier research
Possible methods/tools for data-collection	-Market survey -Food producers survey
Expertise required	Survey design and implementation
Resources required/estimated costs	
Specific observations	It is acknowledged that data from private sector markets are very hard to get and that data on product location (local products vs non-local products) may not be readily available. It is also noted that in cities in the Global South, informal markets (street food, home restaurants) count for an important part of sales of locally produced food. Data collection from the informal sector may be too difficult/time consuming or unreliable. Rather more anecdotal evidence/case studies may be used or findings from earlier research.
Examples of application	The Consuming Urban Poverty project implemented market surveys, including product sourcing, in Kitwe (Zambia), Kisumu (Kenya) and Epworth (Zimbabwe). See: https://consumingurbanpoverty.wordpress.com/

Rationale/evidence

Short food supply chains are promoted to harnesses more integrated urban-rural relations, strengthen social relations between consumer and producers, and promote the inclusiveness of smallholder farmers and vulnerable groups across the supply chain.

The government of Belo Horizonte Metropolitan Region has recognised that small family farms in the urban, peri-urban and rural areas of the metropolitan region are an important component of a healthy, sustainable urban food system, and hence an important contributor to the welfare of urban residents on the long term. Throughout the years, the local government has shown how it can support the interests of the urban population, while at the same time enhancing the livelihoods of food producers and the sustainability of agricultural production. Strategies used include:

1. Provision of a direct market outlet for food producers (“Straight from the Farm programme” and the “Country Store Programme”; conventional and organic markets)
2. Through institutional food purchase/direct procurement of supply from urban, peri-urban and rural producers¹.

The Municipality of Milan also approaches the building of a local food system from both the point of view of the consumer (Food Policy, Priority n° 1: Guaranteeing healthy food for everybody; Guideline n°1.2: The Municipality shall ensure that in each district of the city affordable, healthy and sustainable food is available within short distances that can be covered by people with restricted mobility) as well as the producer (Priority n°2: Promote the sustainability of the food system; Guideline n°2.3: The Municipality shall support social, technological and organisational innovation in processing,

¹ Marielle Dubbeling, Stephania Aleixo de Paula e Silva, Marcelo Lana Franco and Adilana de Oliveira Rocha Alcântara (2016). Rural Food Supply for Vulnerable Urban Groups In: Dubbeling M., C. Bucatariu, G. Santini, C. Vogt and K. Eisenbeiß (2016). City Region Food Systems and Food Waste Management Linking Urban and Rural Areas for Sustainable and Resilient Development. Deutsche Gesellschaft für Internationale Zusammenarbeit / GIZ, RUAF Foundation, Food and Agriculture Organization of the United Nations / FAO. Available from <http://www.ruaf.org/publications/city-region-food-systems-and-food-waste-management-2016> and <http://www.fao.org/3/a-i6233e.pdf>.

distribution, logistics and trading activities to facilitate the transition to a sustainable food system). In Milan, there are currently 10 farmers markets on public areas. The municipality is working on a municipal regulation, which will firmly acknowledge the presence of short-chain markets in the city and the areas where they are held (personal communication City of Milan).

Glossary/concepts/definitions used

Local/regional food producers: Local/regional producers are those producers growing/cultivating/producing in a given city region. Building from a tradition of regional economic geography studies, we know that city regions provide a critical lens through which to understand sub-national dynamics and link economic activity to space. While a city region approach may not address all cases—for example, specific contexts such as small island states where, in some cases, there are no defined city territories but rather urban area territories, the city region has also been used to understand more about resource flows to minimise environmental impacts by, for example, understanding and closing waste through more efficient resource use.² A city region is defined here as: “as larger urban centre or conglomeration of smaller urban centres and the surrounding and interspersed peri-urban and rural hinterland”. Although contexts differ across cities and regions, such urban-rural partnerships and inter-municipal cooperation always extend beyond traditional administrative boundaries.³

A first key activity here will be to conduct a participatory mapping exercise with a wide range of stakeholders to define the nature and boundaries of the local city region and to define “local/regional producers”. A city region can be defined using various criteria: main sources of food and food flows, natural boundaries, administrative and jurisdictional boundaries.

