Sustainable Development Through The Lens Of Early Childhood Development

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Research Paper

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"There is a clear path between investing in early life and better health, better later success in life to break with poverty patterns, promoting gender equality (of both female ECD workforce and female children), build love for fauna and flora in children, and finally build healthy behaviors promoting peaceful healthy relationships and interactions with others and environment."

Dr. Pia Rebello Britto, Chief of Early Childhood Development at UNICEF

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A B S T R A C T

Virtually building inclusive and quality Early Childhood Development policies for human development means considering all the different aspects discussed in Agenda 2030. It means building safe and resilient cities for current and future generations, it means ensuring the end of poverty and hunger, ensuring UHC, ensuring quality education and strong foundations for success in later life, it means securing and promoting diversity of cultures, it means social justice and climate justice, it means access to energy and clean air and water, it means secured livelihood and reduced conflicts zones. It also means strong collaboration at both vertical and horizontal levels across sectors and agencies. However, successful ECD policies need to high-quality ones which has proven to be hard over the past decades, especially in scaling-up projects by various governments. Additionally, such policies take time, which is running short for Agenda 2030, and a global consensus of the various actors involved, when ECD has been really ignored for a long time and is still not well understood by many, both individuals and policymakers. Therefore, if it has potential for becoming a common driver for all actors of the economy and policymakers, in reality it would represents a significant challenge to put ECD at the core of the SDGs.

Keywords: Sustainable Development, Education, Health, Early Childhood Development, Agenda 2030, SDG 4, National Policy, International Cooperation

This paper builds on the ongoing work of scholars in the field of Early Childhood Development, especially Professor Jack P. Shonkoff, President of the Center on the Developing Child, and Professor of Education Hirokazu Yoshikawa at the Center on the Developing Child of Harvard University, as well as the effort of the Sustainable Development Solution Network (SDSN), through the SDGAcademy and referenced publications, to educate on pathways to achieve the Sustainable Development Goals (SDGs) adopted by the UN member countries in 2015 under the Agenda 2030. This paper is part of an ongoing effort to bridge Sustainable Development with Early Childhood Development (ECD) policies.

Over the years, growing attention has been paid to the field of human development, with a particular focus on the welfare of children around the world. While neuroscience and child development research address the reasons to invest in young children, the study of program evaluations adresses questions about when and how to best deliver ECD services, also referred to sometimes as ECCE (Early Chilhood Care and Education). A number of studies over the past decades demonstrate how it is possible to produce a number of positive effects on vulnerable children that will last well into the adult years, generating benefits to society that far exceed program costs. But evaluations have also shown that many programs, if designed or implemented poorly, can only generate few to no beneficial outcomes. Hence an apparent importance to present a unified framework for quality policies and programmes that can take into consideration the many aspects related to early childhood development, while responding to a wide range of the targets of Agenda 2030.

Putting quality, and comprehensive early childhood development policies at the heart of national development plans would allow policymakers to consider clearly the kind of multidisciplinary approach called upon by the SDGs and subsequent targets formulated in the Agenda 2030, such as, but not limited to: reducing poverty, hunger, pollution and inequalities; improving health, education, cities, sanitation, and management of natural resources; and creating human capacity, sustainable job opportunities and healthy environments for communities to thrive. Furthermore, such a framework would have the potential to provoke ripple effects in breaking multigenerational vicious cycles of poor health and education thus setting the foundation for healthier, more educated and productive adults that will have better cognitive, execution function skills, and social skills to understand and apprehend their environment, with better chances of promoting relationships and healthy communities over conflicts; as well as the capacity to provide better parenting to their own children and be more involved and productive citizens and workers. By setting the proper foundation of early skills, it will ultimately raise the chances of children to be both able and willing to pursue education longer, thus raising human capital for the whole society which will lead to more creative thinking, more knowledge creation, and more innovations which will both boost the economy and allow future generations to have the correct tools to tackle the issue of sustainable development and global change. Yet, no political consensus seems to have been reached in that sense as ECD remains a marginalized sector of the economy and policymaking of most countries. This paper will therefore try to *analyze the scientific evidence brought forward by scholars in developmental sciences*, along with *evidence of successful policy implementation* on that ground *and guidelines for better policy making, financing and implementation.*

1. Introduction

Sustainable Development and the state of children in international policies

Agenda 2030

First defined in 1987 (Our Common Future) as "development that meets the need of the current generation without compromising the ability of future generations to meet their own" the concept of sustainable development has been a controversial and sometimes vaguely defined topic for many decades in both the private sector and in academic papers. More recently, and on the basis of further work by international organizations Kolk (2016) purposed a refined version of Sustainable Development reconceptualized around 5 pillars: People – which considers health, sanitation, education, food, and energy–, Planet – which considers ecosystems, natural resources, clean water, soil, air/climate–, Prosperity – aiming for strong, inclusive and transformative economies–, Dignity – with the ambition to end poverty, and fight inequalities and unfairness–, and Justice – for safe and peaceful societies and strong institutions–. He also mentions Partnerships, although considered as more of a mechanism than a goal on its own. In practice this principle has been defined by the UN in the Agenda 2030, a goal-based plan of action adopted on Sep, 25 of 2015 in the form of 17 Sustainable Development Goals, better known as the 17 SDGs. If the actual content of this plan has been greatly criticized for its lack of ambition, with its 169 targets which implementation can be measured through around 230 different indicators it is an important milestone for the climate awareness movement. Indeed, even if the scientific community started to send signals about the negative impact of human activity on the natural environment for over a long time (Fourier, 1824; Arrhenius, 1896; Callendar, 1938) it is only in 1972 that the recognition of a collision between the economy and the environment happened at the UN Conference on the Human Environment. The conference was followed two decades later by the UN Conference on Environment and Development, better known as the 1992 Rio Earth Summit, where concrete action plans were created, and key concepts defined. However, at the occasion of the anniversary of the summit in 2012, the RIO+20 Earth Summit, the UN members realized that none of the treaties had really been implemented and the concept of sustainable development was still very marginalized. However, they were also starting to draw conclusions on another framework that had been implemented for the period 2000-2015: the Millennium Development Goals, the first goal-based framework to be adopted by the UN with the principal objective of ending poverty. Though the end goal had not, and still has not been, achieved the MDGs were very efficient in fighting poverty worldwide and obtaining results. That's why for the next 3 years, a special UN committee in collaboration with all country members worked on the successor of the MDGs, an Agenda that would span over the 2015-2030 timeframe and include a greater focus on the principles of Sustainable Development: Agenda 2030.

