



Mendel University in Brno
Faculty of Regional Development and International Studies

Food (in)security in Mumbai slum area

Bachelor's Thesis

Kristýna Cívková
Brno 2017

Mendel University in Brno

Faculty of Regional Development and International Studies

Study programme: International Territorial Studies

Field of study: International Development Studies

Bachelor's Thesis

Food insecurity in Mumbai slum area

Author:

Kristýna Cívková

Thesis supervisor:

Ing. Zbyšek Korecki, Ph.D.

Brno 2017

Declaration:

I declare that I carried out this thesis: independently, and only with the cited sources, literature and other professional sources.

I agree that my work will be published in accordance with Section 47b of Act No. 111/1998 Coll. on Higher Education as amended thereafter and in accordance with the Guidelines on Publishing University Student Theses.

I understand that my work relates to the rights and obligations under the Act No. 121/2000 Coll., the Copyright Act, as amended, in particular the fact that Mendel University in Brno has the right to conclude a license agreement on the use of this work as a school work pursuant to Section 60 paragraph 1 of the Copyright Act.

Before closing a license agreement on the use of my thesis with another person (subject) I undertake to request for a written statement of the university that the license agreement in question is not in conflict with the legitimate interests of the university, and undertake to pay any contribution, if eligible, to the costs associated with the creation of the thesis, up to their actual amount.

Brno, May 2017

Kristýna Cívková

Acknowledgement

I would like to thank Ing. Zbyšek Korecki for his precious advice and his willingness to help me. I would like thank my love ones who supported me and who were patient during the time of formation this piece.

Abstract

Cívková K., Food insecurity in Mumbai slum area. Bachelor's thesis. Brno 2017.

The thesis deals with food security system for urban slum dwellers of Mumbai, provide recommendations for improving the functioning of Public Distribution System due to analysis of food insecurity researches among the dwellers of urban slum area in Mumbai and point out functioning and errors of Public Distribution System of India. The thesis considers the surveys taken by NGOs and their analysis.

Key words: food security, Public Distribution System (PDS), urban poverty, urbanization.

Abstrakt

Cívková K., Potravinová bezpečnost ve slumech města Mumbai. Bakalářská práce. Brno 2017.

Cílem práce je analýza potravinové bezpečnosti mezi obyvateli slumů ve městě Mumbai, poskytnutí doporučení pro zlepšení fungování distribučního systému na základě analýz potravinové bezpečnosti mezi obyvateli slumů ve městě Mumbai. Dále poukázání na fungování a selhávání distribučního systému v Indii. Práce bere v úvahu výzkumy a analýzy nevládních organizací (NGOs).

Klíčová slova: potravinová bezpečnost, Public Distribution System (PDS), městská chudoba, urbanizace.

Aim of the paper

The aim of the thesis is to suggest the possible changes in the strategy of food policy in India due to urbanization, determination the extention of food security dwellers in Mumbai slum area and assessing experiences with food insecurity of urban poor on the basis of surveys in Mumbai slum area.

In this work I will describe the governmental interventions and possible solutions to the question of food security in the urban slum areas. The functioning of the governmental food distribution system will be described through exact cases of poor households living in Mumbai slum area.

Methodology

The thesis are devided into three parts. The first part is theoretical, where Food Security, Poverty, Urbanization, Nutritional Intake are described from the general context.

In the second part, Analytical Part, the defined aspect were applied in the case of urban slum area of Mumbai and whole India and Public Distribution System were analysed due to researches.

In the third part, the recommendation for improving the Public Distribution System was suggested. The recommendation are based on the findings from the analytical part and on the base of results from the analytical part, the factors connected to food security in Mumbai slum area were derived.

List of abbreviations

AAV	Antyodaya Anna Yojana
AIE	Alternative and Innovative Education
APL	Above Poverty Line
AWC	Anganwadi centre
BftW	Bread for the World
BPL	Below Poverty Line
BUILD	Bombay Industrial League for Development (NGO)
CACP	Commission for Agricultural Costs and Prices
CIDCO	City and Industrial Development Corporation of Maharashtra
EGS	Education Guarantee Scheme
FAO	Food and Agriculture Organization of United Nations
FCI	The Food Corporation of India
FIES	Food Insecurity Experience Scale
FPS	Fair Price Shop
GHI	Global Hunger Index
ICDS	Integrated Child Development Scheme
INHP	Integrated Nutrition and Health Project
IRT	Item Response Theory
LPCD	Litres Per Capita Per Day
MDM	Mid Day Meal
MMR	Mumbai Metropolitan Region
NCMP	National Common Minimum Programme
NGO	Non Governmental Organization
NP-NSPE	The National Program of Nutritional Support to Primary Education
NSSO	National Sample Survey Organisation
OECD	Organisation of Economic Co-operation

PDS	Public Distribution System
PGR	Population Growth rate
RCH	Reproductive and Child Health
Rs	Indian Rupee (Rs 1= EUR 0,014)
SHGs	Self-help Groups
TPDS	Target Public Development System
UN	United Nations
UNDAF	United Nations Development Action Framework
UNDP	United Nations Development Program
UNICEF	The United Nations Children's Fund is a United Nations
UPAI	Urban Poverty Alleviation Initiative
VoH	Voice of Hungry
WB	World Bank
WFP	World Food Program
WHO	World Health Organization
WPI	Wholesale Price Index
WTO	World Trade Organization

Content

Abstract.....	5
Aim of the paper	6
List of abbreviations.....	8
PART 1: THEORETICAL PART	11
1. Food Security and Theory of Distribution of food	12
1.1.Theory of food security	13
1.2. Theory of poverty and nutritional intake.....	14
1.3.Urbanization and models of urban cities.....	18
1.4. Theory of food distribution	20
PART 2: ANALYTICAL PART	23
2. Introduction to the Analytical Part.....	24
Public Distribution System (PDS) in India	24
2.1. Household Food Insecurity in Mumbai slum area	28
2.2. Poverty and food insecurity	32
2.3.Urbanization in Mumbai	34
2.4 Public Distribution System (PDS) in Mumbai	37
Leakage of food grains during transportation of food grains	38
PART 3: RECOMMENDATIONS	40
Recommendations	41
Conclusion	44
References	46
List of Figures	51
List of Tables.....	52
List of Annexes.....	53

PART 1: THEORETICAL PART

1. Food Security and Theory of Distribution of food

In the relation to the phenomenon of rapid urbanisation of Third World, food security has become another challenge. The relation of food security and human population can be understood in the way with the increase of people, the demand for food increases, land required for agriculture increases, related environmental consequences increases, and therefore, the world's food security deteriorates. Although, India is the world's second largest producer of wheat and rice (FAO 2009), around 230 million India's inhabitants are living in hunger (UN World Food Programme, FAO 2008).

The main factor of food security is hunger, which is described as actual malnutrition and limited access to food (Anderson 1990). The household food insecurity contains these factors as well as householders' worries such as perceptions over the quantity and quality of food, its availability, accessibility and acceptability, work which is done to afford to buy food (Carlson et al. 1999). The problem of urban poor children in terms of shortage in nutritional intake (proteins, vitamin A) are actual among the children (Ghosh and Shah 2004; UHRC 2008). Between 1998 and 2006 the situation of caloric intake worsened in most urbanized states (Maharashtra, Karnataka, Andhra Pradesh) (MSSRF and WFP 2010). According to Gupta, in 2009 more than 50% of population lived in slums in commercial capital of Maharashtra (Mumbai), 36% of children were underweight and around 45% of woman had anemia (Gupta et al. 2009).

In terms of urbanization in India, it has increasing trend: in 2001 Census it was 27.81%, then 31.16% in 2011 Census. At the same time the rural population decreased from 72.19% to 68.84%, moreover according to Office of the Registrar and Census Commissioner of India 2011, in urban areas lived around 377 million of people (from 1.2 billion India's inhabitants). The rapid growth of slums, which typically have poor access to safe drinking water, sanitation and drainage, is of particular relevance for the issue of food security.

On the behalf of these actual global topics, this thesis is analysing study the food insecurity situation the slum area in Mumbai and considers the perception and opinions on food conditions of those who live there. These thesis wants to show the food availability and access to governmental food aid services for reducing urban poverty.

1.1. Theory of food security

Food security concept include a large scale of issues such as import/export of food, domestic food production, access to food, power to purchase the food, and besides other factors influencing absorption of food in the body. The elements influencing food security could be divided into four main pillars described below.

For definition of “*Food security*” there is formulation of Food Agriculture Organization stated in The World Food Summit in 1996. The formulation is following: “*When all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.*” The WHO added: “*Usually, the concept of food security is presented as including both physical and economic access to food that meets people's dietary needs as well as their food preferences. Health problems related to dietary excess are an ever increasing threats in lots of countries. Unfortunately, malnutrition and foodborne diarrhea are become double burden.*”(WHO)

Food security is based on four pillars, which are depicted and defined according to WHO and FAO in the Figure 1. The first three pillars where defined by WHO and the last one was added later by FAO. Finally, the World Summit on Food Security, in 2009 refilled “*four pillars of food security are availability, access, utilization, and stability*”.



Figure 1: Four Pillars of Food Security. Source: <https://infogr.am/The-four-Pillars-of-food-security->

- 1.) **Food availability**: sufficient quantities of food available on a consistent basis.
- 2.) **Food access**: having sufficient resources to fulfill right foods for a nutritious diet.
- 3.) **Food use**: related to knowledge of basic nutrition and care and adequate sanitation and water. (WHO)
- 4.) **Stability of supply and access**: weather variability, price fluctuations, factors: political and economical.” (UNICEF)

Food insecurity occurs whenever a household or individual lacks predictable access to foods in sufficient quantity and quality to maintain an active and healthy lifestyle. The four pillar concept is key basis. However, availability refers to the overall abundance of food but as Amarta Sen notes availability does not ensure access.

Although, nowadays world produces enough food, significant number of people cannot access this food. Food security is linked to health in the ways of amount of food in the households, distribution of food and nutritious value of food.

The main source of employment is agriculture in the most developing countries and international agriculture agreements are important to a country's food security. Some argue that trade liberalization can decrease a country's food security because of reducing agricultural employment offers. Other argue that WTO agreements could develop problems in terms of food security because of pushing for the liberalization of crucial markets.

1.2. Theory of poverty and nutritional intake

Poverty is narrow related with food insecurity. It is associated with environmental health risks. As WHO described, poor people tend to have less information, less ability to access health care, higher risk of diseases, disability and undernourishments. Moreover, poverty can reduce household savings, productivity, learning ability and undermine quality of life.