Short food supply chains (SFSCs) are characterised by shorter links between producers and consumers so that food relations are re-socialised and re-spatialised. SFSCs emerged and are defined in opposition to the conventional, industrial (long chain) food system as to include food values, food quality and preferences for example, local and/or organic food, often referring to provenance, the distance food travels and/or knowledge about the food and its region. The consideration is that producer-consumer relations are 'shortened' and redefined by communicating about the origin and quality attributes of food so that products reach the consumer with such information. In SFSCs, “the foods involved are identified by, and traceable to a farmer.”⁴

FAO considers that Short Food Supply Chains (SFSCs) have potential to improve farm incomes, promote sustainable farming systems and contribute to local economic development. There are many different forms of SFSC, but they share a common characteristic of reduced numbers of intermediaries between the farmer or food producer, and the consumer. Whilst the number of SFSCs has proliferated, their collective impact is limited by a number of barriers to scaling up.⁵

The focus in this indicator is on the origin of production (local/regional producers) and the location of sale (public markets in the city). The focus is first on public markets for ease of data collection. If information is available also other –private– market outlets could be included in the indicator. Examples of different **market outlets in the city** include publicly supported street, farmer or other food markets, institutional outlets (procurement), conventional markets such as supermarkets or grocery

² Blay Palmer A., G. Santini, M. Dubbeling, H. Renting, M. Taguchi and T. Giordano, 2017. Validating the City-Region Food System Approach: Enacting inclusive, transformational city-region food systems . Submitted for publication.

³ <http://www.fao.org/in-action/food-for-cities-programme/toolkit/introduction/en/>;
<http://www.ruaf.org/projects/developing-tools-mapping-and-assessing-sustainable-city-region-food-systems-cityfoodtools>

⁴ See footnote 2

⁵ <http://www.fao.org/family-farming/detail/en/c/410251/>. See also: Approximation to short food value chains in developing world: a case from Mexico City <http://www.fao.org/3/a-i6511e.pdf>

stores, or other direct-to-consumers markets such on-farm stores, or food boxes.

Public markets. According to [Wikipedia](#), a market, or marketplace, is a location where people regularly gather for the purchase and sale of provisions, livestock, and other goods. But to be considered a *public* market, the market must:

- Have public goals: how does this place contribute to the community?
- Operate in public spaces- it can be privately owned but customers should not pay to get in
- Serve locally owned and operated businesses. Research from the Ford Foundation shows public markets confer multiple benefits to the communities they serve.⁶

Preparations

The team responsible for monitoring this indicator should agree on:

1. Type of data disaggregation and categories that will be used (see further below)
2. Data collection method (market and/or food producer survey)
3. If surveys are to be used, information should be collected first on the total number of food producers and market outlets (for sampling purposes) and a survey instrument has to be designed. Training of survey enumerators may be needed.

Sampling

In general, a 10% sample (10% of all food producers; 10% of all or specific market outlets) will provide sufficiently reliable data.

Depending on policy or monitoring priorities, surveys could be implemented among specific groups of producers (e.g. youth, women, small-scale producers, etc.), among specific market outlets or in specific areas of the city.

Data collection and data disaggregation

Data disaggregation can be done by 1/ Type of food producer and 2/ Type and location of market outlet.

1. Type of food producers (and their organisations)

Indicate the different types and numbers of food producers:

- Youth vs. adult producers
- Men vs. women producers
- Small scale, vs. medium-scale or large scale producers
- Type of farming systems
- Any other category (e.g. community gardeners with license to sell vs. commercial producers, etc.).

2. Type and location of market outlet

This indicator can be disaggregated for different market types e.g. farmers markets, public markets, public sector food procurement, supermarkets, grocery or specialty stores, wholesale markets, street food vendors, direct to consumer markets (such as box schemes, on-farm sales), private retail and catering, etc. Collecting additional information on the spatial location of different market outlets will provide data for other indicators such as food deserts (Indicator 8 *Number of households living in “food deserts”*).

⁶ <https://www.pps.org/article/4-guidelines-on-taking-public-markets-to-the-next-level>

Note: If data are available, an additional and complementary indicator could measure the “Percentage of local/regional food that is sold to public markets in the city”. To do so data need to be collected on:

- Total volume of local/regional produced food
- Total volume of local/regional food sold in (public) markets.

It is expected however that data needed for this indicator are not readily available.