Among the 17 Sustainable Development Goals adopted in 2015 (See Figure 1), several can be explicitly related to the improvement of the state of children in the world. The first one being the goal on **Lifelong Learning and Education (SDG 4),** which includes various interesting targets and indicators starting with **Target 4.2** (by 2030 all girls and boys will have access to quality ECD, care, and pre-primary education) and its two indicators, 4.2.1., about the proportion of children under 5 who are on track in health, learning and psychological well-being, and 4.2.2., that measures the participation rate in organized learning before entering primary school.

Among the other SDGs that directly relate to early childhood are the ones about nutrition and health (**Target 2.2** on malnutrition, and targets about infant and maternal mortality, reconducted from the MDGs, with the addition of mental health and well-being related targets). Also related to children are the targets around poverty (**Target 1.1** on eradicating extreme poverty, **Target 1.2** on reducing by half those living in relative poverty) along with some aspects of **SDG 6** (Clean Water and Sanitation), **SGD 11** (Sustainable Cities and Communities), **SDG 7** (Clean Energy), and **SDG 16** (Peace, Justice and Inclusion).

One last, but also central Target is on the right of children to be protected from violence, exploitation, maltreatment, and abuse. It is an aim that has been stated for quite some time now in international development and is one of the key rights of the Convention for the Rights of The Child. It has been reaffirmed as a priority in the SDGs under Target 16.2.

The Convention on the Rights of the Child

The Convention on the Rights of the Child is a global consensus on the rights of children, ratified by the United Nations General Assembly in 1989, and designed to ensure seven essential rights to every child around the world:

- Right to Life, Survival, and Healthy Development
- Right to Name and Nationality
- Right to Education
- Right to Family
- Right to Protection from Harm, Violence, and Neglect
- Right to Freedom of Expression
- Right to Play and Entertainment

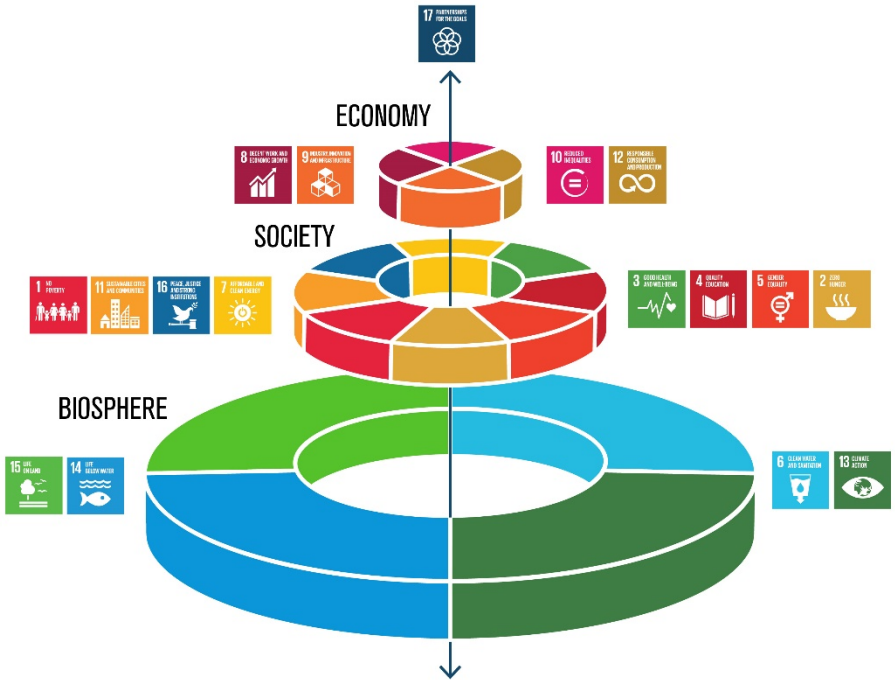

Figure 1. Agenda 2030.
Source: Rockström, & Sukhdev, 2016.

Early Childhood Development policies

Within the framework of sustainable development, children represent the generation that is going to be the most affected by the implementation of the SDGs while also being the one that will need to support it later on and ensure the continuity of the goals in the long-term. Among the six major systemic transformations needed in order to achieve the Sustainable Development Goals (Sachs et al., 2019), we find a urgent need to transform both the Education sector and the Health sector. Interestingly, these two elements are also the two central domains of action of Early Childhood Development (ECD) policies.

Early childhood development is the period of development that span from the prenatal period to age 8, or the beginning of primary schooling (McCartney, & Phillips, 2006; UNICEF, 2002a). It covers a huge range of situations from fetal development to third-grade students. This period of human development is the time during which the brain is developing the most while also being the period most sensitive to environmental influences. Therefore, ECD is often defined as the interaction between the child and its environment (Rutter, 2002). A holistic approach to brain development includes, but is not limited to, physical, cognitive, linguistic, socio-emotional, and ethical and spiritual development, as well as a sense of national or group identity (Britto & Kagan, 2010; Naudeau et al., 2011).

Over the past century, the concept of early childhood education and, to a broader extend, Early Childhood Development, has emerged in great part due to advances in science leading to a better understanding of the human brain and its development, as well as early childhood experiences and their impacts throughout the life of an individual.