World Bank definition of poverty:

“Poverty is hunger. Poverty is lack of shelter. Poverty is being sick and not being able to see a doctor. Poverty is not having access to school and not knowing how to read. Poverty is not having a job, is fear for the future, living one day at a time.

Poverty has many faces, changing from place to place and across time, and has been described in many ways. Most often, poverty is a situation people want to escape. So poverty is a call to action -- for the poor and the wealthy alike -- a call to change the world so that many more may have enough to eat, adequate shelter, access to education

and health, protection from violence, and a voice in what happens in their communities.”

WB approach of *extreme poverty* is determined by income less than USD1.25 per day (in 2005). Below this poverty line belong vast of Sub Saharan Africa, South Asia, East Asia, the Pacific, the West Indies, China and India. The Goal to reduce extreme poverty has become the first goal of Millennium Development Goal (MDG1) in the year 2000.

On the contrary to the monetary approach, which is connected to utilitarianism, Amartya Sen note that the focus should be on human freedoms and valued life. In her words, poverty is defined as the impossibility to achieve minimal capabilities (Sen, 1999). According Amartya Sen just basic needs could be defined in monetary views. This theory could be seen as more satisfactory than monetary theory due to providing definition of poverty in context of people's lives and if they enjoy their freedom. However measurement is provided by the UN's Human Poverty Index based on capabilities correlated to this theory. It describes poverty in the terms of human life: in decent standard of living (measured by GDP per capita), education (literacy rate), healthy and long life (measured by expectancy at birth).

Absolute poverty is measured in relation to meet basic needs such as shelter, food and clothing. This meaning is not concerned broader issues of quality of life such as quality in society. The concept of absolute poverty does not count with the peoples' cultural and social needs. Thus, according to Presidents's report in US, the concept of relative poverty were developed in 1964: *"No objective definition of poverty exists... The definition varies from place to place and time to time. In America as our standard of living rises, so does our idea of what is substandard."* (U.S. Congress, Report of the Joint Economic Committee on the January 1964). This defines poverty in relation to economic status of other members of society. It says, poor are those who do not fulfil standards of living in societal context.

Another term of poverty, *Relative Poverty* which exist on a relative scale. In another words, the poorest of the poor have the worst health conditions around the world. From the global view, it is general known that the worse peoples' socioeconomic positions, the worse health they have. Relative poverty is measured by Gini Index or Theil Index or a as the percentage of the population with income less than some fixed amount of median income. It is usually measured by, the United Nations Children's Fund (UNICEF), the Organisation of Economic Co-operation (OECD), the United Nations Development Program (UNDP) and Development

and Canadian poverty researchers. What is valid for both definitions is that both are concerned with income and consumption. (Raphael, Dennis, 2009)

However, poverty could be understood in many other ways and two internationally important organizations have also different views. The UN's definition through Human Development Index and due to putting more aspects in relation (as education and health). On the other hand, World Bank that is concentrating on poverty as on one-dimensional issue: monetary problem.

Global food consumption

World's food consumption per head is noted in the Annex 1. Food consumption is expressed in kilocalories (kcal) per capita per day. This unit is a variable used for measuring the world and regional food situation.

Analysis of FAOSTAT data shows that dietary energy (in kcals per capita per day) has been rising on a worldwide basis. It is because of availability of calories per head from the mid-1960s to the late 1990s rose by approximately 450 kcal per head per day worldwide and by over 600 kcal per head per day in developing countries as is seen in the Annex 1. But this progress has not been the same across the regions. For example, in sub-Saharan Africa, the per capita supply of energy has remained almost stagnant and has recently fallen in the countries in economic transition. On the other hand, the per capita supply of calories has risen dramatically in East Asia (by almost 1000 kcal per capita per day, mainly in China) and in the Near East/North Africa region (by over 700 kcal per capita per day).

Nutritional value of food

The nutritional value of food contains energy (calories), vitamins and minerals. Crops are a type of food which can be divided in many ways. Agriculturists divide crops into field crops, plantation crops, commercial crops, horticultural crops, forage crops and grasses. Such groups usually overlap, and particular plants may appear in more than one group. However, plants can belong into more than one group.

To divide the food according to nutrients, a lot of different ways of grouping have been stated: major nutrient content (e.g. fatty foods, starchy foods, protein foods), the role of the foodstuffs in human nutrition (e.g. energy foods, protective foods, body-building foods), individual nutrients (e.g. carbohydrates, fats, vitamins, protein), or commercial value (e.g. cereals, roots and tubers, nuts and seeds, fruits, leafy vegetables). Mixture of nutrients is part of all food. Refined white sugar, which consists of 100 percent carbohydrate (sucrose), is the exception. Most food belongs into several categories. The balanced diet and diversity of food is necessary to reach food security. The important advice which is taught in nutrition education for family meal planning is: "*Select at least one food from each of the food groups*", although, cost and acceptability must be considered too. Division of food items according to their contents and vitamins. In the Annex 2, which is given according to World Food Programme, shows Food Consumption Score Nutritional Quality Analysis Guidelines.

There are many processes which affect nutrients in food such as:

- **Soil, water and growing conditions.**

The nutritional value of food strictly depends on the used soil and water during its growing process. When the crops are grown in the soil with lowered nutrient it develops that the food from that crops has lower food nutritional value. Years of intensive agriculture that means soil nutrient exhaustion, lack of irrigation, erosion, the herbicides and pesticides are the causes which affect soil nutrients. Low levels of nutrients in plants lead to the trouble with fighting with predators and diseases of plants. Additionally, huge impact on the quality of meat is connected with the growing conditions for stock animals. However, the nutritional value of plants which are small, poorly coloured is better quality than their opposites.

- **Impacts on nutritional value.**

Local fresh food which has become ripe on the plant has the highest nutrients before its picking up. Immediately after picking fruit or vegetable, it starts decaying and losing its vitamins. For this reason methods of food preservation have been developed. However, these methods impact the whole nutritional value of food. The process of storage affects food's qualities of the nutritional value and moreover food starts to be unhealthy.

1.3. Urbanization and models of urban cities

The cause of growing cities and towns is the process of urbanization due to population move from rural areas. Reason for this moving is often view of better political, social and economic conditions than in rural areas. Urbanization is typical for both developing and developed world. Nowadays more and more people see a better opportunities such as educational, health care, sanitation, housing, business and transportation in cities. Thus, negative effects of urbanization could develop the housing problems which is developed with the lack of place to live. Therefore public utilities, employment, expensive living could be afforded only to limited scale of people. Overcrowding is another problem of growing urbanization. This situation is increasing with the huge number of people living in a small place because of immigrants who move into cities to find better life. Especially people from rural areas tend to migrate to urban areas, thus there is a congestion of inhabitants within a small space. The combination of very high cost of living and unexpected unemployment could lead to development of slums and squatters because of lack of housing, increasing risk of food security, large influx of immigrants and high price of land the proportion of urban poor increases. The Census of India 2001 defines slums as follows: *“An area of at least 300 population or about 60-70 households which are living in unhygienic conditions, with inadequate infrastructure, with lack of proper sanitation and access to drinking water”*.

The issue of unemployed people is highest in urban areas. It is also estimated that more than 50% of people around the world lives in urban areas (conserve-energy-future.com). Thanks to urbanization local governments and municipalities could face to resource shortage in the sewage management which resulting sewages flow into rivers and neighbouring natural water streams. This could lead to spread of diseases, such as plague, diarrhea, dysentery, typhoid, etc. The next issues of overcrowding developed environmental problems among others urban pollution or vehicular pollution which lead to asthma, allergies, food poisoning, cancer even death. Urban crime could be mentioned as a next impact of overcrowding, poverty, lack of services and education

The causes which lead people to move to the cities could be divided into two main groups or factors:

- **Pull factors:** Factors which attract people from rural areas to move to the urban localities. The factors include: better living and social conditions in cities, employment, health care, political situation, modernization, better technological equipment, entertainment
- **Push factors:** Factors which lead people to move from the rural areas. Factors include: lack of employment opportunities, lack of infrastructure, natural disasters, lack of health care, water sanitations

Models of urban Cities

The structure of the cities in terms of population, business and cultural centres, industry areas etc., is given by models. One of the scale of models is the **Sector Model**, which was described by Homer Hoyt in 1932. In this model the core zone (Central Business District-CBD) is in the middle, thus belong to the *concentric zone models* of city. The city could grow outwards, on the other hand, this model is based on 20th century does not count with the use of cars, which is easier to get to the commercial centres, moreover, not only upper classes have cars. It counts with the prerequisite that transportation is key factor for resettlement. The structure of the model is in the Figure 2 (below):

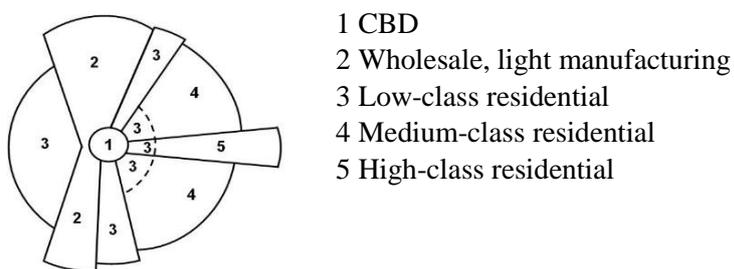


Figure 2: **Hoyt's Sector City Model**

Source: <http://keywordsuggest.org/gallery/755695.html>

Next model of the city resettlement is the **Linear Model of the city**. The city was developed by Arturo Soria y Mata in Madrid, Spain during the 19th century. This concept of a city is a form of urban development with housing and industry along a highway between the cities. It

has high accessibility of services and ables to adaptation to the linear growth but this model is often limited in the terms of afterwards growth and the choice of the direction of the next growth is limited too. The parallel zones exist in this model:

1. a segregated zone for railway lines,
2. an enterprises and production zone and institutions (scientific, educational, technical)
3. a zone with major highway (or green belt)
4. a residential zone, including social institutions
5. a park zone,
6. an agricultural zone (gardens)

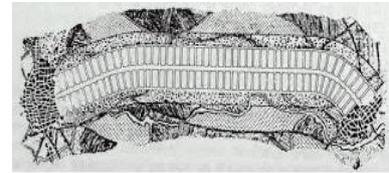


Figure 3: **Linear Model of a city.**

Source:

<https://vegasofiaimd2013.files.wordpress.com/2013/09/modelo-lineal.jpg>

The additional zone must follow the end of the previous band. Thus the city is longer but not wider.

