

# Wellbeing, Green Cities and Aging

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## ABSTRACT

Population aging and urbanization are two global trends together accompanied worldwide by a continuous increase of waste, polluting in air, water, and land. Thus, the necessity to organize and realize age- and environmentally-friendly cities to encourage an active aging, enhancing quality of life of both young and old people. Cities and towns should be designed by green buildings and outdoor spaces and clean transportation, necessary means to facilitate social participation with the inclusion and employment of older people also. These structures result necessary to enhance health and wellness of younger and old citizens, and maintain their better physical, mental, spiritual, emotional and social media views fundamental conditions. Over 15% of the global population, in fact, suffers for mental disorders which together with other diseases have been increased in 2020 from COVID-19 pandemic, highlighting a wide gap between mental health needs and health resources. Unfortunately, the currently pollution represent a further critical factor that contribute to increase premature deaths, thus impacting the citizens' quality of life. Changing the way of production and consumption and reducing the plastic waste is considered the main road to obtain health and wellness with a better life expectancy. Consequently the necessity to change the general mentality transforming the actual linear economy based on taking, making, producing waste and profit in the circular economy of reducing, reusing and recycling goods based on the respect and wellbeing of the workers also. By this New Renaissance it seems possible to live longer obtaining an healthy and better ageing for all the populations worldwide.

**Keywords:** Health; Wellbeing; Friendly-Cities; Environment; Natural Food; Pollution; Aging; Biodiversity; Covid-19

**Abbreviations:** GHG: Greenhouse Gas; WHO: World Health Organization; PP: Polypropylene; PE: polyethylene; PS: Polystyrene

### Introduction

According to the Global Wellness Institute [1] for maintaining the right wellness with an happy longer aging, it is necessary to reduce stress levels, consume natural food and accessing to green environments, thus improving mental and physical health with a better cognitive function and creativity. Unfortunately, over half of the world’s population and three quarters of the European ones lives in urban areas with smog, polluted air and water, having a mounting concern about the effects on natural environments, biodiversity and ecosystem’ service provision [2]. On the other hand cities and metropolitan areas are major contributors to the national economies and play a key role in global markets. Unfortunately, older people are often excluded from the economic cycle and

urbanization, having to change diet and lifestyle, not always in line with the physical and mental wellbeing, particularly in the World’s Global South. Thus over 15% of the global population suffers from mental problems and other disorders which, accelerated in 2020 from the COVID-19 pandemic, have highlighted a wide gap between mental health needs- and resources [2,3]. As a consequence, the necessity to reimagine the cities structures, accelerating the investments in high future healthcare ecosystems and technologies, contemporary increasing the rate of transparency for consumers [4,5]. It has been estimated, in fact, that regarding 9.7 billion people supposed to live worldwide by 2050 (Figure 1), more than 8 billion will have the necessity to be housed in cities with corresponding needs for infrastructures and services [6].