During the 20th century, large-scale preschool programs were launched in various countries with the primary goal of tackling inequalities in children's learning among the most disadvantaged households. To that extent, such programs often integrated additional services along with education services such as health, child protection and social protection services (Yoshikawa, 2004). Alongside center-based programs were also launched some home-based initiatives and many pilot programs supported by either the public or private sectors, sometimes even NGOs. However, the main purpose at the time, as mentioned by Yoshikawa et al. (2014), was more to meet labor market demands with a growing number of women pursuing out-of-home careers than to promote education and children's learning and development (Kamerman, 2006; Shonkoff et al., 2000). But since the beginning of the 21st century, researchers such as economist James Heckman laid the importance of foundational skills for the acquisition of more complex skills later in life, ground-breaking work that aim to explain and show evidence of why investments in early childhood programs will bear positive impacts on skill acquisition over the life span, social and economic productivity, as well as being the most cost effective (Cunha & Heckman, 2006). As a result of these studies conducted in both developed countries (Heckman et al., 2010; Bartik et al., 2012) and developing ones (Yilman et al., 2010); Behrman et al., 2004), the development of cognitive and socio-emotional skills as well as physical health are now increasingly seen as critical determinants for later school attainment, health and socio-economic well-being (Engle et al., 2011).

As a result of these recent advances, the ECD sector is now marked by a myriad of different services (Figure 2), with the age of the child being the first critical dimension that distinguishes early childhood services. In the earliest years, interventions tend to focus on health and nutrition services and systems of support within families and communities (WHO, 1999), while later interventions tend to focus more on the education component. There is a wide range of sectors involved in the provision of these services which typically

include health, nutrition, sanitation, education, and child protection professionals (Vargas-Baron, 2013).

To support the turn of the sector toward interventions even earlier than preschool age, with a holistic approach to human development, several random-assignment studies suggest that programs beginning in infancy, such as the Abecedarian Program, one of the best known example, have the potential to affect key outcomes for vulnerable children during the period from birth to three years. The Abecedarian Program, through a full-day, center-based, educational program was designed for children who were at high risk for school failure, starting in early infancy and continuing until entry in primary school. Despite its US$18,000 annual cost, this program is estimated to have returned roughly $3 for every $1 invest-ed (Karoly et al., 2005; Masse & Barnett, 2002).

However, all services may not be available to children and families, especially those from marginalized populations and reaching the most disadvantaged populations can be extremely challenging. In this regard, a number of studies point the difficulty to implement national programs without exacerbating preexisting inequalities between people (Yoshikawa et al., 2007) with children from language-minority backgrounds showing lower rates of enrollment in early childhood development programs (UNESCO, 2007), children of immigrants often also less likely to be enrolled in these programs (Yoshikawa, 2011) and a too often western bias to the approach considered for programs (Yoshikawa et al., 2014). The cultural-determinants of a child's environment interact directly with early development and the well-being of communities (Sarah Harkness et al, 2013). This paper will therefore focus on successful conceptualization and implementation of ECD policies and programs through the understanding of the variations in culturally determined aspects of different sociocultural settings.

Furthermore, efforts to support ECD in the context of the Agenda 2030 (SDG 4) must also consider the capacities and skills of adults, cities and communities to provide care and raise children.

Early Childhood Development

State of the World's Children

On average, 37% of children are showing low levels of cognitive and socio-emotional development in low-income and middle-income countries, especially in central Africa and south Asia with a global push towards higher access to pre-primary education since the 1990s that has mainly been concentrated to the OECD countries as the enrollment rate has not increased by a lot in sub-Saharan Africa where it still stagnates below 20% on average (UNESCO, 2008) and is at an alarming mere 5% in countries affected by conflict due to a lack of access to pre-primary education for children [1]. Failure to meet basic indicators of developmental potential has also been closely linked to high rates of stunting or exposure to absolute poverty, which still affects around 250 million children in the world (Grantham-McGregor et al., 2007).

According to a recent study by Engle and colleagues (2011), the cost of decreased health, productivity, and well-being solely from lack of access to pre-primary education in low-income countries (Target 4.2) has been estimated at a staggering US $33 billion per year.

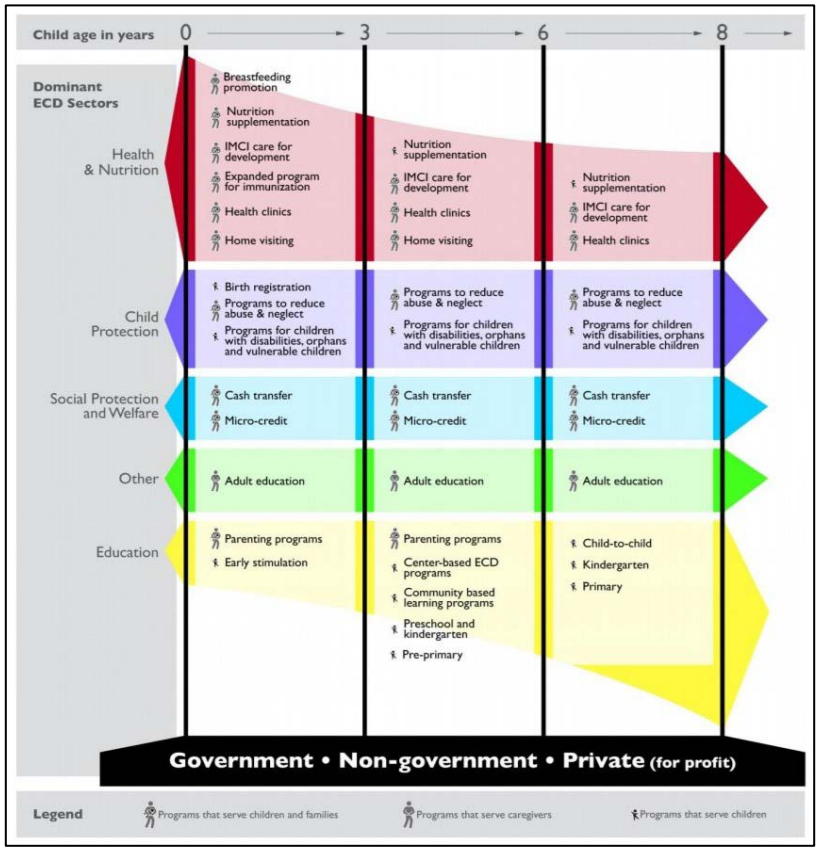

Figure 2. ECS (early childhood services) in time.
Source: Britto, Yoshikawa, & Boiler, 2011.