1.4. Theory of food distribution

In late 18th century, Thomas Malthus discussed the relation of overpopulation and demand for food. He warned the population of the world will exceed the world's capacity to grow food. In his theory, population grows exponentially and food production arithmetically. Moreover, he warned population increases among the poor. He described famine as natural reaction to overpopulation. The lack of political protection and food distribution caused famines such as Indian famines in the late 19th century. At the same time India were exporting food to other English colonies (Davis, 2002). However, challenge of food distribution seems to be more crucial than food production (Handy, 2009).

The distribution, production, precession and purchasing of food is the area of *Food Policy* which is part of the public policy. Food policy's aim is to fulfil social objectives and interests due to its settings which includes operation of the agriculture and food schema including processing issues, decision-making in terms of marketing, utilization, availability and consumption of food. Among the matters of food policy belong creating eligibility standards which ensure labelling of food, quality and safety assurance of food, providing subsidies for poor, ensure safety of food supply. The policy could be on the level of business, government or organization but mostly on domestic level for the reason of ensuring food for the state's citizens. According to Byerlee, this policy crucial for developing countries and

includes protection of the poor from the crisis, increasing food production which promote income and improving use of resources through development of long-run markets (Byerlee et al. 2006). For developing countries, the purchasing of food policy mechanisms are managed by governments, private organizations or public institutions. These bodies tend to keep the price of the food down because of growing urban populations. But the low prices for poor could discourage the farmers from producing more food. Then the impacts could result in lack of trade, need of food imports and even hunger (Boeing, 2016). Therefore, proper governmental interventions into the food redistribution is necessary.

FAO and WHO in relation to India

In terms of membership in international organizations, India is the member of both, Food Agriculture Organization (FAO) and World Health Organization (WHO). Both organizations provide India technical assistance of development of food security response plans.

Government of India has been cooperating with World Food Program (WFP) on Strategic Plan. The co-operator are: UNICEF, FAO and other UN agencies in United Nations Development Action Framework (UNDAF). The cooperation of WFP and India is to working on enhancing the distribution of food and WFP provides technical help which improve the functioning India's PDS. The cooperation is to reach objectives (WFP, India Strategic Plan 2015-18):

- *“to ensure access to safe and safe and quality food for everyone during whole year;*
- *to reduce malnutrition of stunting and wasting children under 5 years of age, pregnant and lactating women, elderly people and adolescent girls.”*

The Strategic plan according to WFP should help to India's government to improve security reforms, support effective security nutritional analysis and support effectiveness of the National Food Security Act. India's food safety standards are described in THE FOOD SAFETY AND STANDARDS ACT, 2006. In this thesis the actual article is about the responsibilities of food business operator. Due to this Act the responsibilities are following:

- 1.) Every business operator belongs under this Act, in terms of processing, import, production, distribution, sale
- 2.) For business operator it is prohibited to sell or store food which is:

“unsafe; or misbranded or sub-standard or contains extraneous matter; or for which a licence is required, except in accordance with the conditions of the licence; or the food is for the time being prohibited by the Food Authority or the Central Government or the State Government in the interest of public health; or in contravention of any other provision of this Act or of any rule or regulation made thereunder...” (THE FOOD SAFETY AND STANDARDS ACT, 2006)

4.) Business operator could sell only the food which has got guarantee in the paper form and is specified with regulations about the nature and quality. An operator must provide a bill, invoice or cash memo.

“(5) Where any food which is unsafe is part of a batch, lot or consignment of food of the same class or description, it shall be presumed that all the food in that batch, lot or consignment is also unsafe...”(THE FOOD SAFETY AND STANDARDS ACT, 2006)

The Article of National Food Security Bill of India says (NFSB, 2011):

“Article 47 of the Constitution, inter alia, provides that the State shall regard raising the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties. Eradicating extreme poverty and hunger is one of the goals under the Millennium Development Goals of the United Nations.”

“To provide for food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity and for matters connected therewith or incidental thereto.” (NFSB, 2011)

PART 2: ANALYTICAL PART

2. Introduction to the Analytical Part

Food and nutrition security is related to the access of food that would provide the required calories and also to effective biological utilisation of food consumed by individuals. However, food (in)security and poverty are tightly related. According to the server *worldpopulationreview.com*, the number of people living in slums is estimated at 9 million, which is up from 6 million just a decade ago. In other words, about 62% of all Mumbaiers live in slums. Dharavi, the second largest slum in Asia, is located in central Mumbai and is home to 800,000 to 1 million people in just 2.39 square kilometres. This makes it one of the most densely populated areas on the planet with a density of a minimum of 334,728 people per square kilometer. It's also the most literate slum in India with a literacy rate of 69%. The analysed destination is Mumbai, India. The implementation of the analytical part considers situational analysis of food insecurity in urban slums of Mumbai called „EAT LESS, SLEEP LESS, AND WORK MORE“ whose authors were NGOs: Bombay Industrial League for Development (BUILD) and Bread for the World (BftW). This project provides accompaniment for the whole part of analysing of food security in Mumbai slums too. The sample of participants is described in the first chapter of analytical part (2.1. Household food insecurity and access).

Public Distribution System (PDS) in India

Food security in India is closely related and influenced by Public Distribution System (PDS). PDS was created during the World War II. Until the 1960s the food grains were imported and thus PDS was dependent on this import. The food shortage in 1960s resulted in the expansion of distribution of food, thus Agriculture Price Commission and Food Corporation of India was set up by government. After Green Revolution in 1970s and 1980s, PDS was supported and its extension to the locations of high poverty. PDS moderated the food prices of food of urban poor.

In 1970's, the universal distribution food system was evolved and later (1990s) government put the stress for improving access of food grains to the poor who live in inaccessible locations.

In 1997, TPDS (Targeted Public Distribution System) was established in India, whose purpose was to provide fuel and subsidised food (rice, wheat) to the poor ones. These

commodities were given out in the special ration shops. Under the TDP scheme, the grains are procured by farmers, then divided into states and then delivered to the local ration shops, where the poor can buy the subsidised food.

National Food Security Act

This act was enacted in September 2013 with the aim to provide the justiciable right to food and its access in nutritional security, adequate quantity and quality of food at affordable prices for those who need that. The Act ensure the functioning of existing TPDS, it means the delivery of food to poor. The NFSA ensure that

PDS has been forming from the 1930s. The main reforms and important interventions into regulations of PDS, could be seen in the chronological way in the Table 1.

Evolution of PDS	Timeline	Details
PDS	1940s	Launched as general entitlement scheme
TPDS	1997	PDS was revamped to target poor households
Antyodaya Anna Yojana	2000	Scheme launched to target the 'poorest of the poor'
PDS Control Order	2001	Government notified this Order to administer TPDS
PUCL vs. Union of India	2001	Ongoing case in Supreme Court contending that "right to food" is a fundamental right
National Food Security Act	2013	Act to provide legal right to food to the poor

Table 1: Chronological evolution of PDS. Own work based on:

<http://www.prsindia.org/administrator/uploads/general/1388728622~~TPDS%20Thematic%20Note.pdf>

Categorisation of beneficiaries

As was mentioned, in relation to TPDS, the government divides the beneficiaries into three main groups, which are:

- 1.) (BPL) Households Below the Poverty Line and
- 2.) (APL) Households Above the Poverty Line or APL and
- 3.) (AAY) The Anyodaya Anna Yojana scheme.

The first group, BPL group, were established simultaneously with the launching of TPDS and the total number of BPL groups were calculated in the detailed process by Planning Commission. In terms of identification of BPLs was on side of each state government and with the criteria given by The Ministry of Rural Development. The BPL identification was made on inclusion and exclusion basis. After this process the households received the BPL ration card. On the other hand, APL groups were not included under identification process and thus APL ration card could be applied by any household Above the Poverty Line.

In December 2000, next group of beneficiaries under the TDPS was added: The Anyodaya Anna Yojana (AAY) scheme. This class were aimed to the poorest of the BPLs. Government of India, Ministry of Consumer Affairs, Food & Public Distribution divides AAY beneficiaries according to following criterias (Department of Food & Public Distribution)

- *“Landless agriculture labourers, marginal farmers, rural artisans/craftsmen such as potters, tanners, weavers, blacksmiths, carpenters, slum dwellers, and persons earning their livelihood on daily basis in the informal sector like porters, coolies, rickshaw pullers, hand cart pullers, fruit and flower sellers, snake charmers, rag pickers, cobblers, destitute and other similar categories in both rural and urban areas.*
- *Households headed by widows or terminally ill persons/disabled persons/persons aged 60 years or more with no assured means of subsistence or societal support.*
- *Widows or terminally ill persons or disabled persons or persons aged 60 years or more or single women or single men with no family or societal support or assured means of subsistence.*
- *All primitive tribal households.*
- *All eligible Below Poverty Line (BPL) families of HIV positive persons.”*

Beneficiaries and their rights for subsidised food

The beneficiaries are provided commodities such as rice, wheat, kerosene, sugar.

The Table 2 indicates the entitlements across categories.

Number of beneficiaries and entitlements		
Category	Number of beneficiaries (in 10 millions families)	Entitlement of food grains (kg/family)
AAV	2,43	35 kg
BPL	4,09	35 kg
APL	11,52	15 - 35 kg
Total	18,04	-

Table 2: Entitlements of beneficiaries to food grains

Own work based on: Lok Sabha, Ministry of Consumer Affairs, Food and Public Distribution, Answered on February 26, 2013 Ministry of Consumer Affairs, Food & Public Distribution

The process of delivering

The identification of beneficiaries is responsibility of a state and central governments. The central government gain food grains from farmers at MSP (Minimum Support Price). Next, the central governments sell the grains to states at CIP (Central Issue Price). The delivering into each state godowns is on the side of the central governments as soon as the godowns receive it, the transportation from there to the ration shops (Fair Price Shops) is the responsibility of states. The beneficiaries could buy the subsidised food in ration shops or Fair Price Shops (FPS) at lower Central Issue Price. Nevertheless, sometimes before selling it to the beneficiaries, the states even more subsidise the price of food grain.

The transportation of the food is the issue of state governments through FCI (The Food Corporation of India). It is an agency whose aim is to allocate the food grains into the godowns of the states. It has these responsibilities:

- To buy the food grains from farmers (at Minimum Support Price),
- to ensure food security through maintaining operational and buffer stocks ,
- distribution of commodities among the states,
- sale of the grains to states (at the Central Issue Price).