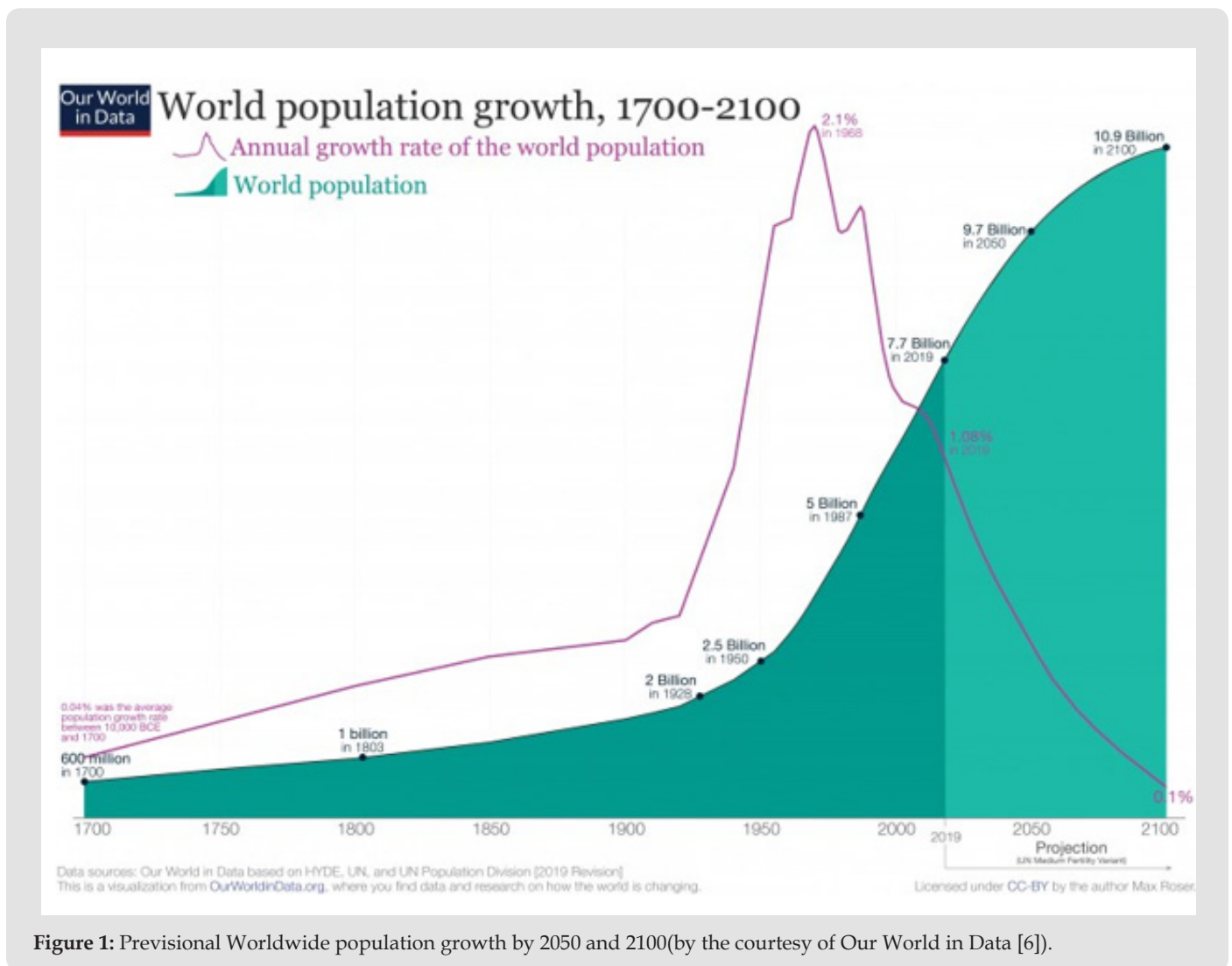


Figure 1: Previsional Worldwide population growth by 2050 and 2100(by the courtesy of Our World in Data [6]).

Moreover, urbanization is posing the public challenge to promote beauty wellbeing as an important priority to be realized by well-structured green areas which, ameliorating the people’s personal health, may facilitate both social contacts and physical activities [7,8]. The impelling necessity to organize vegetated environments into the cities is also due to the continuous increasing of greenhouse gas (GHG) emissions of the last twenty years. The urban areas, on the one hand occupy 3% of the worldwide land surface, on the other hand are responsible for three-quarters of both global carbon emissions and natural resources utilized [5].

**Environment and Aging**

Nowadays people are generally living longer than even before. Thus, it has been estimated the worldwide aging population by 2020 consisted of 727 million person aged 65 and over, will be more than double by 2050 reaching 1.9 billion, with a registered increase of 16% (Figure 2) [9]. Unfortunately, the currently pollution continues to represent a critical factor, increasing premature deaths, thus

impacting quality and expectancy of life [10]. Consequently, the World Health Organization(WHO) has estimated that 13% of the death in 2012 could be attributable to environmental factors, including polluted soil and water, with air rich of toxic compounds and fine particulates (PM2.5) [11]. At this purpose, data indicate a strong link between PM2.5 size- pollution and consumption of food delivered and eaten outdoor, because packaged by plastic materials, too often released in the environment [12]. Moreover it has not to be forgotten the asphalt-related products which, emitting into the air diverse mixture of organic hazardous compounds in dependence of temperature and other environmental condition, represent a significant source of urban pollutants affecting the public health [13]. Thus, it has been estimated that air pollutants and particulates together with nano-micro- plastics and organic waste, seem to shorting life expectancy by nearly two years. Therefore, pollution represents the greatest risk to human health, having also contributed to spread the COVID-19 pandemic, affecting billions people around the world [10,11].