The Science Behind Early Childhood Development

The first 1,000 days

From a purely neurological perspective, the human brain is quite unique as it takes more time to mature, in comparison to our lifespan, and has more neurons (16 billion) than most other species (gorillas for instance, considered our closest relatives in the animal kingdom only have 9 billion). The adult brain is composed of billions of highly integrated sets of neural circuits that start to build in the womb under the influences of genetics, environment, and experience. While genes determine when circuits are formed, a child's experiences and environment shape how the formation of synapses between brain cells unfold. The brain architecture of children is built from "the bottom up", meaning that higher-level circuits, that process more complex information and are related to more complex skills, build on lower-level circuits that process basic information and are the foundation of early skills. Once a circuit is "wired", the brain moves on to constructing later-developing circuits that can process more complex information and cannot be "rewired". The only way to compensate for weak low-level neuronal circuits is by making "adjustments" on higher-level circuits later in life, which requires expensive and

intensive efforts with results that will never be as strong as if it had been done correctly the first time around (Knudsen, 2004; Cunha et al., 2005; Knudsen et al., 2006). Therefore, how strong, or weak the foundation of the brain architecture is, will bear lasting consequences for all future learning, behavior and health.

The first years of life are when the brain development is most active, with around 700 neural connection made every second from conception to birth and then up to age 2, a period also regularly referred to as the "first 1,000 days" (Figure 3). During that most sensitive period, children will acquire in a very short time the foundation of a range of early skills, including cognitive, social, and executive function skills (Yoshikawa et al., 2007). These areas of learning include the basis for language acquisition, as well as math, pro-social behaviors, empathy, self-regulation, and the capacity to maintain attention on tasks among other things. A number of studies on early development, has proven the degree of acquisition of these skills to be markers for later school success and completion, higher earnings, active participation in society, better health, as well as reduced chances of being arrested for a crime in adulthood (Yoshikawa et al., 2014; Duncan et al., 2007; Shonkoff et al., 2009; Caspi et al., 1996). Building such skills in the early years of life can help convert a multi-generational vicious cycle of bad health, and poor education opportunities, into a virtuous cycle as skills are transmitted, and reinforced, from one generation to the next once children reach adulthood.

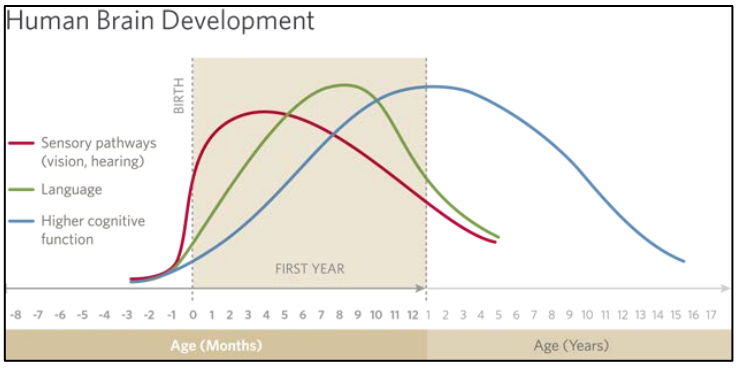

Figure 3. Brain development in the early years of life.
Source: Nelson, & Thompson, 2000. (adapted)
https://www.educareschools.org/

In this process, the role of environmental factors is central to the development of brain architecture, as noted by Catherine Tamis-LeMonda, professor of applied psychology at NYU, "infant development is really the interaction between neurological biological processes and the environment".

One pioneer in the field of conceptualizing young children's environment is Urie Bronfenbrenner and his ecological model of development which puts the child at the center, surrounded by the many environmental influences that affect its development, defined as systems (Figure 4). Microsystems refer to the close environment of the baby, and regular everyday interactions. Mesosystems refer to the interactions between different microsystems, such as the relation between the caregiver at childcare and the parents at home (Bornstein et al., 2012). If these two microsystems push for different values (e.g. obedient vs. playful), it can create a conflict of value systems for the child. Finally, macrosystems refer to indirect influences such as the broader values and societal patterns within a cultural community, or in the policies of a society. It also refers to large-scale social, economic, or political changes in a community such as historical changes, wars, or natural disasters (Shonkoff & Phillips, 2000; Super & Harkness, 1999).

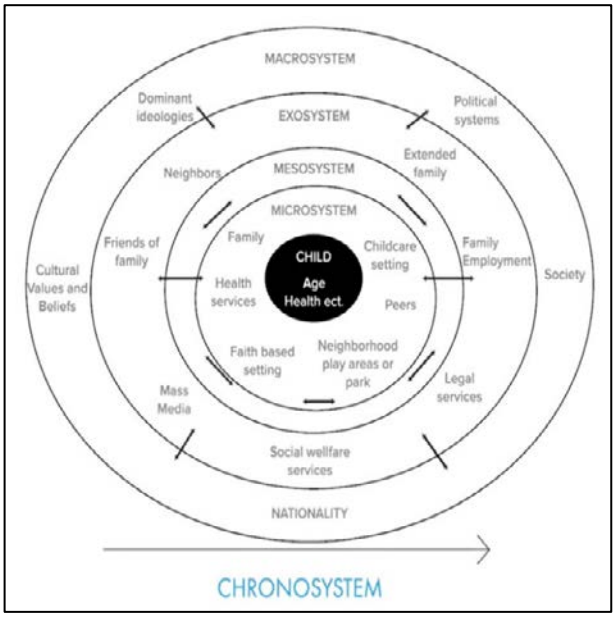

Figure 4. Ecological Model of Development (Bronfenbrenner)
Source: Center on The Developing Child, 2014.