Data can be collected from:

1. Market surveys

Surveys among specific or all types of market outlets in the city to monitor current sale of locally produced food items and identify obstacles and opportunities for improvement.

2. Food producer surveys

In addition to, or in place of, a market survey, a survey among a sample of urban and peri-urban food producers would yield the needed information. This survey could integrate questions that would also provide data for other indicators, like land ownership and tenure regimes (see indicator 28 *Proportion of total agricultural population with ownership or secure rights over agricultural land for food production, by sex*), area under sustainable agriculture (Indicator 29 *Proportion of agricultural land in the municipal area under sustainable agriculture*) and number of producers that benefitted from technical training and assistance (Indicator 30 *Number of food producers that benefitted from technical training and assistance in the past 12 months*).

Sample questions from surveys developed for other (African research) projects are provided in Annex 1 and 2⁷.

Data analysis/calculation of the indicator

The indicator is computed by dividing the total number of food producers selling their products to markets in the city by the total number of local/regional food producers:

$$\text{Proportion of local/regional food producers that sell their products to public markets in the city} = (\text{Total number of food producers selling their products to markets in the city} / \text{Total number of local/regional food producers}) * 100$$

If data are available, the following alternative indicator can be computed:

$$\text{Volume of local/regional food products sold at markets in the city} / \text{Total volume of food products sold at markets in the city} * 100$$

Depending on the type of survey questions used, further analysis of information on for example consumer interest in local food, availability and prices of local food, incentives and needs for increased local sales can be implemented.

⁷ Adapted from the Consuming Urban Poverty project: <https://consumingurbanpoverty.wordpress.com/>; World Bank urban food business survey

Annex 1: Market Survey

1. Classify different type of market outlets

[Only for wholesale and distribution] If your business assembles and redistribute food items, what type of wholesale and distributor are you?

- ☐ Sale/redistribution to retailers
- ☐ Sale/redistribution to food caterers
- ☐ Sale/redistribution to others (*please specify*)
- ☐ We are also engaged in food retail
- ☐ Other (*specify*)
- ☐ Information does not exist
- ☐ Do not know
- ☐ Choose not to response

[Only for retail] If your business is a shop that sells food to the public, what type of retailer is it? *Only read the question out loud and select the most appropriate answers. Probe the interviewee further if no answers are forthcoming.*

- ☐ Supermarkets
- ☐ Kiosks/house shops
- ☐ Independent specialist stores (e.g. butchers, bakers, fishmongers etc.)
- ☐ Specific ethnic food shops (Polish, Somali, Asian etc.)
- ☐ Other shops (*please specify*)
- ☐ Food markets
- ☐ Processors & manufacturers that combine processing and retail (e.g. local millers)
- ☐ Wholesalers & distributors that are also engaged in retail
- ☐ Restaurants, hotels, cafes, other eating out places
- ☐ Informal street food sellers/ mobile vendors
- ☐ Direct sales from producers (e.g. farmers, urban gardens)
- ☐ Social/solidarity shop
- ☐ Community buying groups or cooperatives
- ☐ Other retail (*specify*).....
- ☐ Information does not exist
- ☐ Do not know
- ☐ Choose not to response

[Only for catering, meals preparation] If your business provides prepared food or meals, what sort of caterer is it? *Only read the question out loud and select the most appropriate answers. Probe the interviewee further if no answers are forthcoming.*

- ☐ Hotel, restaurant, café
- ☐ Catering company supplying other businesses
- ☐ School meal preparation
- ☐ Hospital meal preparation
- ☐ Private company meal preparation
- ☐ Own business preparing meals for sale
- ☐ Fast food outlet
- ☐ Kiosk serving food
- ☐ Permanent street food seller
- ☐ Mobile street food seller/hawker
- ☐ Other informal pre-prepared food sellers (e.g. office to office lunch sellers)
- ☐ Homeless or malnutrition or children feeding centres
- ☐ Other (*specify*).....

- ☐ Information does not exist
- ☐ Do not know/No response

2. Location

Note: Please use a map to which the respondents can relate

Where, in relation to the city boundaries, is your business located?

- ☐ Inner city area
- ☐ Outskirts of city but within municipal boundary
- ☐ Outside the city municipal boundary
- ☐ Another part of the city (*specify*).....