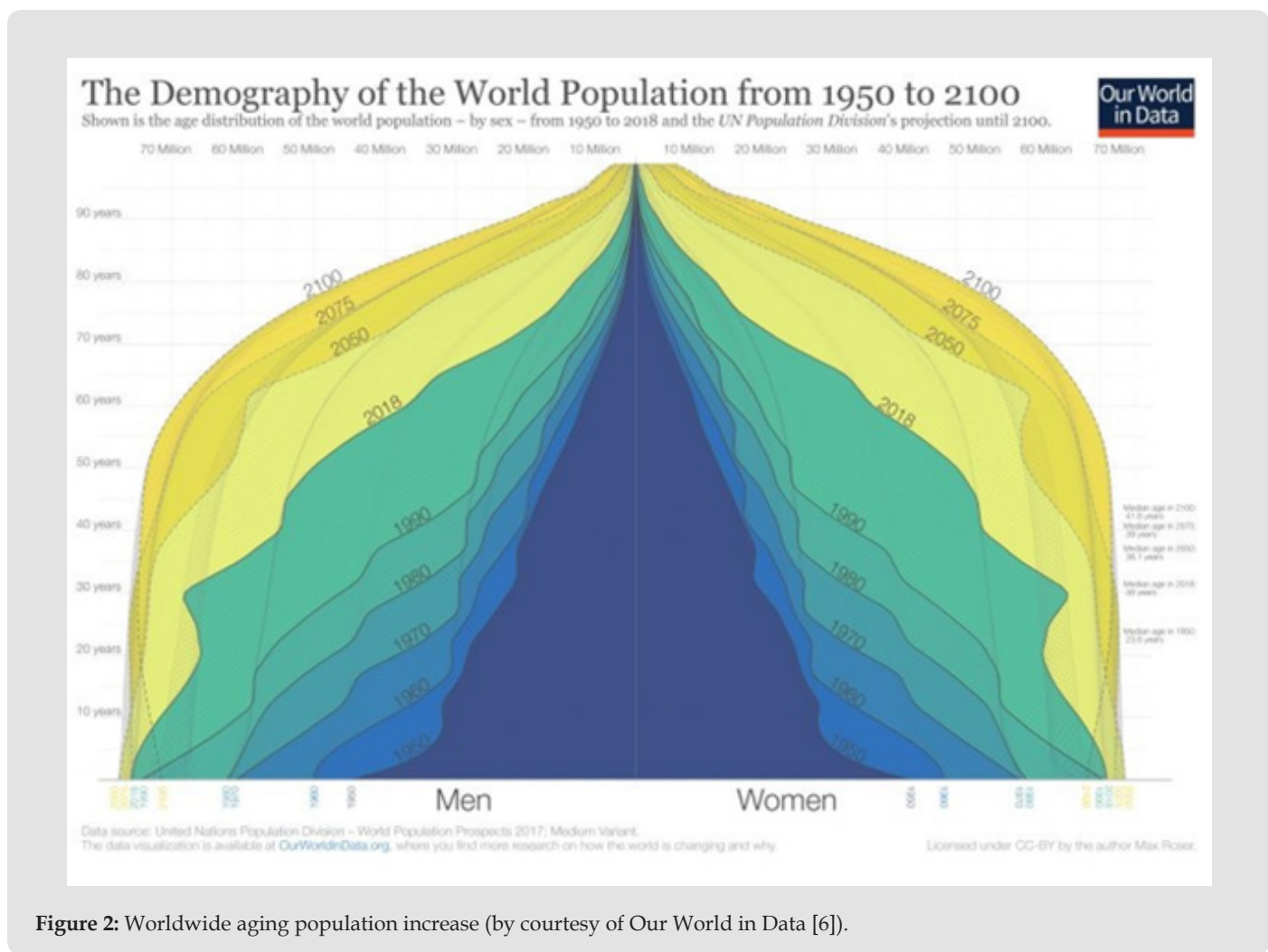


Figure 2: Worldwide aging population increase (by courtesy of Our World in Data [6]).

Additionally, organic waste from agro-forestry industries is one of the major sources of pollution, increasing day by day [14]. Every second, in fact, more than 100 trees disappear from tropical forests around the world which, reducing the most important oxygen reservoir and increasing the GHG emissions by cultured lands and pastoral farming, contribute to both climate and biodiversity changing. On the other hand at least 8 billion tons of plastics are entering in the oceans every year, making up 80% of all marine debris from surface or deep-sea sediments, which ingested from fishes and marine mammals are transferred to human food with their content of toxic compounds [15]. It has been estimated, in fact, that in 2015, 55% of the global plastic production was discarded, 25% incinerated, and 20% recycled. Thus from 10,000 to 100,000

micro-nano particles remained in surface water, resulting dangerous for human health [16]. Just to remember, the most common plastic polymers produced and discarded in the environment were polypropylene (PP) and polyethylene (PE) at high and low density, used both to produce textiles, bottling, food/cosmetic packaging, and teabags. To understand better the problem, a single teabag made by PP «could release about 11.6 billion microplastics and 3.1 billion nanoplastics, «lasted into a single cup of beverage» during a «typical steeping process» [17,18]. Moreover, PP and PE are the same polymers used to make disposable gloves and bag plastic shoppers, commonly utilized by people, going outside for shopping (Figure 3).



Figure 3: Plastic polymers entering the oceans.

In addition, the current battle to fight COVID-19 pandemic has dramatically increased production, use and discard of surgical masks, gloves and personal protective equipments comprising of the same and other non-biodegradable plastic polymers which, when left to decompose under sun, emit large amount of methane and ethylene, two of the biggest greenhouse gases contributing to global warming (Figure 4). To make the situation worse, during this pandemic lockdown, many people are ordering more food deliveries and takeaway boxes made by PP or polystyrene( PS), causing further environmental issues[19]. Therefore, COVID-19 has pushed Chinese plastic industries to produce 116 million items per day since February 2020, resulting in a monthly consumption of

129 billion face masks and 65 billion gloves, further increasing by about 12 times the global waste pollution [19]. As a consequence, during the virus spreading, hospitals more than 240 tons of single-use plastic-based medical waste was produced per day for Wuhan hospitals, 6 times more than before the pandemic occurred [19]. In anyway environment and lifestyle choices affect the skin aging processes also, causing not only skin fragility, wrinkling, and age spots, but other different disorders. Therefore, the addressing climate change could help young and old people to become more resilient for the future, encouraging them to create more sustainable jobs and economic growth [20].