In a broad sense, experiences and environments in early childhood are defined as the regular interactions that young children have with important adults. Primarily these will be the parents and close family, but extensively it can also include the neighbors, friends, childcare providers, and teachers. The nature of this environment of relationships lies in the degree of mutual interaction, or responsiveness, between the child and the adults, defined as a "*serve and return*" engagement. Mutual interaction is a back-and-forth, two-way communication, between the adult and the child, in the form of physical and/or oral expression (i.e. smiling, waiving, looking, talking, interacting). In essence, when the child does something the adult responds, and when the adult does something the child responds.

Early experiences, according to multiple studies, impact the brain by modifying the activity and organization of specific neural circuitry through modifications of synaptic transmissions (Citri, & Malenka, 2008) and epigenetic mutation (Mustard, 2010).

Scientists use the term "plasticity" to refer to the capacity of neural activity to modify synaptic transmission and change the structure of the brain in response to one's experiences with its environment. Synaptic transmissions can be either enhanced or depressed through this process, with consequent effect on neural circuits. While plasticity is maximum in early childhood and decreases with age, it never really goes to zero, and remains capable of modifying, to a certain extent, neural circuitry of the brain late into the adult years. However, as the maturing brain becomes more specialized in higher-level circuits, in becomes less capable of "adapting to new or unexpected challenges, and consequently changing behavior or building new skills [2]". Trying to do so will require more work and is more expensive for the brain,

meaning that greater amount of energy is needed to compensate for circuits that do not perform as they should.

Epigenetics, on the other hand, refers to "the molecular and cellular process that governs the function of genes through processes affecting the complex combination of DNA and proteins (i.e. through DNA methylation) [3]". Indeed, even though the billions of neurons that are found in one's brain have the same gene coding, they differentiate according to their different functions (e.g. vision, hearing, touch, behavior) through the process of epigenetics (McCain, Mustard, & Shanker, 2007; Melher, 2008; Szyf, McGowan, & Meaney, 2008).

The epigenetic changes in neurons, induced by sensory experiences during in utero development and throughout life (e.g. sound, touch, food, injury, disease, and vision), affect neurobiological pathways that influence health (physical and mental), behavior and learning (Gilbert, & Epel, 2009; Gluckman et al., 2008; Szyf, McGowan, & Meaney, 2008). Among other things, a number of studies have shown that experiences in the mother's womb and early infancy influences risks for type II diabetes, hypertensions, heart attacks, obesity, cancer, coronary heart disease, mental health problems and other health conditions in adult life (Gilbert, & Epel, 2009; Gluckman et al., 2008; Felitti et al., 1998).

Early skills and experiences (0 to 3)

Specialists in early childhood development target a variety of domains of development, including physical development, cognitive development, language development, social development, emotional development, and temperament. If these areas can be influenced by many factors, holistic policies are also going to be the ones with targets on developmental achievements in each of these areas, which are the results of interdependent neuronal circuits inside the brain, which foundations are built in the first years of life.

motor skills

As children grow, they develop two kinds of motor skills. The first are fine motor skills and are the movements that involve small muscles (hands and fingers), they are related with writing, grasping, touching, and holding. The second are gross motor skills, and are the movements that involve large muscles (arms, legs, head), they are associated with standing upright, crawling, and walking. Motor skills develop according to different and unique development schedules. Different practices in cultures can either speed up motor development or slow it down. One example is the work by Blandine Bril (1989; 1997) in Mali, and she found out that the daily stretching and high stimulation of babies' arms and legs can promote the onset of earlier motor milestones in that cultural community.

b. babies and their surrounding environment

Babies are curious, they want to learn the features of objects and how to interact with others, but it is sometimes difficult to assess their degree of understanding of the world that surrounds them. However, regarding this understanding of the physical world, we now know that babies can reason about objects and physical constraints (gravity, obstacles…) and even reason about numbers. It is based on a tendency about babies to look at unfamiliar events longer than familiar events. Renée Baillargeon (1992) looked at the notion of support, showing images of a block pushed on a longer block, and another set of images of a block being pushed over the underneath block like it was hanging in the air. What she found out was that babies looked at the second set of images longer, meaning they might be recognizing the odd feature of an object "floating in the air". Regarding their understanding of numbers, Karen Wynn (2009), professor of cognitive science at Yale, designed an experiment that suggest babies can even do "simple math", recognizing the odd feature of 1+1=1 (in an experiment involving hidden objects, where two were presented but only one "reappeared").

At the light of these recent studies, we see that infants are apparently able to think and reason about their world. They are also able to express themselves, even before they can talk, through gestures. In fact, researchers have been able to use gesture to promote language development with the use of baby signs (Cesafsky, 2009). Teaching pre-linguistic babies a vocabulary of gestures was found to promote earlier talking when it was time to enter into language. The reason is that vision is developing earlier than the language and high cognitive regions of the brain.

Preschool age (3 to 8)

By the age of 3 years old, commonly defined as preschool age, children can already do multiple things. They can run and dance, understand numbers and words, and manipulate small toys. They can sit when asked, understand the intentions of others, and feel both empathy and guilt. They can also represent one thing with another (i.e. build trucks and animals from construction blocks). They also have a certain cognitive flexibility, to switch from one language to another for example (bilingualism).