In which type of neighbourhood of the city is your business or your main business operation located? *Cross-check answer given with own observation by interviewer*

- ☐ Designated industrial area (in the city)
- ☐ Designated retail shopping mall (in the city)
- ☐ City provided retail space (e.g. market) in industrial areas
- ☐ Non official retail space (e.g. market areas) in residential areas
- ☐ Non official retail space (e.g. market areas) in industrial areas
- ☐ Mobile, move around locations
- ☐ Have more than one main site (*tick any other options as relevant*)
- ☐ In residential area, home-based
- ☐ Other (*specify*).....
- ☐ Information does not exist
- ☐ Do not know
- ☐ Choose not to response

3. Sale of local food (e.g. food produced by urban, peri-urban and rural producers in the municipal area)

Do you market or label your products as "local"?

- ☐ Yes
- ☐ No
- ☐ Do not know
- ☐ Choose not to response

Where does your business buy 'local' products?

- ☐ Do not buy local products
- ☐ Directly from local farmers
- ☐ From wholesalers
- ☐ From other retail outlets
- ☐ Other (*specify*)
- ☐ Do not know
- ☐ Choose not to response

From how many local farmers or growers do you buy produce directly?

- ☐ Less than 5
- ☐ 5-10
- ☐ 10-25
- ☐ 25-50
- ☐ 50-100
- ☐ Over 100
- ☐ Do not know
- ☐ Choose not to response

Which types of local products do you buy and sell? *Circle or add specific product details as appropriate*

- ☐ Fruits
- ☐ Vegetables – roots, tubers (potato, sweet potato, cassava)
- ☐ Other vegetables
- ☐ Meat
- ☐ Bread, cereals & grains (e.g. rice, millet, maize etc.)
- ☐ Eggs
- ☐ Fish & shellfish (fresh or dried)
- ☐ Dairy products (dried milk, liquid milk, cheese, yoghurt, curds, etc.)
- ☐ Pulses, seeds & nuts (or foods made with these ingredients)
- ☐ Sugars & sweeteners (e.g. honey, syrups)
- ☐ Fats & oils
- ☐ Processed items (e.g. noodles, biscuits, cakes, snacks/fritters)
- ☐ Mushrooms
- ☐ Other (*specify*).....
- ☐ Do not know
- ☐ Choose not to response

How easy is it for your business to get local products?

- ☐ Always easy
- ☐ Sometimes easy sometimes difficult
- ☐ Always difficult
- ☐ Impossible
- ☐ Do not know
- ☐ Choose not to response

Do you stock any products that have a specific 'local food' label?

- ☐ Yes
- ☐ No
- ☐ Do not know
- ☐ Choose not to response

If yes, specify what types of products

How important is it to your business to inform your customers of where the food they buy comes from?

- ☐ Very important
- ☐ Quite important
- ☐ Not important
- ☐ Has not occurred to us to do that
- ☐ Do not know
- ☐ Choose not to response

Is there a drive or a directive from the national or regional government to support more local supply chains/ promote domestic production/restrict imports?

- ☐ Yes, promote domestic production
- ☐ Yes, restrict imports
- ☐ Yes, support local supply chains
- ☐ No
- ☐ Do not know
- ☐ Choose not to response

If yes, what kinds of incentives are provided for businesses to work more with local products & supply chains?

- ☐ Financial incentives (*please specify*).....
- ☐ Technical support
- ☐ Marketing support & promotion
- ☐ Knowledge and information provision
- ☐ Other (*specify*)
- ☐ Don't know of any such incentives
- ☐ Choose not to response

4. Total value of local produce

If your customers specifically request local products, which types of products do they request most? *Only read the question out loud and select the most appropriate answers. Probe the interviewee further if no answers are forthcoming.*

- ☐ Fruits (*specify which types*)
- ☐ Vegetables (*specify which types*)
- ☐ Meat (*specify which types*)
- ☐ Bread, cereals & grains (*specify which types*)
- ☐ Eggs
- ☐ Fish & shellfish (*specify which types*)
- ☐ Dairy products (*specify which types*)
- ☐ Pulses, seeds & nuts (*specify which types*)
- ☐ Sugars & sweeteners (*specify which types*)
- ☐ Fats & oils (*specify which types*)
- ☐ Mushrooms
- ☐ Other (*specify*)
- ☐ Do not know
- ☐ Choose not to response

Are local products cheaper or more expensive than non-local products?