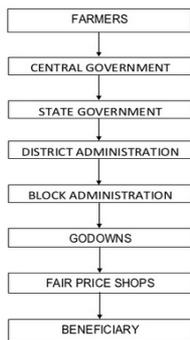


Figure 4: TPDS Delivery scheme

SOURCE: <http://www.civilserviceindia.com/subject/General-Studies/notes/public-distribution-system-functioning-limitations-revamping.html>

2.1. Household Food Insecurity in Mumbai slum area

With the relations to the food security and prevailing of its four main pillars (described in the first part of this papers) people, who were taking part in the project of BUILD, were answering with the following manners. Participants were mostly inhabitants of „*chawls*“ in urban slum area of Mumbai. A *chawl* is a name for a type of building found in India. They are often 4 to 5 floors with about 10 to 20 tenements, known as “*kholis*”, means 'rooms' on each floor. In Mumbai, chawls were constructed in abundance in the early 1900s to house the people migrating to Mumbai because of its booming cotton mills and overall strong economy. Chawls are organized into „*bastis*“ (also called „*nagars*“). The survey were made among 294 participants. Broader description of the participants of the BUILD surveys is: 4% male and 96% were female, 6% were unmarried and 13% were widowed. 6.22 year of education was the mean of education among respondents. 28% were housewives and 29% part-time workers, 5.08 persons per family were the mean number.

- **Worries over food**

„193 of 294 households were worried at some point in the year (2009) that their household would not have enough food.“ (Situational Analysis of Food Insecurity in Mumbai Slums-IUFN)

- **Food Quality**

192 of 294 households said they eat the same foods every day with no change. The reason was they could not afford others. And 60% ate undesirable or non-preferred foods.

- **Food Quantity**

165 of 294 households report the food they had did not last, but they could not afford buy other. And one in two households (152 of 294) said that an adult in the household reduced the size of the meals due to the fact they could not afford more food.

Food Expenses

Food Expenses correlates with household income. In fact, expense on food is one of the greatest expenses in poor households and any rise in income generally leads to a higher food expense. In the relation to the BUILD study, monthly food expense could be used as a proxy measure for poverty. According to the BUILD study, food expenses means 52% of the income of household per month that is counted from that:

- *Rs. 5587 (EUR 90); that is the mean monthly household income and the mean personal income per month was Rs. 995.*
- *The mean of the total monthly food expense of the households was analysed as Rs 2912 (EUR 47).*
- *Rs 590.51 (EUR 9.5) that is the average food expense per person monthly*
- *Rs 19.68/day (EUR 0.3/day) that is expense on food per person per day*
- *Rs 18.74 that is the median per day food expense per person.*

From the data above, follows that the most of urban poor households spend EUR 0.19 or US \$ 0.25 for food every day. It is much less than the \$1 or \$1.25 (amount given by international institutions).

In the Annex 5 we could see the monthly food budget in terms of cereals (including grains and bread) and others. What is important to mention is that the high expense on vegetables is mainly result of high price of vegetables. Almost 2 in 5 households earned less than Rs 4000 which is inadequate income for the minimum caloric requirement per day.

Food per day

In the Annex 6 we can see daily food of households. According to the survey, the first food in a day is usually breakfast but as breakfast is in most of the cases meant Indian tea „Chai“ which contains sugar and milk or milk powder (just in some cases with biscuits or chapatti-

Indian bread). Thus, consuming Indian tea do not supply nutrients and just falsely rises the diversity of the nutritional score. On the other hand, most children do not eat breakfast. Most of the households in the survey areas have 3 meals per day.

Majority of households (291 of 294) ate cereals or grains (including: *rice, wheat, chapati (bread), bajra (millet)*).

Oil is also a basic ingredience in majority of Indian meals and the only source of protein are usually pulses. Leafy vegetable is consumed the most because it it the cheapest type of vegetable in Mumbai. From the report is seen that around 35% of the households consume vegetable. Thus families are vegetarian, the consumption of animal protein is very small. Moreover they can not afford it.

In terms of twenty poorest families from the participants -with the monthly household income of Rs. 4500 or less (EUR 72)- all of them said, they do not have breakfast because of time pressure. Lunch means daal rice or chapatti and an sometimes vegetable (the vegetable depends on the prices). Majority of the children do not usually eat in the time between lunch and dinner. Moreover, the parents only drink tea in the evening. Then dinner is similar to lunch. Among fruits belong only apple (because of cheap price) and banana (in the most lowest income families very rarely). They are not starving but the quality of food has gone down. Some mothers reported that they get on with whatever is available such as onion and chapatti at times.

National Sample Survey Organisation (NSSO 2007) reported the nutrition intake in the Indian's states. The devision is seen in the Annex 7. The findings are very close to the findings from the BUILD project analysis.

The NSSO reports, that In India the total consumption contents from a major part a food grains that was in 2004-2005 cereal and pulses products accounted around 62.76% of total calorie and 67.2% of total protein products. From the Annex 7 is seen that the average caloric intake has a declining tendency. The whole Indian consumption per day declined from 2020Kcal (in 1993-1994) to 2071Kcal (in 2004-2005). In Maharashtra, where Mumbai is the capital, the decline was even rapid: from 1989Kcal in 1993-1994 to 1847Kcal in 2004-2005. This decline is notable in the lowest 30% expenditure classes in Maharashtra (from 1570Kcal in 1993-1994 to 1535Kcal in 2004-2005). According to Patnaik: *„directly measured by counting the persons unable to access the official nutrition norm of 2100 calories through their total monthly spending on all goods and services, urban poverty declined slightly between 1983 and 1993-94, but has risen substantially between 1993-94 and 2004-05 while poverty depth has*

increased. This is particularly evident in the states with the conurbations – Delhi, Mumbai, Chennai and Kolkata – while states with smaller urban centres have fared better“ (Patnaik 2009). Patnaik shows in his analysis that the number of people who cannot afford daily intake of 2100Kcal increased from 52.5% in 1993-1994 to 85% in 2004-2005 in Maharashtra state. According to MSSRF and WFP 2010 1,890Kcal per day is the norm of daily intake but, in Maharashtra state, which including Mumbai, around 24% of inhabitants had less than this norm. The food situation in this state deteriorated from 1998 to 2006. In terms of Mumbai city, 45% of women suffer from anemia, stunted children percentage is around 46%, 36% are underweighted (Gupta et al. 2009).

In relation to the money required for reaching the daily minimum caloric requirement, in local shop, the necessary amount of money is between Rs. 25 and Rs. 30. Additionally, it means Rs 720/- to Rs 900 per capita monthly. But the average per capita monthly expense on food in the participating households is Rs 590.51 (USD12) and it follows that there is a shortfall of Rs 300/- if one considers the upper boundary of Rs 900 – as the amount required for a healthy diet per capita per month. In other words, poor households gain just 2/3rds of the required amount.

2.2. Poverty and food insecurity

Costs of food per day/per person

According to WHO: “person of healthy body weight consuming approximately 2000 calories per day.” Considering person living in the urban slums would have to spend between Rs 25 (EUR 0.40) to Rs 30 (EUR 0.48). The monthly food expense data of BUILD discovered that half of the households in the project are spending less than Rs 18 and researchers of the BUILD project could not buy the required calories with that amount. With Rs 20 it was possible to have 3 meals, however they do not meet the calorie requirement. The result of this bad consumption could be impacts on the physiology and the physical part of the body. The possibility to achieve excessive calories thanks to cheap carbohydrates is possible source of chronic diseases. The Annex 8 shows what could one person buy with the amount of Rs 25 per day.

“Although the recent urban growth was much higher than in the past, not only was this associated with increased urban inequality but also many urban areas failed to offer either linkage to their rural hinterlands or escape for the rural poor. This suggests that urban poverty is a phenomenon in itself, rather than a mere overflow of rural poverty” (Awasthi et al. 2009). Child, infant and neonatal survival among the urban poor was similar to those of the rural population. In many States, undernutrition among urban poor children was worse than in rural areas (Agarwal and Sangar 2005). The aspect influencing the affordability of food is the food price inflation across India, which happened in 2009. The base of this situation was on WPI (Wholesale Price Index) in terms of food products. In December 2009 reached 20% level (Government of India 2010; Times News Network 2009). Thus (in comparison with 2008) the consumers had to spend 20% more in the section of food and this resulted in the beneficiaries taking part in the surveys in these thesis. With the relation to results of the used research, the increase of the food prices has a significant impact on food security and the households, especially when the mentioned households have a stable income. The quantity of food needed to be cut down as well as the quality got worse. Another similar researches took place in Bangladesh where was discovered that 55.3% of households reported that they consumed food of lower quality and 36.3% were worried about the food in the next days (Coates et al.2006).

Financial situation of people living in slums in Mumbai

Financial situations of urban slum households are according to participants that every member of a households had to work. Moreover they had to take periodic loans (most often from friends because of no interest rates). Everyday expenses like food, rent, children's education, medical expenses was the main use of the household's income, thus participants had more- less nothing to keep as savings or to invest for their future. In the terms of loans, people's perception is that if the loans are not provided by their friends, the participants turn to self-help groups or local loan sharks and jewelers' shops for loans. There they can pawn their valuable things. However, they collectively felt discomfort about taking loans from the bank because of high-interest rate. But self-help groups (SHGs) were the only saving purposes which helped them to manage a saving a small amount of Rs 100 (EUR 1.5+/-) every month.

Another finding of the result could be the awareness of the fact that when the income of family is limited, the first worries of the household are the question *where to get next food*. Next step is the substitution of the quality of food for the worse and final possibility is the reduction of the consumed quantity by adults (Radimer et al. 1990).

The next which could be mention and plays definitely an important role in the surveys too, is the fact that uncertainty of food is daily task in the mind of the slum dwellers. It is something common in everyday lives of the urban poor. When we consider India in the cultural way, the idea of *destiny or fate* takes a part in the issue of food security. Indians could be influenced by the determination of their cultural and social conditions. They could prefer to *leave things to fate* or *everything is predetermined* could lead them they do not need to or even cannot control their lives in terms of daily food too. And thus the striving for food could be understood as a norm because of occurrence of food shortage is everyday issue.

The findings from the used surveys which was that 52% cut the size of the meals, 32% of households skip the meals could be also understood that the households prefer to eat small portion of food than to not eat at all. In relation with the results majority of respondents said they eat 3 meals per day including: breakfast, lunch, dinner. Nevertheless, tea *Chai* is considered as a meal. The adults, more woman, skip the meal because of shortage of food, moreover in the daily intake is missing sources of proteins and vegetables. The used surveys

pointed out the reality which could lead to the finding that if urban poor people in Mumbai know more about the daily balanced food intake, the problem of insecurity could be decreased.