However, they may not yet be able to always differentiate cause and effects (i.e. death), and to communicate grammar rules. They are also still young physically and cognitively and should not walk several km and cross rivers and other obstacles daily to go to school.

pretend play and socio-emotional skills

Developmental Psychology giants, Jean Piaget (1962) and Lev Vygotski (1960a, 1960b, 1967), believed that pretend play, also called symbolic play, was an important component of development. By preschool age it can manifests in playing with construction bocks or acting (shopping, buying, negotiating price, resolving conflicts and everyday life situations).

Play can be facilitated by teachers and communities by asking how kids are feeling, what they are trying to do, how they might resolve a conflict, asking for suggestions and feedback. Teachers can also encourage creativity and how to play with toys in different ways. It further strengthens social and cognitive skills, as well as executive function skills through the acquisition of various problem-solving techniques and group play. Executive function is related to learning how to follow directions, pay attention, and adapt to different situations and are key to both cognitive and socio-emotional development (Box 1.1). Being able to work effectively with others, manage distraction, and effectively understand rules and direction is key to a healthy development and later productivity.

At preschool age, children can also learn much more than just numbers. They start to understand concepts of magnitude (size of shapes), how shapes can combine and interact (building new forms with multiple shapes), and simple arithmetic that are the foundation for later math skills.

Pro-social, or moral, development is also key in the transition from parallel play to cooperative play. They learn how to wait one's turn, and work in team. Empathy is key to this process. Guilt, which is a universal human emotion that develops during preschool age, is the combination of empathy and the realization you can cause another's distress; therefore, guilt is related to later conceptions of fairness and justice.

Jean Piaget, an early stage theorist and pioneer of the theory of cognitive child development in the early 20st century, proposed that before age 5, children were very egocentric and couldn't understand other people's beliefs and preferences (Piaget, 1928). Later studies (Repacholi & Gopnik, 1997), have suggested that by 18 months of age babies were already able to perceive and understand the preferences of others. They noted that if 14-month-olds weren't able to accept that other people might have different taste than them, at 18 months babies were able to perceive that someone else might have different tastes and act accordingly (i.e. offer that person what she liked instead of their own preference).

BOX 1.1. Executive Function Skills & Self-regulation is "*the ability to focus your attention, to set goals, to make plans, to monitor how things are going, take corrective measures, make decisions, solve problems, to engage in goal-directed behavior, to be able to self-determine what it is you're trying to accomplish and set out a plan, and be able to delay gratification. [It is also the ability] to control your impulses, to follow the rules, and not just live in the moment just kind of getting by, but to have some sense of control over your life. These are skills that make it possible to overcome challenges, cope with threatening situations, and persevere in the face of adversity.*" In simple terms, it relates to the child's capacity to solve problems, follow directions, control impulses, and manage groups of people (Blair & Razza, 2007; Blair & Raver, 2012; Lipina et al., 2004; Maldonado-Carreño & Votruba, 2013). They allow the brain to manage a lot of information by involving the working memory (remember what the child is supposed to do), inhibitory control (let the other child take turn), and mental flexibility (adjust to unpredictability). These skills are essential to be a contributing community member, to be employable, and to be a successful adult among other things. How well-developed these executive and self-regulation functions are in adulthood is going to affect how well parents can coach and build those same skills in their children.

the role of culture, and limitations of the western "pre-school" education system

The process of learning these different skills, vary in different cultures. Barbara Rogoff, a developmental psychologist specialized in learning setting in indigenous communities, highlighted that while young children are mostly thought to learn in formal school settings, traditional communities actually rely heavily on another learning approach that is community-based she refers to as "intent participation".

According to Rogoff and colleagues (1975; 1993; 2003), children learn through participation in community and household activities, rather than activities specifically intended for their learning like school activities. For example, by helping with chores, children can learn about ideas of volume, size, counting, and weight as well as develop spatial (counting distances), hygiene, and social (following directions) skills.

More generally, culture can have a profound influence on learning which actually happens in every moment that the child is awake whether it is time spent in a formal setting (preschool) or a non-formal setting (everyday life).

In regards to the value of moral development, recent studies have found that in some cultures, children can also make the distinction between moral transgressions (teasing or hitting another child) versus conventional transgressions (eating food with fingers or calling a teacher by their first name) which is not necessarily valued in other cultures.

A study conducted in Hong Kong by developmental psychologists Yau and Smetana (2003), explored the understanding of children of these different transgressions by first asking them if they were acceptable or not, and then why they were not accepted. Hong Kong preschoolers distinguished well from the moral transgressions that focused on the welfare of the other child, and the conventional transgressions that were just "not okay". In contrast, US preschoolers in similar studies were not able to distinguish between the two, but simply call both "bad" or "not nice".

Finally, Paul Ekman, a famous psychologist that conducted extensive research on emotions across culture, highlighted the existence of similarities in facial expressions to manifest core emotions across different cultural communities (anger, happiness, sadness, disgust). There are a number of basic emotional expressions that babies also show very early on and that may be innate or supports the idea of a universality to emotional understanding (Ekman, 1982). In contrast with emotions that are short and can change throughout the day, temperament is a more constant state of being. It's a kind of predisposition toward a constant way of reacting to emotional experiences. Child psychiatrists Thomas & Chess (1963; 1968), looked at individual differences in baby's temperament. Profiles of early temperament, as they found out, have long-term consequences, and are predictive of the big personality types in adulthood.

Yet, what is considered as a difficult temperament in one family or cultural community, might be seen differently in another. For instance, in rural Kenya, where shared caregiving is typical, children who don't adapt well to being handed over to multiple caregivers are considered difficult. In communities where a primary caregiver is the norm, such as the US, parents will on the other hand pride themselves with the fact that babies only want to be with them. Similarly, regularity is seen differently in schedule-driven versus less schedule-driven communities. The dimension of going to sleep at the same time, eating at the same time, and so on, is not as important in less-scheduled communities, such as rural India. Parents' use of emotional language can also help child understand and label their own emotions and understand emotions in others. Secure and positive attachments are also associated with positive emotional development. On the other hand, inadequate physical

development (stunting, malnutrition…) can lead to slow levels of positive emotional development.