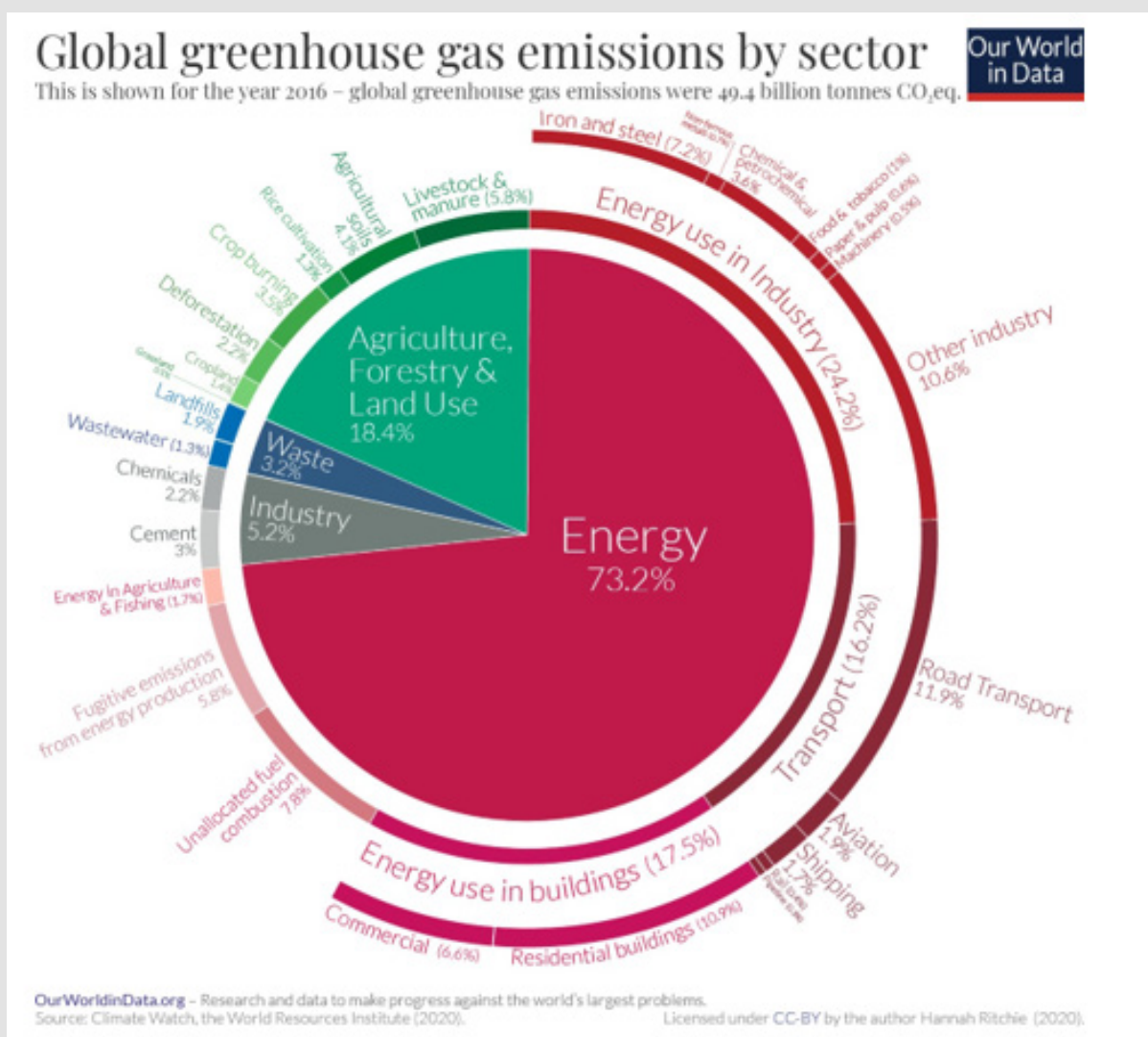


Figure 4: Global GHG emissions by sectors (up) and type(down) (By courtesy of Our World in Data [48]).

### Aging Well in Friendly Cities

Among the major problems and challenges of today society there is the unprecedented urban growth, where over half of the global population is living into cities and towns, consuming more than 70% of the global food supply [21]. It will be not possible, in fact, «to achieve a healthy planet and healthy population without a fundamental transformation of the entire food system», based almost exclusively on the linear economy (21). The actual way of production and consumption, in fact, are not only depleting the world's finite resources, but are also damaging the health of the human's ecosystem. Thus the necessity to transform the linear economy based on taking, making and producing waste, in the circular economy of reducing, reusing and recycling goods (Figure 5) [21]. Consequently, the necessity to change the food production chain, also remembering that food arrangements of older people has to be associated with economic well-being, physical, psychological and social health based on a final life satisfaction [21,22]. It has been tested, in fact that «older people are a resource for their

families, their communities and the economy»[22]. Therefore, a must of the society would be the necessity to organize age-friendly cities for encouraging the so called active-aging (Figure 6) based on economic, health, social, personal, physical and environmental determinants (Figure 7) [23,24]. However, «maintaining inter generation solidarity, autonomy and independence as one grows older is a key goal for both individuals and policy makers»[23,24]. So doing it will be possible to optimize the quality of life of aged people, enhancing their health and wellbeing. At this purpose, it is again to underline that human lifespan is determined not only by the genes but also by the external influences which, as previously reported, acting by means of genetic pathways, could impact the human genome [25,26]. Its fingerprint, in fact, influencing cellular energy production, DNA repair and replication as well as the antioxidants' production, could modify the cellular process of aging and death [25,26] according also with the ancient Chinese medicine, which since 221 BC, connected food and environment conditions with health and wellbeing [27].

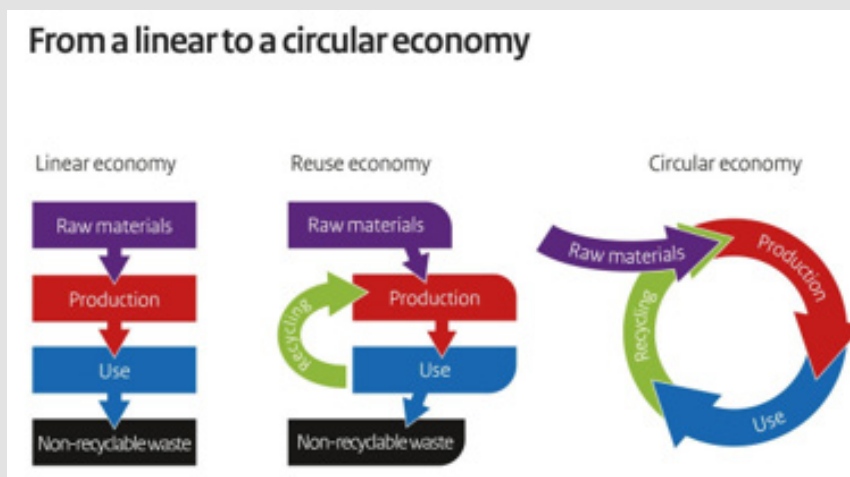


Figure 5: Linear economy versus circular economy (by the courtesy of EC).



Figure 6: Determinants for an Active Ageing (by the courtesy of WHO [24]).