- ☐ Yes local products are cheaper
- ☐ No, both are the same
- ☐ No local products are more expensive
- ☐ Other (*specify*)
- ☐ Do not know
- ☐ Choose not to response

Of your total food sales per year, what proportion is from local products?

- ☐ 0-25%
- ☐ 25-50%
- ☐ 50-75%
- ☐ 75-100%
- ☐ Do not know
- ☐ Choose not to response

Would it be possible for your business to substitute more local products for imported products?

- ☐ Yes
- ☐ No
- ☐ Do not know
- ☐ Choose not to response

What prevents your business from selling/using more local products? *Only read the question out loud and select the most appropriate answers. Probe the interviewee further if no answers are forthcoming.*

- ☐ Cannot afford local products, prices too high

- ☐ No knowledge of what local products are available
- ☐ Range of types of local products too limited
- ☐ Volume of available local products too low
- ☐ No logistical means of getting local products
- ☐ No or low customer demand
- ☐ Customers prefer “imported products” because of their better quality or taste
- ☐ No funding or possibilities for marketing of local products/local product visibility
- ☐ Other (*specify*)
- ☐ Do not know
- ☐ Choose not to response

What is needed to facilitate/improve local supply food chains? *Only read the question out loud and select the most appropriate answers. Probe the interviewee further if no answers are forthcoming.*

- ☐ New/improved information and knowledge on local products/supply chains
- ☐ Improved coordination/collaboration among producers to pool local supply
- ☐ Improving quality of local production
- ☐ New/improved infrastructure (e.g. roads, centralised food distribution hubs)
- ☐ Training and technical assistance
- ☐ New/improved connections between various actors in the local supply chain
- ☐ Product labelling
- ☐ Policy or financial incentives
- ☐ Other (*specify*)
- ☐ Do not know

Annex 2: Food producer survey⁸

Do you market or label your products as “local”?

- ☐ Yes
- ☐ No
- ☐ Do not know
- ☐ Choose not to response

Which types of products do you sell at different markets in the city? *Circle or add specific product details as appropriate*

- ☐ Fruits
- ☐ Vegetables – roots, tubers (potato, sweet potato, cassava)
- ☐ Other vegetables
- ☐ Meat (please specify)
- ☐ Cereals & grains (e.g. rice, millet, maize etc.)
- ☐ Eggs
- ☐ Fish & shellfish (fresh or dried)
- ☐ Dairy products (dried milk, liquid milk, cheese, yoghurt, curds, etc.)
- ☐ Pulses, seeds & nuts (or foods made with these ingredients)
- ☐ Processed items (e.g. noodles, biscuits, cakes, snacks/fritters)
- ☐ Mushrooms
- ☐ Other (*specify*).....
- ☐ Do not know
- ☐ Choose not to response

Where do you sell your products locally?

⁸ See footnote 2

- ☐ We do not sell our products on any market in the city
- ☐ Household deliveries/drop off to collection points
- ☐ Bulk-buying groups or co-ops
- ☐ On-farm sales
- ☐ Street markets or Farmers markets
- ☐ Whole sale markets
- ☐ Public offices or institutions (hospitals, government offices, schools)
- ☐ Supermarkets
- ☐ Grocery or speciality stores (*specify*).....
- ☐ Private catering (*restaurants, etc., specify*).....
- ☐ Other
- ☐ Do not know
- ☐ Choose not to response

What is needed to support you to sell a larger share of your products on markets in the city *Only read the question out loud and select the most appropriate answers. Probe the interviewee further if no answers are forthcoming.*

- ☐ New/improved information and knowledge (*specify*).....
- ☐ Improved coordination/collaboration among producers to pool local supply
- ☐ Improving quality of local production
- ☐ New/improved infrastructure (e.g. roads, centralised food distribution hubs)
- ☐ Training and technical assistance (*specify*).....
- ☐ New/improved connections between various actors in the local supply chain
- ☐ Product labelling
- ☐ Policy or financial incentives
- ☐ Other (*specify*)
- ☐ Do not know



**Food and Agriculture
Organization of the
United Nations**



Milan Urban Food Policy Pact Monitoring Framework

March 2021 version

Indicator 33: Annual proportion of urban organic waste collected that is re-used in agricultural production taking place within municipal boundaries