2.3. Urbanization in Mumbai

According to Census 2011, Mumbai Metropolitan Region's population is 17,700,000 and extends on an area of 4,355 sq.km with the population density of 4,000 people per sq.km. Mumbai city and Mumbai suburban district are part of the Great Mumbai which is the core city. Further parts are Thane and Raigad districts. The core area of Mumbai Metropolitan Region (MMR) has half of the population of the MMR but on 10% of the total geographical space. In the Table 3 it is seen that in 1991 the population changed from 67% to 53% in 2011, at the same time Inner and Outer Mumbai gained more people. Between 2001-2011 population grew in the MMR at the 1.72% per year. There was a sharp decrease of population in the Core Mumbai between 2001-2011 than in 1991-2001. This was caused due to changes in industrial sectors and resulted in migration into the other parts of Mumbai. Due to this decline in manufacturing sectors. Inhabitants in Central Mumbai work in the service such as social and personal services, IT, transport, communications and this process developed unorganized job sector. Sundraram noted that by the end of 1990 this unorganized area were two-thirds of all job positions in Mumbai (Sundraram, 2008). The rising unorganized employment was not able to create growth in total employment according to Shaban (Shaban, 2010). The Office of the Registrar and Census Commissioner of India 2011 reports that around 377 millions of population live in urban areas and the urbanization in India increased between 2001 (27,81%) to 2011 (31,16%), although in rural areas decreased from 72,19% to 68,84%. However it was supposed, the number of urban population will be raising to more than 550 million by 2030 (Gupta et al. 2009). 25% of country's population (93 millions) lives with lack of drinking water, inadequate sanitary and hygienic conditions, so with limited access to public services and 79 million of Indians (one fifth) lived in extreme poverty (Press Information Bureau 2010 and Ministry of Housing and Urban Poverty Alleviation 2010). With the relation to access to public services, population show worries (Agarwal and Taneja). With the actual migration to the cities, the question of food security is playing an important role in the lives of slum dwellers and urban poor therefore it is necessary to make a steps to ensure the food security there.

Migration is related to the creation of slums in Mumbai. There are around 2000 slum places in Mumbai which was created between commercial resorts and upper class localities (Sharma, 2010). Thus the neighborhoods coexist next to each other, which is the contrast from European cities. According to Census 2001 slum population in Central Mumbai were 54% of population and in 2011 it was 52.2%. Mumbai slums are concentrated in the western and eastern part at the railways. Until 1980s, Bombay Improvement Trust and factory owners provided housing to the migrant workers, then the decline of the formal sector forced migrants to find their own shelters. They are cheap labourers for the city with low incomes, thus cannot afford appropriate housing. Municipal Corporation of Greater Mumbai reported the monthly average per capita income was RS 5000. Formal flat of 600sq. feet with this income (less than USD150) is impossible to find because of the price USD30.000 in suburban area in Mumbai (Sharma 2007). The price of housing is now even higher (around USD100.000). Therefore most of the population lives in slums. This problem of space for living is the main reason for the shift of population to peripheral Outer Mumbai in the MMR. Anyways the central city is still overpopulated (The Times of India 2013; Sharma 2007).

For the solution of the slum areas in Mumbai there were some tries such as slum redevelopment program in 1990s which aim was providing free housing for those, who could prove they were slum residence before January 1995. Although, this program were monitoring by the Slum Regulatory Authority, most of the slum dwellers were continuing living in slums in 2011. But increase cost of living, corruption, quality of housing and loss of livelihood, the redevelopments programs has been still failing. Moreover the programs are refused by slum inhabitants (Gandhi 2007; Bhowmik 2011)

Size of Population Increase in Mumbai Metropolitan Region, 1991 to 2011								
MMR/components	Core		Inner Zone		Outer Zone Urban		MMR (Urban)	
	1991-2001	2001-2011	1991-2001	2001-2011	1991-2001	2001-2011	1991-2001	2001-2011
Population increase (in millions)	2,05	0,5	1,72	1,55	1,17	1,43	4,94	3,48
Natural increase (in millions)	1,24	0,85	0,45	0,44	0,17	0,22	1,86	1,51
Net migrations (in millions)	0,81	-0,35	1,27	1,11	1	1,21	3,08	1,97
% contribution of migration	39,5	-70	73,8	71,6	85,4	84,6	62,3	56,6

Table 3: Size of Population according to Mumbai districts. Own work based on: Asia Research Institute, Working Paper Series No.201

Greater Mumbai reached 16.4 million population In 2001. Geographically, the expansion were from the sea side and eastward into mainland. Mumbai faces to land-space problem as result of industrialization and urbanization. Thanks to high land price it is insufficient to move to the urban area for the unwealthy citizens. On the other hand, rich people have been purchasing land there for recreation such as hotel resorts or farm houses along to highway from Panvell. The next change is in the industrialization at the beginning of the 20th century with dominating textile industry which developed in Central Mumbai. According to Whitehead, textile industry employing around 250.000 workers until 1980s, although then the population moved to the periphery as result of declining manufacturing sector in central Mumbai. This is seen in the table The villagers who used to work in the traditional sectors as fishing and farming areas during the 1970s, are now working in the secondary and tertiary sectors which is now prevailing in the region. The map of the city and its district, its settlement and slums localities are available in the Annex 9.

Mumbai as a type of Linear City

Mumbai's east periphery has been increasing in population numbers and during census 1991-2001 the growth rate was 63% on the contrary to the core area. It was the result of development projects of the City and Industrial Development Corporation of Maharashtra (CIDCO) in the east and due to added peripheral parts such as Thane into the Greater Mumbai urban agglomeration area. Next impact of this inclusion were pressure on open spaces and environment, conversion of agriculture areas.

As World Bank also reported, Mumbai is a city wich has characteristics of Linear city (WB, India Urban Resettlement, 2012). At south, east and west side Mumbai is surrounded by the sea, thus the available area for development is constrained. Housing is expensive in the core and it results in development of slums through this city. Due to increasing population, middle class population moved to Navi Mumbai for job opportunities in areas of engineering, clerks, mechanics, are found in the parts Thane and Taloja (in Navi Mumbai). The result of increasing urbanisation itself in the sense of increase number of population living in urban places leads to the claim that poverty is getting „urbanised“. However, it also leads to urban inequality, although as per capita incomes in cities rise, the deteriorating distribution of income and wealth increase the urban poor and possibly their share in urban population. The rate of reduction in poverty has slowed down 1991, when the economic reforms were set. „*The rapid growth of the*

urban population and the low investment in urban development has created serious shelter problems and deficiencies in basic amenities in the towns and cities of the country“ (Kundu 2009).

2.4 Public Distribution System (PDS) in Mumbai

As was written, the efforts of India governments and central government in Mumbai is to improve the food insecurity in Mumbai through PDS scheme. The focus group of participants in this survey were the beneficiaries chosen by BUILD social workers. The question were on their thoughts about PDS and their perception.

For PDS system is necessary both central and state governments. That means, both these parties are responsible for work under this scheme. The Food Corporation of India (central government) ensure food grains into districts and villages in each state (in case of Mumbai, the FCI godown is located at Borivali). Food grains are also tested for nutrition and safety at the FCI and the they are devided into state governments according to disctricts. After that the food grains must pass through state officials. The final step is upon these wholesalers: they distribute food grains to various ration shops in the city.

Corruption is in the sphere of the ration shops (FPS) and also among politicians and it leads to the ineffectiveness of PDS. There is lack of monitoring mechanism and the lack of transparency in the system which make monitoring almost impossible.

According to the ration card holders the system is frustrating: *„Most respondents complained about the substandard quality of rice distributed through the ration shops; 54% rated the products as poor, while 24% rated them as average or fair. Nearly 57% said that products were always unavailable at rations shops and 51% rated the quality of service as poor and 60% were not satisfied at all with the service or unsure. Not a single household gave the quality of ration food items an ‘Excellent’ rating. About 172 households (59%) reported their last visit to the ration shop as being completely unsatisfactory.“* (Situational Analysis of Food Insecurity in Mumbai Slums-IUFN). Asked households were not contented (in the relation with PDS) with poor quality the available food in ration shops, permanent lack of food supplied grains and lack of services.

The main aim of these schemes is combating with hunger of the poorest and most needful groups, however they can only buy their ration for little repayment on the amount of money which they momentarily have with them. Cases when the FPS owners do not allow the beneficiaries to do so and beneficiaries need to buy the food for full price or simply have to buy the food for owners conditions. Moreover, lots of FPS owners do not care about the rule for the beneficiaries and so the poor cannot buy *their quota in the following month, if they can not afford to purchase in the same month*. The owners claim the quota increased and the despite the fact of beneficiaries' rights they are denied the grains. Thus the FPS owner complicate the right of poor to buy their full quota of grains, leaving a lot of food, that is subsequently sold in the open market.

These reasons should lead to the concentration of attention and improving these scheme for its right aim. Considering these findings of the reports, Indian's THE FOOD SAFETY AND STANDARDS ACT, 2006 and its article in the chapter 1.4. *Theory of food distribution*, and business operators in Mumbai make have some difficulties with following the Food Safety and Standards Act. As it is posted, food business food operators cannot sell *unsafe* or even *sub-standard* food. In the case of the report survey, it is obvious that this Act was broken.

Leakage of food grains during transportation of food grains

Planning Commission found 36% leakages of food grains (rice and wheat) in India during the process of transportation of food grains to the fair price shops. The leakages of individual food grains across the India's states is available in the Tables 4 and 5. In terms of Mumbai, it is a capital of the state Maharashtra.

Leakage of food grains across states	
Low Leakage (less than 25%)	Andhra Pradesh, Kerala, Orissa, Tamil Nadu, West Bengal
High Leakage (25% - 50%)	Assam, Gujarat, Himachal Pradesh, Kamataka, Maharashtra , Rajasthan
Very High Leakage (50% - 75%)	Haryana, Madhya Pradesh, Uttar Pradesh
Abnormal Leakage (more than 75%)	Bihar, Punjab

Table 4: Leakages of food grains across states. Source: Own work based on: *Performance Evaluation of Targeted Public Distribution System, Planning Commission, 2005*

Leakage of food grains at the FPS	
Very Low Leakage (less than 10%)	Assam, Himachal Pradesh, Madhya Pradesh, Odisha, Tamil Nadu, West Bengal
Moderate Leakage (10% - 25%)	Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra
High Leakage (25% - 50%)	Madhya Pradesh, Uttar Pradesh
Very High Leakage (more than 50%)	Bihar, Punjab, Haryana

Table 5: Leakages of food grains at Fair Price Shops. Source: Own work based on: Performance Evaluation of Targeted Public Distribution System, Planning Commission, 2005

Commission for Agricultural Costs and Prices found significant leakages of food grains in the years 2004-2005 and 2009-2010. 47.6 million tonnes were allocated among the states but 42.4 million tonnes ended in the states in 2009-2010 and just 25.3 million tonnes were finally consumed, it means that 40.4% of leakages from TPDS network. (CACP,2012)

This findings could means that although, PDS scheme of India is the largest in the world, it has its failures in terms of corruptions and leakages or mistakes made during the identification of beneficiaries.