The Effects of Stress and Violence

Positive, Tolerable, and Toxic Stress

All animals are born with a stress response system that allows us to respond to threats and ensure our survival as a species. Not all stress is bad, positive stress, or regular stress, is linked to everyday small challenges (i.e. sharing toys with a friend or being refused candies) and does not last over a long period of time. The next level of stress is referred to as "tolerable" stress, which is linked to sudden violent events such as the death of a relative or witnessing a one-time conflict. It is highly dependent of the capacity of parents and other caregivers to manage stress by providing a sense of comfort and safety to the child. The third kind of stress, and most dangerous, is "toxic stress" and is mostly characterized by a "strong, frequent, or prolonged activation of the body's stress management system [4]". Studies indicate that toxic stress can have a dreadful impact on brain architecture, even more so during the early developing years when the brain is most sensitive to environmental influences. Continuous activation of the stress response system is also closely associated with disruptions on the nervous system and brain chemistry that can damage the immune system and metabolic regulatory functions. The activation of the body's stress response system produces a variety of physiological reactions such as an increase in heart rate, a rise in blood pressure, and elevated blood levels of stress hormones (i.e. cortisol) and inflammatory proteins (i.e. cytokines). Prolonged activation of the stress system has therefore been closely linked with disruptions on the foundations of the brain architecture upon which future learning and behavior skills are built (McEwen, & Sapolsky, 1995; Caldji et al., 1998; Gunnar, & Donzella, 2002). Additionally, science has shown that toxic stress in the early stages of life "can result in a lifetime of greater susceptibility to physical illnesses, such as cardiovascular disease, hypertension, obesity, and diabetes, as well as mental health problems, such as depression, anxiety disorders, and substance abuse" (Anda et al., 2006; McEwen, 1998; McEwen, & Seeman, 1998) .

Furthermore, epigenetics teaches us that there is a biological "memory" link between adversity factors in early childhood and greater risks of health issues (e.g. heart disease, diabetes, chronic illness) in adult life. A U.S. study looked at the cumulative effect of different adversity factors such as abuse and neglect, poverty, low parent education, mental illness in a parent, or incarceration of a parent. This study highlighted that our body can in fact adapt to some level of adversity. However, the cumulative effects of adversity factors before age three highly contribute to poorer outcomes later in life. While the percentage of children at age three failing a developmental assessment (cognition, language, emotional, social well-being) was of under 20% for children who faced between 1-3 risk factors, that number goes up to 90-100% for children who have faced 6-7 of those risk factors in the first three years of their life (Barth et al., 2008).

Children facing adversity

Multiple surveys conducted by the UNICEF have shown high rates of violent discipline including physical punishment, with very low rates of children only experiencing non-violent discipline across cultures and countries.

However, physical punishment in discipline has not been found to actually improve behavior or development of the child. Developmental psychologist Elizabeth Gershoff, on an analysis of over 117 studies (2002; 2010), highlighted as results of physical punishment an increase in child aggression and anti-social behavior. The study also informed on the effects later in life with associated increased criminal and anti-social behaviors into adulthood and decreased mental health. Moreover, experiencing routine violent behaviors at home as a child increases the risk of the child repeating similar abusive behaviors against spouse and children later as an adult.

Alongside violence against children, very high rates of intimate partner violence against women has been observed, regardless of the level of economic development of a country. A recent survey on 104 countries revealed that only 16% of the countries in the survey has a comprehensive policy to combat these forms of home violence, while 22% didn't have any and over 50% only had "partial" policies against them (Ortiz-Barreda & Vives-Cases, 2013).

There is a need to address violence at home against children or their mothers. This need can be addressed through supporting families after the fact [5] while also actively implementing preventive approaches (e.g. identify and address families at risk, or improve parenting approach) [6].

Resilience in children starts with a supportive environment of relationships

Resilience in children is defined as the capacity to face and overcome various adversity and stress factors throughout the course of childhood and adult life. The first essential step toward building resilience is the degree to which parents and other adults are able to protect children from sources of toxic stress. The second essential feature is the ability of these adults to provide supportive care and bring the required healthy coping system for children to be able to deal with stress.

Children might use a few different strategies to cope with strong emotions, or "self-regulate" and involve a mix of language, cognitive, behavior and executive functions that build around preschool age. In these years, children can develop some problems with self-regulation. One is called internalizing behavior, which are withdrawn or anxious behaviors. The other is called externalizing behavior, which is about "acting out" with aggressive behaviors or less obvious behaviors such as lying, cheating, or stealing. Studies (Mulvaney & Mebert, 2007; Ma et al., 2012; Hecker et al., 2014) found that internalizing and externalizing behaviors generally increase with parent's corporal punishment and decrease with maternal warmth. However, corporal punishment seems to have less harmful consequences on cultural settings where it is the norm than the ones where it is not the norm.

In conclusion, there are various set of periods for the development of different early and complex skills, and they can differ slightly from one culture to the other, and from one individual to the next. But, overall, this development begins as early as in the prenatal environment of the mother's womb and is particularly intense during the first years of the child's life. Vision and perception emerge earliest, followed later by language and higher

cognitive functions. During that early time of life, development is closely linked and sensitive to the child's environment.

2. ECD Policies

The Health Sector in Early Childhood Development

Improving Health and Nutrition

The main reason for the integration of early childhood development in health policies and practices is that development neurobiology studies strongly support that biological risk factors such as malnutrition, low birth weight, malaria, diarrheal disease, and heavy metal exposure are closely associated with both poor physical health and poor developmental well-being with lifelong consequences. For example, diarrheal episodes can lead to a depletion of essential micronutrients that are needed for the child's development, which in turn can lead to poor learning development and also children less willing and able to explore their environment and grow correctly.