MUFPP framework of actions' category: Food production

The indicator measures the percentage of urban organic waste collected and recycled that is re-used in urban and peri-urban agriculture production

Overview table

MUFPP Work stream	Food production
MUFPP action	Improve (waste) water management and reuse in agriculture and food production through policies and programmes using participatory approaches
What the indicator measures	The indicator measures the percentage of urban organic waste collected and recycled that is re-used in urban and peri-urban agriculture production
Which variables need to be measured / what data are needed	-The total tonnage of urban organic waste collected in the city -The total tonnage of urban organic waste that is recycled -The total tonnage of recycled organic waste that is used in urban and peri-urban agriculture production (e.g. agriculture taking place within municipal boundaries)
Unit of measurement (i.e. Percentages, averages, number, etc.)	Tonnage and percentage of organic waste collected and re-used
Unit(s) of Analysis (i.e. people under 5 years old, etc.)	The organic components of municipal solid waste
Possible sources of information of such data	Data on formal organic waste collection and management may be available from municipal bodies and/or private contractors. Additional and informal collection data may be available from NGOs and community organisations. Information can be sourced from municipal records, service providers, community profiles and household surveys. UN-Habitat is collecting information on solid waste

	management and discharge in more than 1000 cities that are part of the City Prosperity Initiative ¹ .
Possible methods/tools for data-collection	Analysis of records and surveys
Expertise required	
Resources required/ estimated costs	
Specific observations	It is recognised that in many cities, solid waste collection and management data are currently incomplete or not available. Cities have varying policies that define appropriate waste management, with different levels of treatment and data collection. Cities that have more advanced systems should be able to report other aspects of waste management such as recycling that can be disaggregated by different components and uses.
Examples of application	New York City (USA) has set a zero-waste target by 2030. In 2016, the NYC Department of Sanitation (DSNY) has collected more than 60,000 tons of organic waste. Most of the organic waste collected in NYC is used to create compost, but as per 2018 part of it will be incinerated for energy production. For those not yet receiving curbside organics pickup, DSNY continues to develop drop-off sites for organic waste. There are now more than 88 drop-off sites in addition to at least 225 community composting sites, which divert an estimated 1,200 tons of organic waste per year. As per 2016, certain New York City businesses were required by law to separate their organic waste for beneficial use (composting, anaerobic digestion or other) ² .

Rationale/evidence

The indicator “Annual proportion of urban organic waste collected that is re-used in urban and peri-urban agricultural production” relates to Sustainable Development Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable), Target 11.6: ‘By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management’³. It also relates to SDG 12 (Ensure sustainable consumption and production patterns), Target 12.5: ‘By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse’.

Regardless of the context, managing solid waste is one of the important challenges of urban areas of all sizes. Cities generate enormous amounts of waste from urban households, industries and markets⁴. Large amounts of this Municipal Solid Waste (MSW) mostly end up in non-engineered landfills or polluting the urban environment, especially in low-income countries where sanitation infrastructure is less developed. A shift from waste(water) disposal to Reduce, Recycle and Reuse practices⁵, is in many cases, a ‘must’ as limited water resources increase competition for drinking and irrigation water, while some other resources like phosphorus are non-renewable and especially poorer countries will be the first to feel increasing fertiliser prices.

¹ <https://unhabitat.org/urban-initiatives/initiatives-programmes/city-prosperity-initiative/>

² <http://www1.nyc.gov/assets/foodpolicy/downloads/pdf/2017-Food-Metrics-Report-Corrected.pdf>

³ The SDG Indicator 11.6.1 used is: Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities

⁴ Pay Drechsel, Bernard Keraita, Olufunke O. Cofie and Josiane Nikiema. Productive and safe use of urban organic wastes and wastewater in urban food production systems in low-income countries. In: De Zeeuw H. and P. Drechsel. Cities and agriculture- Developing Resilient Urban Food Systems, 2015. Earthscan. <http://www.ruaf.org/process-and-tools-multistakeholder-planning-urban-agro-food-systems>

⁵ UNEP, 2011. Towards a green economy: Pathways to sustainable development and poverty eradication. United Nations Environment Programme (UNEP). Available from: www.unep.org/greeneconomy.