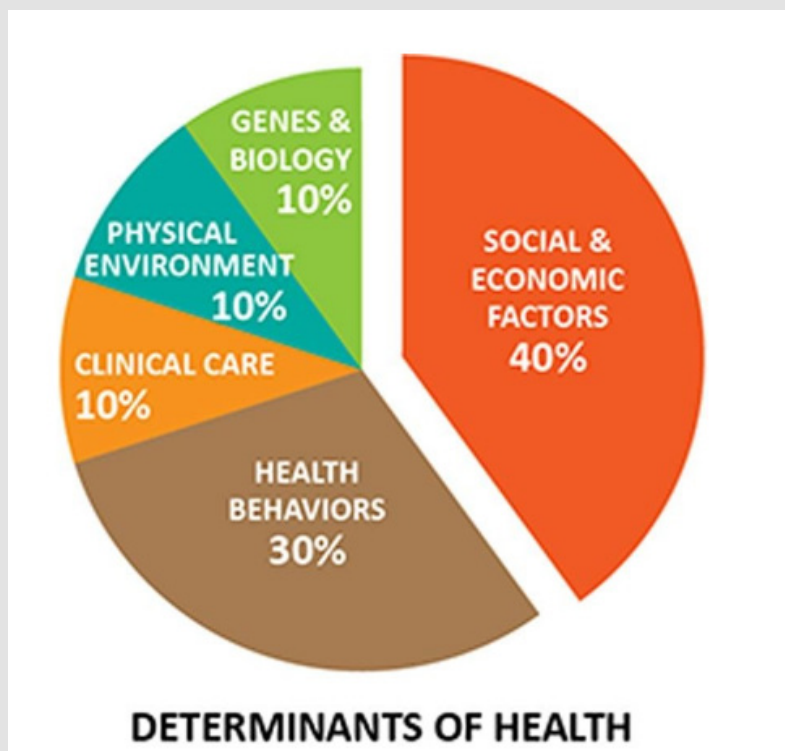


Figure 7: Determinants of Health (By the courtesy of WHO [24]).

The environmental stressors such as UV rays, in fact, combined with internal factors (i. e. Food and mitochondrial DNA mutation), make the skin vulnerable, being thus responsible of cutaneous diseases and premature aging [26,28]. Understanding how the environment of friendly-cities modulate aging-related genes may lead, for example, to change life-style, diet and pharmacological interventions [24-26,28]. At this purpose, it seems interesting to underline how older Asian people, living particularly in high-density cities, like to spend time in green spaces considered important in promoting health [29]. Therefore, for example, in China, the Government are paying particular attention to organize new public parks maintaining in good conditions the old ones also, according to the ancient habits of the people to rest with their birds and play among flowers and trees during their free-time (Figure 8). This

probably the reported reason that 61% of the worldwide consumers are worried about climate changing, searching an outdoor green oasis to support their mental and physical wellbeing [30]. The open-air activity, in fact, results beneficial for 51% of this group, considering a priority the time spent for themselves, while 69% are more concerned about sustainability than before COVID-19, thus reaching the decision to use biodegradable packaging, reducing consume of energy and water also [30,31]. Therefore, for the United Nations [32] most cities should be «designed to support an able-body working population», «developing smart, secure, safe, functional, and comfortable buildings and in- buildings» (Figure 9) because useful to enhance the lives of both younger and older people and create «supportive environments» for all the ages.



**Figure 8:** Chinese old people in the park with their birds(on) and resting under flowers and trees (down).





**Figure 9:** Green buildings by architect Boeri in Milano (Italy).

In conclusion, the urban environment, as reported from the 11th UN goal for a sustainable living, has to be considered an important step, fundamental to promote a global healthy aging (Figure 10) [33]. At this purpose, it is also to remember the density of citizens living in EU, North and South Americas, which range actually more than 80% of the global population, compared to more than 50% people living in Asia and Africa (Figure 11) [34]. Thus, the future smart and age-friendly cities would be characterized by transportation vehicles at low- or zero emissions, green and healthy outdoor spaces to facilitate and increase social communications and co-mobility of citizens affected from disabilities [35]. In conclusion, due the global increased pollution and the actual stressful way of living, the development of safeness and healthy environment remains a relevant program to reconnect people with nature by the

so-called Vitamin N (N= nature), for trying also to neutralize and stop the stress condition caused by COVID-19 spreading [36]. This viral pandemic, therefore, « has nudged people to adapt healthier habits “encouraging to better understand and appreciate nature in its different features for discovering again the power of «forests bathing», bird- watching, camping, bicycling» [36]. At this purpose and according to the opinion of various psychologists, the time to live in nature for at least 120 minutes-weekly is considered the «vitamin N» necessary to live in good health and wellbeing [35]. Therefore, the natural environments and ecosystem services have to be recognized worldwide crucial for both mental and physical wellbeing, also if the conditions specifically in the Global South low-income countries should be better elucidated [3].



Figure 10: The UN goals: 11th in evidence (by the courtesy of UN [33]).