PART 3: RECOMMENDATIONS

Recommendations

With the findings in the analytical part of this thesis, I would find that the solution for improving a food security in Mumbai, is in the hands of Indian government. The PDS system is very complex issue for the understanding and in my opinion, especially for slum dwellers. They should be more informed about the system to not being deceived by from the side of those who wants to profit from this governmental programme. The slum dwellers get in touch just with the owners of Fair Price Shops, who are according to the researches sometimes corrupted. That is first problem. The next issue is the shortage of food and quality of this subsidized food provided in the Fair Price Shops. Then, the content of this food, which is mostly just rice and wheat. The next issue which needs to be addressed, is the knowledges about the nutritious and source of protein from the side of beneficiares. However, Indian are mostly vegetarian due to their culture. From my point of view, they should know more about the meal which they consumed. As was discovered, vast majority of the slum urban poor have Chai for breakfast with the consideration of that it is nutritious meal. It is a source of “fast sugars” but for sure cannot be understood as a meal.

Moreover, with these result I would recommend the state government should ensure more kinds of subsidized food grains than only wheat and rice, which both belong to the same category of cereals. They are both source of starch and fibre (as is depicted in the Annex 3). Thus my suggestions for ensure improvement of food security of poor people, is to include another type food subsidy available for the beneficiares. The source of proteins is obviously important for those people. It can be in the form of pulses such as beans, peas, and lentils, which is very known ingredience of the Indian meal *Daal*.

Next suggestions could be the implementation of sources of nutritions of each food grains in the paper form in every Fair Price Shop. This *nutrition list* could be described on the door of these shops. The description of adequate layout of vitamins, minerals and sources for the human body could be added with this *nutrition list*. From my point of view, it may be enriching for the poor households. Nevertheless, the need of monitoring of the Fair Price Shop is crucial. In case of Mumbai slum area, according to BUILD analysis, the main complains were, that the food grains are gone from the shops and if not, in terrible quality. This need to be improve and thus monitoring and penalty for unsafe food sale take its place here. This condition which is also stated in the National Food Security Bill, needs get more attention from the side of governments. Although, there are several administrative authorities in Mumbai and each one have the responsibility of preparing a development plan, the plan needs

to be effectively allocated more strictly, densely and empowered by Metropolitan Planning Committee. Furthermore, in India, urban development is a subject of state government, thus the power for change is the state's matter. The possible suggestion for the government could be the training of volunteers who would provide the nutrition information about the food and health.

In terms of shortage of the food grains in the FPS, the monitoring of the owners is necessary too. For this reason could be valid, that the state government in cooperation with municipalities define the exact FPS where the family could buy the subsidized food with the ration price. This solution would be organized and would be seen how much and who buys the grains. But this option needs to be really well specified and monitored with reliable technology: the individual state governments would determine the required allocation under PDS for their state. Then, the allocation per household in PDS should be divided according to the number of consumption units in the household into the specific FPS, according to the residence of the beneficiaries. In order to improve viability of Fair Price Shops, and (at the same time) support the purchasing power of the incomes of the poor, commodities such as edible oil, cloth and more daily used needs could be sold in these shops. FPS could be enhanced through the provision of appropriate margins or subsidies.

Community food security systems could be improved in the way that the production of nutritious millets and other local foodgrains receive more support. For its sustainability, initiatives should work closely with elected local bodies. Additionally, the food delivery system should involve appropriate supplementation programmes to ensure that all stages of the lifecycle are addressed.

Summarize the suggestions, the city planners should create a reliable plan which improve conditions in the sphere of supplied food for the poor, employment, health, education to shelter poor living in slums and support their social and economic security. The suggested realization could be provided due to ensure the cross country know-how technologies to improve production. Then making the PDS system more effective in terms of enhancing community involvement for planning to service delivery, its controlling and strengthening public partnership.

In the relation to the financial situations, the findings of the analysis show that urban poor naturally prefer friend-loans than banks-loans and this lead to me to the meaning, that the politicians should support and prefer using ShG (Self-help groups) scheme financed by the

these poor people who are taking part of the ShG rather than charity. Although, ShG are informal groups of people, they share the same socio-economic lifestyle and share the same purposes. People could come together and save there amount which they want to save without relation on their income. They agree to share a common fund and lending amount of money to ShG's members if they need that.

Conclusion

The aim of the analytical part of this work is to point out food insecurity among urban slums in Mumbai according to the surveys. This work shows that rapid urbanization results in increasing slum dwellers across Mumbai and impacts the conditions of living and food security of these urban poor. The used study shows that food insecurity is taking its place in more than 50% of asked poor households living in slum in Mumbai were worried about: the food intake (66%), the quality of the food (65% eat same food every day), the quantity of the food (52% cut the size of meals, 60% ate undesirable food, 32% skip the meals, 23% did not eat whole day). As we could see in the Annex 4. Very similar results were found out in another study (Nilesh Chatterjee et al.) where 59.7% of households had experiences with food insecurity in Mumbai's slum. The next similar finding are that: 51.9% of adults of the households were constrained to cut the size of meals and because of the lack of money 23.3% of adults of the households did not eat whole day. Therefore these results should have lead to the action. The enhancing of the shortfalls and hunger among the urban poor should be made from the side of government in the form of supporting nutrition programs.

With the comparison of these results with another reports, in New Delhi, 14.7% of households claimed that were in the situation when one of the family were hungry because of lack of food, 51% of asked households reported that the food they had bought did not last and 65.8% of households could not eat the nutritional valuable food because of lack of money (Agarwal et al. 2009).

As summarization of this thesis I noted the factors which have impacts on food security in Mumbai slum area. The factors follow the findings from the analytical part.

Factors identifying food insecurity

From the cases in the analytical part of these thesis I summarize factors which are associated to food security among the poor households from the used surveys. The factors are:

- Affordability of food
- Availability of food
- Income level
- Expenditure on food
- Debt burden

Household size

Employment (Un/under employment)

The observed perception of inhabitants living in urban poor area in Mumbai over the food insecurity is that in the year 2009, more than 50% of asked households reported inadequate foods in the house for one or more months. The next discovering according to the BUILD Situational Analysis of Food Insecurity in Urban Slums of Mumbai is that *two out of three households ate the same foods daily because they could not afford another food*. And because of lack of money, 52% adult cut the size of their meals. Moreover, in 56% of households the food they bought did not last but they could not afford another because of their financial situation.

In the terms of daily food intake, it lacks nutritional values thus a persistent lack of dietary diversity is the actual issue. It means that it is not enough to satisfy the caloric requirements. It is important to note that this not means an acute famine or starvation situation, however „*chronic food insecurity*“ which could be the cause of malnutrition, under-nutrition or other acute and chronic diseases connected with the high stress and weak immunity as well as the body is not getting enough rest, enough food and is overworked.

From the analysis, it is obvious that the food is available, however, poor families cannot afford this food because of high price. This basically means that the access to food is more critical than its availability. What is bordering availability from moving it to real access is affordability. Therefore, the problem is economic, that means lack of money, in other words: income to buy the available food. As was written, food is available, however, the price of the food is too high for the poor ones.

References

Adhikari, S.K., & Bredenkamp, C. (2009). Moving towards an outcomes-oriented approach to nutrition program monitoring: the India ICDS program. Health, Nutrition, and Population (HNP) discussion paper. W. Bank. Washington, D.C., The International Bank for Reconstruction and Development, The World Bank: 116.

Agarwal, Arti Bhanot and Kirti Sangar. 2005. "Neonatal Care and Transport among the Urban Poor: Challenges and Options". *Journal of Neonatology* 19 (4): 347-52.

Anderson, S. A. (Ed.) (1990). Core indicators of nutritional status for difficult-to-sample populations. *Journal of Nutrition*

Asia Research Institute. „Working Paper Series No. 201, Population change and Migration in Mumbai Metropolitan Region: Implication for Planning and Governance“. Ram B. Bhagat, Gavin W. Jones

Austin Community College. „Population Growth and Regulation“ from http://www.austincc.edu/akeddy/eeb_sg_u3

Awasthi, Dinesh, S. P. Kashyap and Jignasu Yagnik. 2009. "Changing Sectoral Profile of the Urban Economy and Implications for Urban Poverty". In MoHUPA (ed). India: Urban Poverty Report 2009.

Boeing, G. 2016. "How Our Neighborhoods Lost Food, and How They Can Get It Back." *Progressive Planning*

Bombay-Industrial-League-for-Development-2010-Food-Insecurity-in-Mumbai-Slums, <http://www.buildindia.org/FINAL%20REPORT.pdf>

Boundless. "Exponential Population Growth." *Boundless Biology*. Boundless, 08 Jan. 2016. Retrieved 16 May. 2016 from <https://www.boundless.com/biology/textbooks/boundless-biology-textbook/population-and-community-ecology-45/environmental-limits-to-population-growth-251/exponential-population-growth-929-12185/>

City population. "Mumbai" from <http://www.citypopulation.de/php/india-maharashtra.php?adm2id=2723>

Coates, Jennifer, Edward A. Frongillo, Beatrice Lorge Rogers, Patrick Webb (2006) *Commonalities in the Experience of Household Food Insecurity across Cultures What Are Measures Missing?*

Cohen, Barney. 2004. "Urban Growth in Developing Countries: A Review of Current Trends and A Caution Regarding Existing Forecasts".

Demographia. "Mumbai Municipality & Suburban Population from 1981"
<http://www.demographia.com/db-mumbai1981.htm#cht>

Department of Food & Public Distribution <http://dfpd.nic.in/public-distribution.htm>

Derek Byerlee, T.S. Jayne, Robert J. Myers "Managing food price risks and instability in a liberalizing market environment: Overview and policy options".