In general, the organic fraction is the largest one within domestic waste. Studies indicate that between 28-64% (varying from high to low income countries) of urban solid waste is biodegradable and hence of immediate interest in recycling⁶. Many organic wastes are nutrient-rich and can be productively used in intra- and peri-urban agricultural systems enhancing resource recovery and circular economies as well as the resilience of the urban metabolism.

Benefits of organic waste composting and recycling are to:

- Reduce overall waste volume and transport costs
- Replenish the soil humus layer and enhances soil quality
- Extend existing landfill capacity and landfill lifetime
- Enhance recycling and incineration operations by removing moist organic matter from the waste stream
- Promote environmentally sound practices and reduce the environmental impact of disposal sites, such as the reduction of methane generation at landfills.
- Be flexible for implementation at different levels, from household efforts to large-scale centralised facilities; i.e., can also be started with very little capital and operating costs.
- Address possible health impacts from faecal matter due to the composting (sanitising) process.
- Integrate existing informal sectors involved in the collection, separation and recycling of wastes, and contributes to the 'green economy' of a city.

However, despite these benefits, productive reuse of waste faces a variety of challenges and current MSW management practices show very small proportions of MSW being recycled and/or composted. Challenges range from securing cost recovery for up- and out-scaling successful examples of planned reuse, and the acceptance of safety practices within the informal reuse sector in urban and peri-urban areas. However, the largest concern related to waste reuse are possible sources of contamination (toxic substances like heavy metals, pathogens), especially where waste products are used in food production. Opportunities for addressing the first challenge include more attention to business models which can build on different value propositions beyond normal 'composting', and for the second challenge they include more attention to social marketing options, private-sector engagement and incentive systems for catalysing behaviour change towards the adoption of safety practices.

It should also be noted that productive re-use of organic waste in urban and peri-urban agriculture will only be successful if certain quality and quantity requirements are fulfilled:

Quality: Several cities promote organic waste composting for environmental reasons and may provide compost to farmers for nominal fees. However and in case of commercial composting, urban farmers with a sufficiently high willingness to pay for compost -allowing compost stations to break even- are those producing for the urban market, not subsistence farmers. Also in commercial agriculture production, crops of short rotation like exotic vegetables, need most of all a nitrogen fertiliser, less than an organic soil ameliorant. Where producers have poor tenure security they will also seek a more short-term fertiliser supply than a long-term soil ameliorant (see also Indicator 28 *Proportion of total agricultural population with ownership and secure tenure rights over agricultural land*). There are several technical options to 'boost' the fertiliser value and attractiveness of the MSW compost, including co-composting.

Quantity: Urban waste management is usually only interested in embarking on composting if this can reduce a significant volume of the waste. To start a compost station for saving, for example 3% of its transport volume, is usually not worth the effort. However, most intra- and peri-urban farming systems can hardly absorb any larger amounts of compost. A detailed market assessment by IWMI in Kumasi

⁶ See footnote 4

and Accra, Ghana found that, of the organic waste which is collected and not otherwise used, if composted, less than 1% could be absorbed across all intra- and peri-urban farming systems if the willingness to pay should cover compost operational production costs. It was only in smaller cities with less waste generation, like in Tamale (also Ghana), that up to 5% was possible, and higher percentages can be expected from towns. But also in a city like Accra, the percentage can increase up to 20% if, for example, the non-agricultural demand, like from the housing (ornamental gardens) and forestry/park sector is considered⁷.

Glossary/concepts/definitions used

Urban waste can be solid, partially solid (e.g., manure, sludge) or liquid (grey water), organic or inorganic, recyclable or non-recyclable. Of interest to agriculture as a source of nutrient and organic matter is the **organic waste**: the organic fraction of municipal solid waste and agro-industrial waste, and as a source of water and nutrients also domestic wastewater. Typical types of organic waste commonly used in urban farming are:

- **Solid waste**: Domestic and market wastes, food waste including vegetable and fruit peelings, and charcoal ash. This also includes waste from institutions and commercial centres.
- **Horticultural and agricultural waste**: Common especially in high-income areas: garden refuse, leaf litter, cut grass, tree cuttings, weeds, animal dung, crop residues, waste from public parks, etc.
- **Agro-industrial waste**: Waste generated by abattoirs, breweries, timber mills, poultry farms, food processing and agro-based industries.
- **Sludge and biosolids**: Human faecal matter from septic tanks and treatment plants.