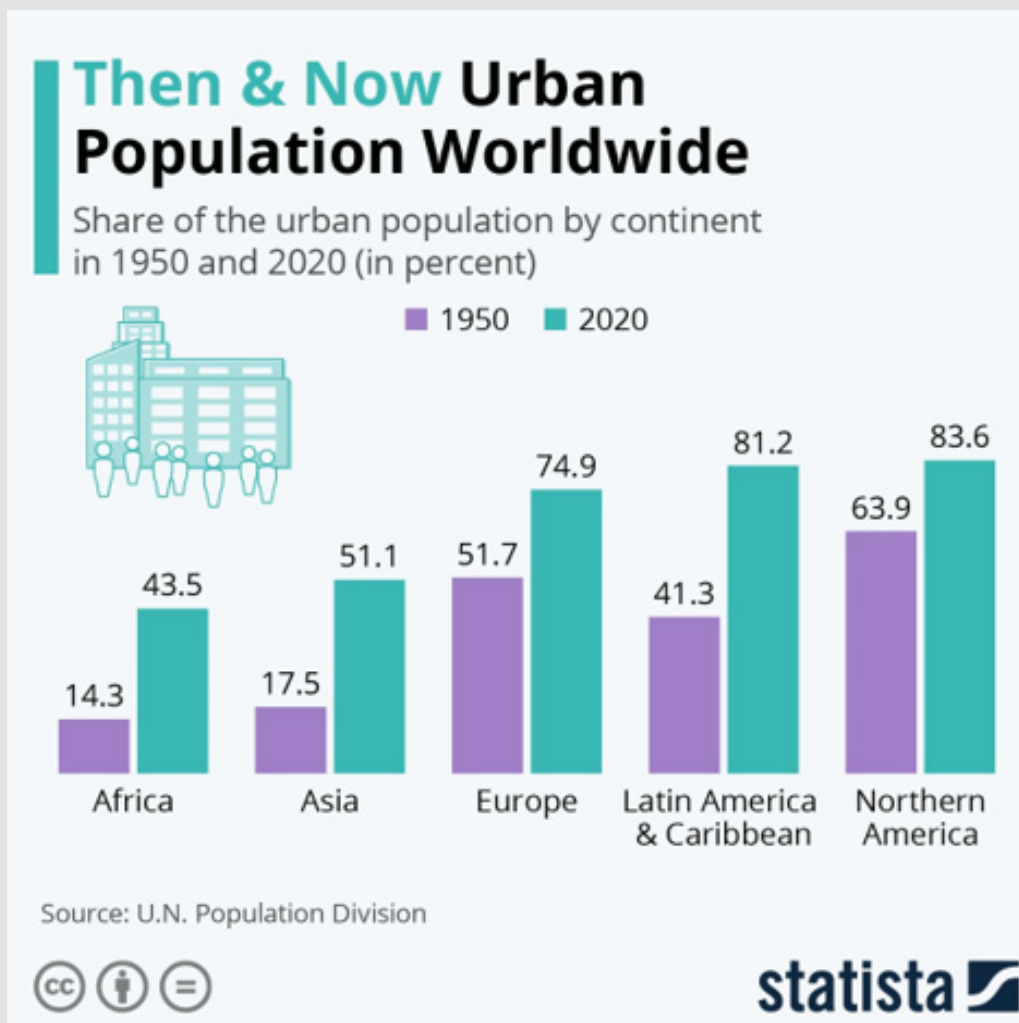


Figure 11: Worldwide Distribution of urban population by continent (by courtesy of Statista [34]).

## Conclusion

The global feeding by 2040, for billion people in the world and the increasing plastic waste invading land and oceans, is the greatest actual challenge. The necessity to achieve an healthy planet and healthy population, transforming the system of producing and consuming, by a circular and new bio-plastic economy, has to be considered a must of our society [37,38]. This challenge has to be braved by the rules of the circular economy, redesigning and resetting the production' methodologies, modifying the actual structures of the cities, and changing our incorrect way of consuming and living in a globalized and unjust society. The disaster caused in few months by COVID-19 pandemic shows clearly the necessity to deeply modify the actual organization of cities, hospitals, jobs and global society' structures [39]. Hundreds of millions people have lost their jobs in many fundamental sectors such as retail, tourism, and hospitality, catering, manufacturing, transportation and other services, leaving million of families in poverty.

They are working, being paid «just to survive and feed their families», without having any kind of real social protection [38-40]. The actual pandemic has to be a «wake-up call to the world» having delivered the biggest and broadest' value chain shock in recent memory, together with the forty weather disasters in 2019, which caused damages exceeding USD 1 billion each [39,41]. Consequently, the value systems of the modern society drive stress and anxiety, lower mental wellness, develop memory loss and dementia of older people, weakening the overall resilience [40]. Thus in 2017, 11 billion cases of mental disorders were estimated as leading cause of illness and disability of the global population [39-42]. Therefore, as previously reported, became fundamental the necessity to leave the linear economy -based on labor, product cost, polluting waste and profit- and to look for a more social oriented circular economy, possibly at zero waste and based on financial security, health and wellbeing for all the workers involved [37,38]. At this purpose, it has been shown how the city's built environment and the external determinants could influence people health and wellness. Moreover,

the positive and happy aging in green locations seems able to reduce the increasing stress, acting also as a protective factor for high risk dementia. [42,43]. The building design and the green area, in fact, may control infections in high-density urban areas where the reported external determinants seem to be responsible for up 80-90% of all the epidemic diseases, having contributed to increase the spread of COVID-19 pandemic also [44-47].

It has been shown that pollution in 2015 was responsible for 9 million premature deaths and the major plastic pollutants from 1950 to 2015 were released above all by waste of food and cosmetic packagings, building & construction and textiles (Figure 12) [16,47-49]. In conclusion, the right way of living and a green environment are at the base of a good health and wellbeing, representing the determinants for an healthy and longer aging (Figures 6 & 7) [42, 50]. However, it is also to remember that wellness is different from healthcare [42]. While healthcare is focused on causes, consequences, diagnosis and treatment of diseases, wellness has to be focused on prevention and therefore based on the possibilities to live in green, healthy and smart and age-friendly cities by a correct lifestyle (Figure 13) [42]. In conclusion, it will be possible to change the way of living if politicians and citizens worldwide, according to WHO' wellbeing determinants and the innovative bio-economy, will realize well-structured cities made by public buildings, green houses and green spaces in the shortest time possible, safeguarding money also [23,46,50]. However, it is necessary to recognize that «we cannot live a full life without a healthy body , mind, and spirit « because «we are connected to other people and to our natural world»[41]. Thus, COVID-19 has shown that wellness, based on a multidimensional approach, is also strictly connected to economic structures that has to be changed by a bio- mentality [39-50]. At this purpose in 2017, the EU-28 involved in Bio- economy has shown an economic turnover of this new sector of 2. 4 trillion of Euro with 18. 5 billion of employees (Figure 14) [50]. So doing the worldwide citizen could have a good aging (Figure 15) and a welfare state, living longer in a Healthy Environment, safeguarding natural raw materials and the Planet' biodiversity (Figure 16).