Distribution Press Information Bureau, Government of India, Ministry of Consumer Affairs, Food and Public Distribution. <http://pib.nic.in/newsite/PrintRelease.aspx?relid=116288>

Donal Rutherford. *Malthus and Three Approaches to Solving the Population Problem 2007* (http://www.cairn-int.info/article-E_POPU_702_0253--malthus-and-three-approaches-to-solving.htm)

FAO, Voices Of Hungry. <http://www.fao.org/in-action/voices-of-the-hungry/fies/en/>

FAO. „Diet, Nutrition and the Prevention of Chronic Diseases” from
<http://www.fao.org/docrep/005/ac911e/ac911e05.htm#TopOfPage>

FAO. Agriculture food and nutrition for Africa – “A resource book for teachers of agriculture” from
<http://www.fao.org/docrep/w0078e/w0078e08.htm>

FAO. Food Security among Urban Poor.
http://www.fao.org/fsnforum/sites/default/files/files/35_Food_Insecurity_Urban_Poor/SUMMARY_Food_Insecurity_Among_Urban_Poor.pdf

FAO. Rome declaration on world food security, world food summit. Rome: Food and Agriculture Organization; 1996

FAO: <http://www.fao.org/docrep/013/i1686e/i1686e00.pdf>

from http://globalcenters.columbia.edu/mumbai/files/globalcenters_mumbai/Improving_Integration_of_Health_and_Nutrition_Sectors_CGCSA_Working_Paper_2.pdf

Gandhi S.: Housing Mumbai's poor, *Economic and Political Weekly*, September 22

Ghosh and Shah, 2004; UHRC, 2008; Ghosh, J (2004): 'Income Inequality in India', People's Democracy

Gupta K. and R. Prasad. Dispersal of population: A case of Bombay city, *Urban Explosion in Mumbai*.(1996)

Healthy-food-site.com from <http://www.healthy-food-site.com/food-nutritional-value.html>

http://lewishistoricalsociety.com/wiki2011/tiki-read_article.php?articleId=28

<http://www.conserve-energy-future.com/causes-effects-solutions-urbanization.php>

<http://www.hindustantimes.com/india-news/india-hunger-levels-ranked-as-serious-in-2016-global-hunger-index/story-TGSaInBeNJL2cXWO7m4HXI.html>

International Council on Human Rights Policy

http://www.ichrp.org/files/papers/144/121_Riddell.pdf.

J. Anthony Cassils. 2004. „Overpopulation, Sustainable Development, and Security: Developing an Integrated Strategy”.

Karn, S., S. Shikura and H. Harada. 2003. “Living Environment and Health of Urban Poor: A Study in Mumbai”. *Economic and Political Weekly* 38 (26): 3575-86.

Kundu, A. (2006). „Food security system in India: analysing a few conceptual issues in the contemporary policy debate”. In Srivastava, N. and Sharma, P. (eds), *Protecting the Vulnerable Poor in India: The Role of Social Safety Nets*. New Delhi: World Food Programme

Linear Settlement: https://en.wikipedia.org/wiki/Linear_settlement

Meadows D., Randers J., Meadows D., 2004, *Limits to growth – the 30-year update*, Bath Press, Bath, UK

Naandi Foundation: HUNGaMA (Hunger and Malnutrition) report 2011

National Food Security Bill: Challenges and Options, Commission for Agricultural Costs and Prices, Ashok Gulati, Jyoti Gujral and T. Nandakumar, December 2012

Navi Mumbai Municipal Corporation: <https://www.nmmc.gov.in/web/guest/history1>

Neelima Risbud “The case of Mumbai, India” from http://www.ucl.ac.uk/dpu-projects/Global_Report/pdfs/Mumbai.pdf

New Geography „The Evolving urban form: Mumbai“

<http://www.newgeography.com/content/002172-the-evolving-urban-form-mumbai>

Nilesh Chatterjee, Genevieve Fernandes, Mike Hernandez. „*Food insecurity in urban poor households in Mumbai, India*“. The Science, Sociology and Economics of Food Production and Access to Food, Food Sec. (2012) 4:619-632

NSSO (2007). „Perceived adequacy of food consumption in Indian households 2004– 2005 - NSS 61st Round, July 2004–June 2005“. NSS Report No. 512. New Delhi: NSSO, Ministry of Statistics and Programme Implementation, Government of India

Patnaik 2009. Changes in Urban Poverty in the Light of Rural Poverty: Trends under Economic Reforms, 1993-94 to 2004-05. Unpublished document.

PRS Legislative Research

<http://www.prsindia.org/administrator/uploads/general/1388728622~~TPDS%20Thematic%20Note.pdf>

Radimer, K.L., Olson, C.M. & Campbell, C.C. 1990 Development of indicators to assess hunger. Journal of Nutrition

Saxena, N. C. (2009). Call to action: Hunger, under-nutrition, and food security in India. Policy brief series. New Delhi, Centre for Legislative Research and Advocacy (CLRA): 8

Sen, A. K. (1999) Development as Freedom. Oxford: Oxford University Press

Sen, A. K. (1999) Development as Freedom. Oxford: Oxford University Press

Sridhar, C. R. 2006. “Slum Demolition and Urban Cleansing”. *New Age*.

The Indian Express. “Mumbai’s population growth rate is twice that of the state” from <http://indianexpress.com/article/cities/mumbai/mumbais-population-growth-rate-is-twice-that-of-the-state/#sthash.AaoYJem7.dpuf>

The National Food Security Bill 2011.

<http://www.prsindia.org/uploads/media/Food%20Security/National%20Food%20Security%20Bill%202011.pdf>

UN HABITAT 2008. “State of the World’s Cities 2008/2009”.

UNICEF from http://www.unicef.org/albania/Food_Security_ANG.pdf

UNWFP. 2002. "Urban Food Insecurity: Strategies for WFP Food Assistance to Urban Areas". Policy Issues Agenda Item 5. Document presented at Executive Board Annual Session. Rome, 20-23 May.

WB: Indian Urban Settlement

<http://www.worldbank.org/en/news/feature/2012/07/24/india-urban-resettlement>

WFP: *Indian Strategic Plan*

https://www.wfp.org/sites/default/files/Indian%20Country%20Strategic%20Plan_Low%20Resolution.pdf

WFP: Report on food security in urban India

<https://www.wfp.org/sites/default/files/Report%20on%20Food%20Insecurity%20in%20Urban%20India.pdf>

WHO. "Food security" from <http://www.who.int/trade/glossary/story028/en/>

Wikipedia "Population Growth" from https://en.wikipedia.org/wiki/Population_growth

Wikipedia. "Chawl" from <https://en.wikipedia.org/wiki/Chawl>

Wikipedia. "Public Distribution System from

https://en.wikipedia.org/wiki/Public_distribution_system

WPR „Mumbai population“ from <http://worldpopulationreview.com/world-cities/mumbai-population/>

List of Figures

Figure 1: Four Pillars of Food Security.

Source: <https://infoagr.am/The-four-Pillars-of-food-security->

Figure 2: Hoyt's Sector City Model

Source: <http://keywordsuggest.org/gallery/755695.html>

Figure 3: Linear Model of a city.

Source: <https://vegasofiaimd2013.files.wordpress.com/2013/09/modelo-lineal.jpg>

Figure 4: TPDS Delivery scheme

Source: <http://www.civilserviceindia.com/subject/General-Studies/notes/public-distribution-system-functioning-limitations-revamping.html>

List of Tables

Table 1: Chronological evolution of PDS

Own work based on:

<http://www.prsindia.org/administrator/uploads/general/1388728622~~TPDS%20Thematic%20Note.pdf>

Table 2: Entitlements of beneficiaries to food grains

Own work based on: Lok Sabha, Ministry of Consumer Affairs, Food and Public Distribution, Answered on February 26, 2013

Table 3: Size of Population according to Mumbai districts.

Own work based on: Asia Research Institute, Working Paper Series No.201

Table 4: Leakages of food grains across states.

Source: Own work based on Performance Evaluation of Targeted Public Distribution System, Planning Commission, 2005

Table 5: Leakages of food grains at Fair Price Shops.

Source: Own work based on Performance Evaluation of Targeted Public Distribution System, Planning Commission, 2005

List of Annexes

Annex 1: Global and regional per capita food consumption (kcal per capita per day).

Region	1964 - 1966	1974 - 1976	1984 – 1986	1997 - 1999	2015
World	2358	2435	2655	2803	2940
Developing countries	2054	2152	2450	2681	2850
Near East and North Africa	2290	2591	2953	3006	3090
Sub-Saharan Africa*	2058	2079	2057	2195	2360
Latin America and the Caribbean	2393	2546	2689	2824	2980
East Asia	1957	2105	2559	2921	3060
South Asia	2017	1986	2205	2403	2700
Industrialized countries	2947	3065	3206	3380	3440
Transition countries	3222	3385	3379	2906	3060

* Excludes South Africa.

Source: Own work based on: FAO, *World agriculture: towards 2015/2030. Summary report*. Rome, Food and Agriculture Organization of the United Nations, 2002.

Annex 2: Division of food items.

Food Items	Food Group	Standard Variable Name	Components
<i>Rice, pasta, bread / sorghum, millet, maize, fonio, potato, yam, cassava, white flesh sweet potato, taro and / or other tubers, plantain⁵</i>	Cereals and tubers	Staples	
<i>Beans, cowpeas, peanuts, lentils, nut, soy, pigeonpea and / or other nuts</i>	Pulses	Pulses	Protein
<i>Fresh milk / sour, yogurt, cheese, other dairy products (Exclude margarine/butter or small amounts of milk for tea / coffee)</i>	Milk and Dairy	Dairy	Protein Vitamin A
<i>Beef, goat, poultry, pork, eggs and fish</i>	Meat, fish and eggs	Proteins	
Flesh meat: <i>beef, pork, lamb, goat, rabbit, chicken, duck, other birds, insects</i>		FleshMeat	Protein Hem iron
Liver, kidney, heart and / or other organ meats		OrganMeat	Protein Vitamin A Hem Iron
Fish / Shellfish <i>fish, including canned tuna, escargot, and / or other seafood (fish in large quantities and not as a condiment)</i>		Fish	Protein Hem Iron
Eggs		Eggs	Protein Vitamin A
<i>All vegetables and leaves</i>	Vegetables	Veg	
Orange vegetables (vegetables rich in Vitamin A) <i>carrot, red pepper, pumpkin, orange sweet potatoes⁶</i>		OrangeVeg	Vitamin A
Dark green leafy vegetables <i>spinach, broccoli, amaranth and / or other dark green leaves, cassava leaves</i>		GreenVeg	Vitamin A
<i>All fruits</i>	Fruits	Fruits	
Orange fruits (Fruits rich in Vitamin A) <i>mango, papaya, apricot, peach. (NB: do not include oranges⁷)</i>		OrangeFruit	Vitamin A
<i>Vegetable oil, palm oil, shea butter, ghee, margarine, other fats / oil</i>	Oils and Fats	Fats	
<i>Sugar, honey, jam, cakes, candy, cookies, pastries, cakes and other sweet (sugary drinks)</i>	Sugar	Sugars	
Condiments / Spices <i>tea, coffee / cocoa, salt, garlic, spices, yeast / baking powder, tomato / sauce, meat or fish as a condiment, condiments including small amount of milk / tea coffee.</i>		Condiments	