Waste collected refers to waste that is routinely collected from specific addresses or designated collection points. Waste collection is conducted directly by municipal authorities or private contractors licensed/commissioned by municipal authorities with a regular schedule of the day of the week and time of collection. In some cases private waste collection companies have contracts with clients individually and provide collection services.

Organic waste recycling involves the recycling of organic wastes into valuable products such as fertiliser, biofuels and animal feed:

- **Animal Feed** – Some types of non-hazardous organic waste, with appropriate amounts of specific nutrients, can be used by certain types of animal farms or feed producers for livestock.
- **Composting** – This is a broad term used to define many methods of breaking down organic matter to be used as fertiliser. Composting is as a biological process that involves aerobic biological decomposition of organic materials to produce stable humus-like product. **Vermicomposting** refers to the production of compost by earthworms. While any organic waste is biodegradable, certain composting methods prove more efficient for different organic waste types.
- **Anaerobic Digestion** – This process involves using anaerobic microbes (those that exist and grow in environments without oxygen) to transform organic waste into energy. This process may produce biogas and rets-products may be used as bio-fertilisers.

Preparations

Data collection and analysis starts from identification of waste collection and management practices in the city and of possible data sources needed for this indicator (see further data collection).

⁷ See footnote 4

Sampling

Data collection is best done at the level of the city. Where city wide data are not available, data can be collected from specific agricultural or waste projects or specific waste management and recycling business to get a first insight into waste reuse practices and potential.

Data collection and data disaggregation

In order to generate the annual proportion of urban organic waste collected by the city that is re-used in urban and peri-urban agricultural production, there is a need to define the three components that are core to this indicator:

- The total tonnage of urban organic waste collected in the city. Organic waste may already be separately collected at the source where the waste is generated or waste separation may take place at disposal and/or treatment sites.
- The total tonnage of urban organic waste that is recycled. Out of the total tonnage organic waste collected, the proportion of the organic waste that is recycled should be estimated. If data are available, data can be disaggregated for different products: e.g. recycling in form of animal feed, (vermi)compost or incineration for production of biogas and bio-fertiliser.
- The total tonnage of recycled organic waste that is sold or distributed to farmers (e.g. used in urban and peri-urban agriculture).

1. Organic waste collected

The indicator refers to organic waste that is routinely collected directly by municipal authorities or private contractors. If data are available, informal waste collection schemes by waste pickers or community organisations could be included. Waste collected however excludes the proportion of organic waste that was taken and recycled before the waste collection, for example the organic waste composted by individual households, organisations (like schools, industries) and community gardeners. The latter will require other methods of data collection like household, institutional and garden surveys. Impacts of waste collection and composting campaigns targeting households may contribute to reducing amounts of organic waste collected and thus indirectly be monitored by applying this indicator.

2. Organic waste recycled

Secondly the indicator refers to the proportion of the total amount of organic waste collected that is recycled in form of animal feed, humus or compost. Formal recycling is done by municipal services or similar institutions, or by public or private corporations and specialised enterprises. Informal recycling may take place in cities in the Global South in form of landfill scavenging for example.

3. Organic waste re-used in urban and peri-urban agriculture

Finally the indicator tries to single out the proportion of the total amount of organic waste collected, recycled and used in urban and peri-urban agriculture as compared to other uses (by households, industries, in rural agriculture, etc.).

Once data on organic waste recycling are available, cities can use these data for calculating other indicators such as “the reduction of GHG emissions and fossil energy use as a result of (an increase in) the reuse of urban organic wastes as compost in urban and peri-urban agriculture and forestry”.

Data analysis/calculation of the indicator

The indicator can be computed by:

Annual proportion of urban organic waste collected that is re-used in urban and peri-urban agricultural production= $\left[\frac{\text{Total tonnage of organic waste re-used in urban and peri-urban agriculture}}{\text{Total tonnage of organic waste collected}} \right] \times 100$

References and links to reports/tools

Pay Drechsel, Bernard Keraita, Olufunke O. Cofie and Josiane Nikiema. Productive and safe use of urban organic wastes and wastewater in urban food production systems in low-income countries. In: De Zeeuw H. and P. Drechsel. Cities and agriculture- Developing Resilient Urban Food Systems, 2015. Earthscan. <http://www.ruaf.org/process-and-tools-multistakeholder-planning-urban-agro-food-systems>