### INDUSTRIAL USE OF PLASTICS BY SECTOR

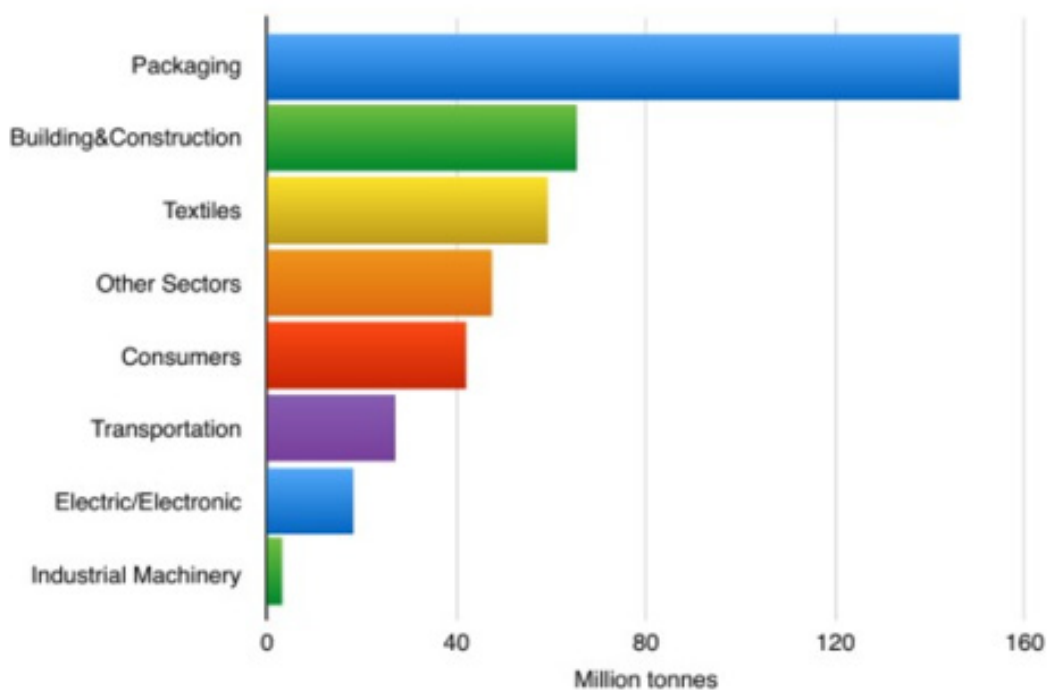


Figure 12: The main users and responsible of plastics waste (By courtesy of OurWorldinData [16]).



Figure 13: Smart cities' necessities for an healthy aging (by courtesy of WHO [24]).