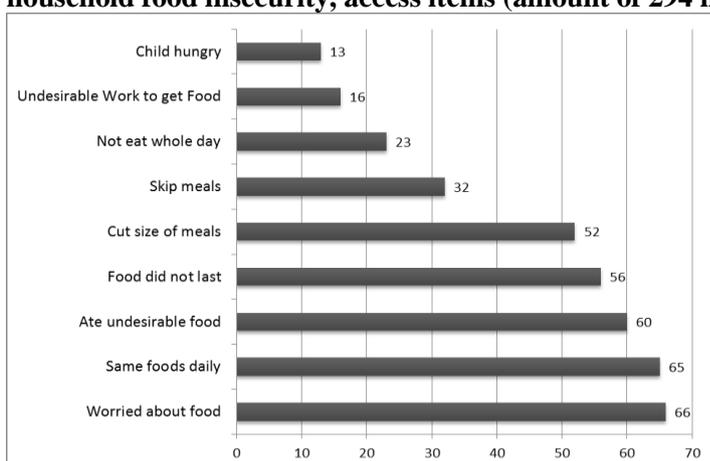
Source: Food Consumption Score Nutritional Quality Analysis Guidelines, August 2015

Annex 3: Classification of food according to content

Food	Rich source of	Moderate source of
Cereals	Starch, fibre	Protein, B vitamins, many minerals
Starchy roots and fruits	Starch, fibre	Some minerals, vitamin C if fresh, vitamin A if yellow or orange
Beans and peas	Protein, starch, some minerals, fibre	B vitamins
Oilseeds	Fat, protein, fibre	B vitamins, some minerals
Fats and oils	Fat	Vitamin A if orange or red
Dark- to medium-green leaves	Vitamins A and C, folate	Protein, minerals
Orange vegetables	Vitamins A and C	Fibre
Orange fruits	Vitamins A and C	Fibre
Citrus fruits	Vitamin C	Fibre
Milk	Fat, protein, calcium, vitamins	
Eggs	Protein, vitamins	Fat, minerals (not iron)
Meat	Protein, iron	
Fish	Protein, iron	
Liver	Protein, iron, vitamins	

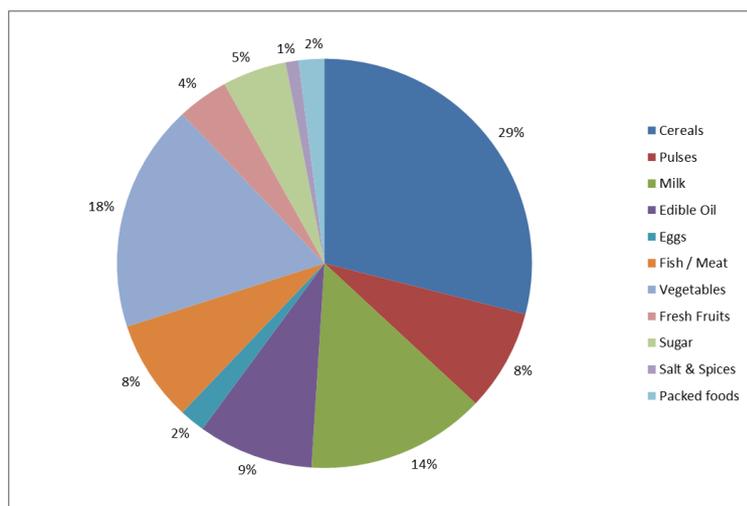
Source: <http://www.fao.org/docrep/w0078e/w0078e08.htm>

Annex 4: Household Food Insecurity and Access: percentage of affirmative responses to specific household food insecurity, access items (amount of 294 households).



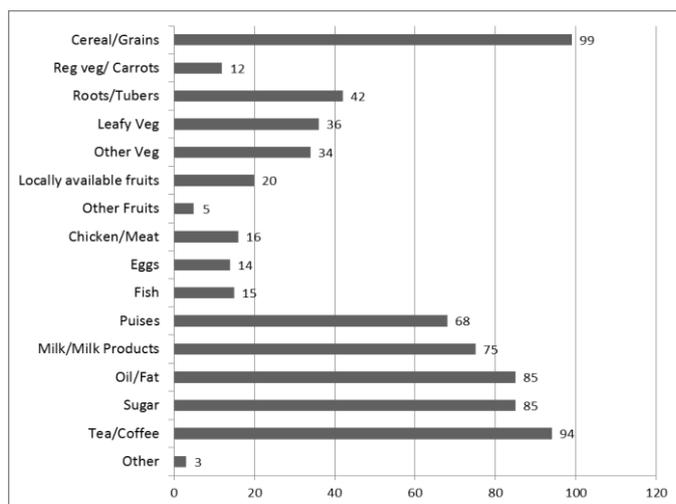
Source: Own work based on: Mumbai - Urban Slums/Food Insecurity- Final report/Mar 2010 data

Annex 5: Monthly food budget



Source: Own work based on Urban Slums/Food Insecurity- Final report/Mar 2010 data

Annex 6: Households diversity of food consumption per day (in percentages). The amount of asked households was 294



Source: Own work based on: Mumbai - Urban Slums/Food Insecurity- Final report/Mar 2010 data

Annex 7: Average consumption per capita per day across Indian Countries.

Sl. No.	States	Average per capita calorie consumption (Kcal/day)							
		Bottom 30% of Expenditure Classes		Middle 40% of Expenditure Classes		Top 30% of Expenditure Classes		All Classes	
		1993-94	2004-05	1993-94	2004-05	1993-94	2004-05	1993-94	2004-05
1	Andhra Pradesh	1603	1618	2025	2003	2497	2461	1992	2000
2	Assam	1674	1744	2031	2055	2519	2578	2108	2413
3	Bihar	1858	1850	2314	2383	2862	3208	2188	2372
4	Gujarat	1501	1537	2038	1942	2517	2393	2027	1991
5	Haryana	1584	1558	2061	1930	2556	2465	2140	2033
6	Karnataka	1566	1583	2043	1904	2518	2352	2026	1944
7	Kerala	1361	1382	1874	1863	2477	2474	1966	1996
8	Madhya Pradesh	1718	1610	2116	2013	2586	2374	2082	2011
9	Maharashtra	1570	1535	1869	1787	2332	2137	1989	1847
10	Orissa	1861	1853	2283	2236	2839	2701	2261	2139
11	Punjab	1522	1633	1931	2013	2450	2535	2089	2150
12	Rajasthan	1741	1707	2195	2128	2588	2740	2184	2116
13	Tamil Nadu	1440	1550	1923	1857	2520	2334	1922	1935
14	Uttar Pradesh	1747	1829	2123	2181	2691	2628	2114	2169
15	West Bengal	1701	1681	2100	1978	2319	2319	2131	2011
	India	1636	1678	2033	1984	2537	2412	2071	2020

Source: Own work based on: NSSO 1996b; NSSO 2007c

Annex 8: Costs of food per day/person with the amount of Rs 25 per day

Sr. No	Food for Rs.25 per person	Quantity	Calories per serving	Cost
1	Milk	500ml	100	12
2	Parle G/Marie (Biscuits / Cookies)	200gm	100	10
3	Sugar/Jaggery	250gm	200	9
4	Peanuts	300gm	300	8
5	Rice	500gm	345	10
6	Bengal gram	300gm	180	8
7	Green leafy vegetables	1 bunch	30	8
8	Amla	4	-	3
9	Oil	100 gm	200	15
10	Sweet Potato	500gm	170	8
11	Jowar	300gm	300	4
12	Daal Masur	300gm	210	15
13	Banana	5	100	10
14	Miscellaneous (onion, spice etc)			5
For 5 persons Total			2235	125

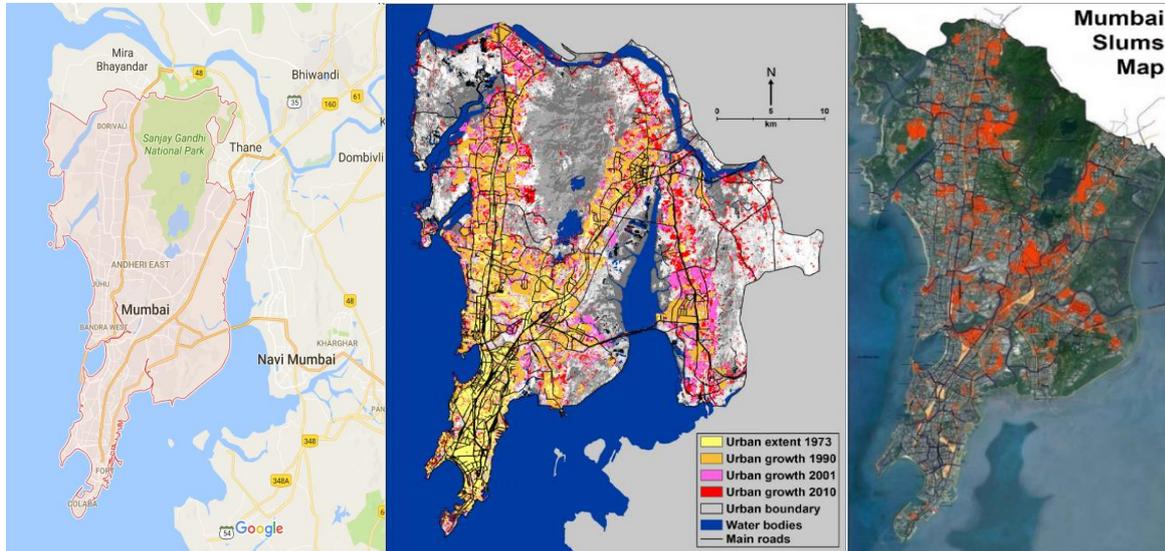
Source: Mumbai - Urban Slums/Food Insecurity- Final report/Mar 2010 data

Annex 9:

1.)Map of Mumbai Metropolitan Area and surroundings Navi Mumbai and Thane district

2.)Urban Growth in Mumbai

3.) Mumbai Slum map



Sources: www.google.cz/maps/place/Bomba and <https://www.researchgate.net/figure/266794316> fig4 Fig-4-
Urban-growth-in-Mumbai-from-1973-to-2010