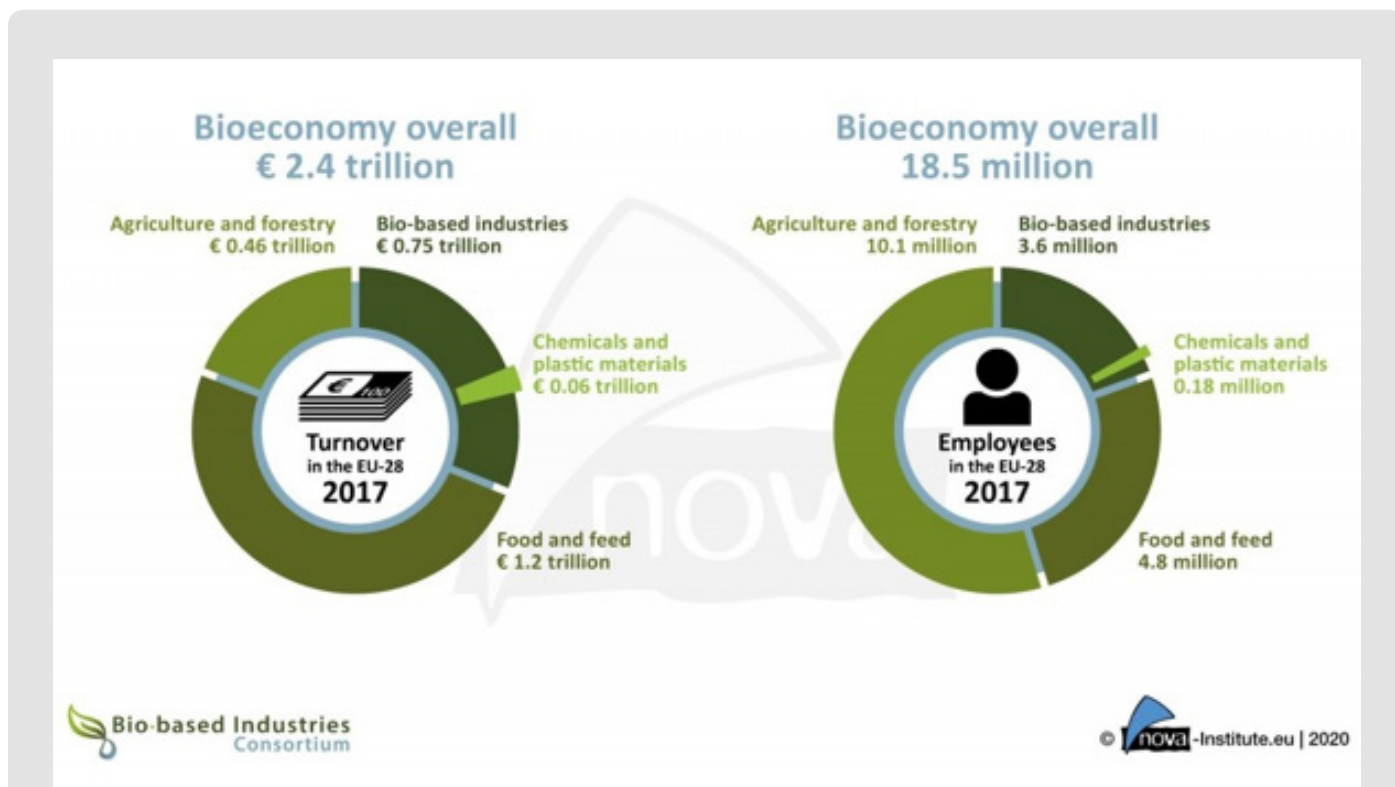


Figure 14: The EU-28 Bioeconomy turnover and a employees in 2017(by Courtesy of Nova Institute [50]).



Figure 15: Maintaining the biodiversity has to be considered a must of our society.

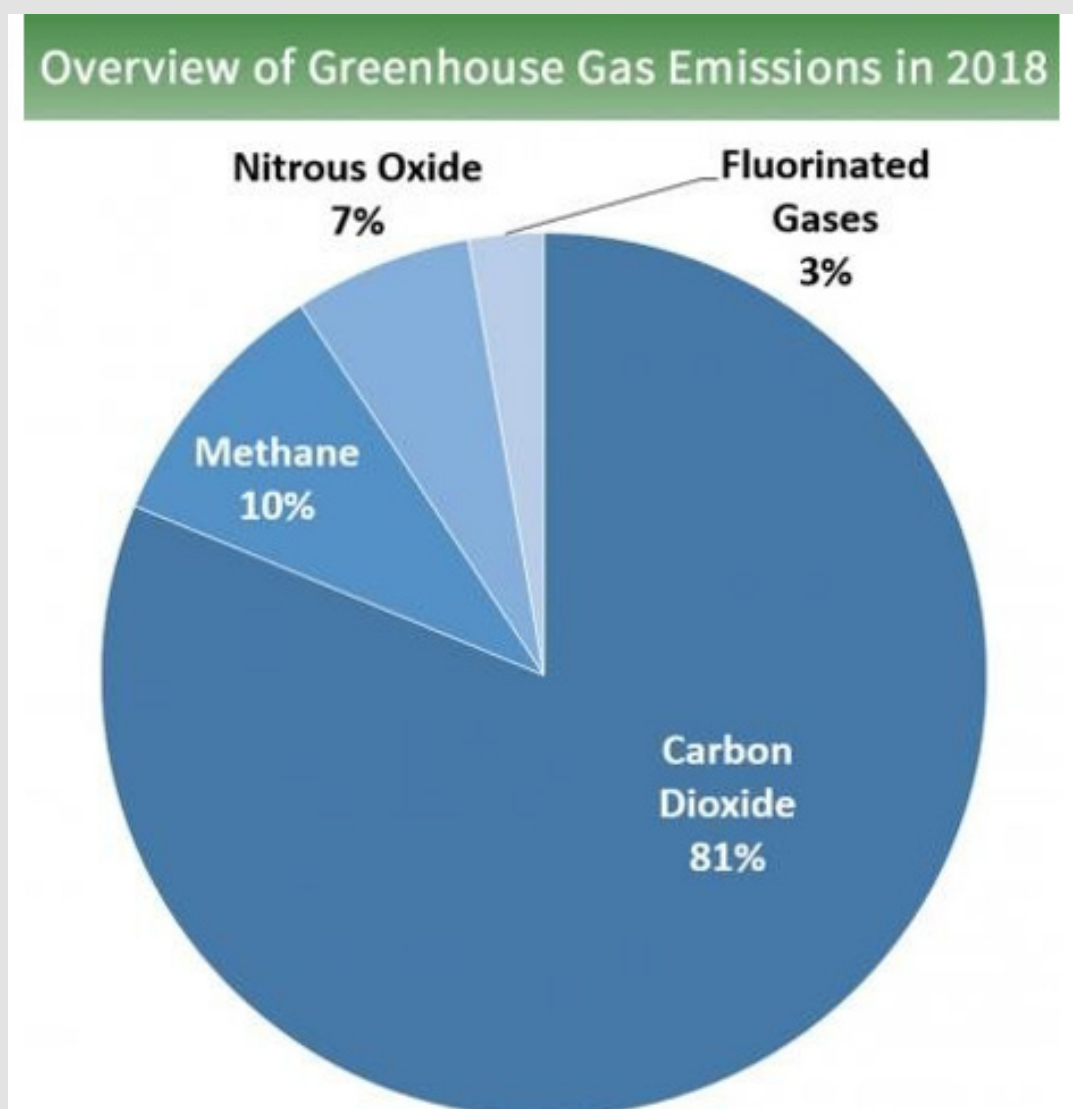


Figure 16.

### Author Contributions

Idea of manuscript PM; Writing-original draft preparation PM, GM; writing review and editing PM, NV, H D-C and GM; Supervision PM, H D-C and NV; writing-review and editing PM and NV; supervision PM and H D-C. All the authors agree to the publishing version of manuscript.

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### Conflicts of Interest

The authors declare no conflicts of interest.

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