High-quality health care and adequate nutrition before birth (for pregnant women) and after birth (for both the primary caregiver and baby) are fundamental to the promotion of healthy child development. Providing access to affordable health services (including mental health care, when needed) is, therefore, one of the most effective policies available for reducing perinatal and early childhood health impairments (Carroli et al., 2001). However, in many poor countries, there are just no doctors, or nurses, or functioning clinics in rural areas and poor communities. In other countries, although there is a physical possibility to access health services, it's too expensive for households to be able to afford it or people are too estranged with the services offered (often highly influenced by western medicine practices). For many, therefore, regular health check-up in clinics is not seen as a routine practice and can even in some cases be seen as a last resort solution to health issues.

Stunting

Stunting currently affects up to 50% of children under 2 years of age in LMICs, and this is closely associated with poor cognitive development. More generally, around one-third of children under the age of 5 – 250 million children – fail to meet basic indicators of developmental potential, due mostly to stunting or exposure to absolute poverty (Grantham-Mc Gregor et al., 2007). Worldwide, stunting has significantly declined, by one-third, between 1990 and 2010 along with under-5 deaths, which have declined by 50% in the same 20-year timeframe (from 12.7million in 1990 to 6.3 million in 2013). But as highlighted by the Center On The Developing Child, that means approximately 17,000 fewer children dying daily, but still 17,000 children under 5 that are dying every day around the world. The MDGs that aimed to reduce by 2-thirds the under-5 mortality rate in every countries of the world really made a difference even if the goal has not been achieved in every region (especially in Asia and Sub-Saharan Africa). There are continued high rates of children being stunted, particularly in developing and low-income countries where, like in India and Sub-Saharan Africa, it still averages 40% of children under 5 [7].

Stunting, as defined by the World Health Organization (WHO, 2017) is "the impaired growth and development that children experience due to poor nutrition, repeated infection and inadequate psychosocial stimulation". Children that are stunted by the age of 2/3 years old will suffer consequences on health and productivity during the rest of their childhood and adulthood. Searchers have demonstrated that even though stunting cannot be cured, it can be avoided. The most crucial period is the first 1000 days of life (from conception to 2 years), with up to 20% of the stunting that can be attributed to complication during pregnancy (infection, malnutrition, high level of stress…). Compatible to the hypothesis that epigenetic effects initiated during early development can be countered by good nutrition and stimulation in the early years of life, Grantham-Mc Gregor and colleagues (1991) have shown evidence that if given nutrition and stimulation early, children stunted at birth can approach the performance of control children by 24 months.

From an economic perspective an estimate 1% loss on height from child being stunted equals a 1.4% loss on economic productivity for poorer country. Economic losses related to stunting are losses on productivity due to poor physical conditions, losses due to poorer cognitive skills and school attendance, economic losses due to costs of healthcare resulting from chronic illness and weak immune system. Overall stunting results in poorer cognitive development, learning difficulties, growth and health issues, higher healthcare costs, lower productivity, difficulties to reproduce [7].

Different pathways can be considered to tackle the issue such as economic policies (food price regulation, poverty income, social security), health policies (access to healthcare, qualified professionals, decent infrastructures), education policies (female education, access to quality education), cultural policies (changing norms, women's status, social support), agricultural policies (self-sufficiency, nutrient rich food, diversifies diet), and sanitation policies (access to clean water, proper disposal of waste, clean households). Measures that can therefore easily be linked back to several of the Sustainable Development Goals adopted in 2015, beyond SDG 2 on Zero Hunger, such as SDG 1 (No Poverty), SDG 3 (Good Health and Well-Being), SDG 4 (Quality Education, SDG 5 (Gender Equality), SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities), as well as SDG 9 (Industry, Innovation and Infrastructure) and SDG 11 (Sustainable Cities and Communities), all the way to SDG 7, 13, 14, and 15 on Affordable Energy, Climate Action, Life Below Water, and Life On Land which are critical to building self-sufficiency and better economic situations to both poor and small communities in rural or urban contexts alike. Finally, such a diverse package of measures calls for strong institutions on a national and international level (SDG 16) and enhanced partnerships, both between countries and between the private and public sectors (SDG 17).

While stunting is only one of the aspects that can be addressed through ECD policies, we can already see from this one example how intertwined with the SDGs these policies are.

Neurotoxins

There is no question that early exposure to certain chemical substances can cause significant and irreversible damage to the developing young brain of a fetus or infant. Push to reductions in the levels of well-documented neurotoxins (such as alcohol, mercury, and lead) in the environment have been proven to lower the risk of preventable damage to the brains of fetuses

and young children. However, it is not generally incorporated into public policy, and when it is the thresholds are determined based on research findings from mature animals and adult humans, with obvious greater tolerance levels than children, let alone an infant or fetus [8]. Consequently, the fact that some legally available substances such as alcohol and certain prescription drugs are noticeably more toxic to the developing brain of a fetus than most illegal drugs is not known by most people (Burbacher & Grant, 2006; Costa et al., 2004; Welch-Carre, 2005).

Ignoring the devastating impacts of neurotoxins, aside from the emotional burden of severe disabilities that could have been prevented, is expensive for society. Lead poisoning alone, which has been accused of causing severe cognitive impairment in children, has been estimated to costs society approximately $43 billion annually (Landrigan et al., 2002). Expanding public awareness could lead to significant benefits. Information on the toxic effects of pesticides, for example, would enable pregnant women, families with young children, and ECCE centers to make more informed choices about the products they use [9].

Responsive Parenting

Aside from the direct focus on children's welfare, science tells us there is a close link between a child's health and psycho-social development and the ability of parents to provide responsive care. For instance, touch has been shown to have a real impact on weight; which is commonly referred to as "kangaroo care" or extensive skin-to-skin contact. A program in Bangladesh showed that kangaroo care on premature babies helped for quicker growth, reduced mortality and building a stronger immune system (Sloan et al., 2008). More generally, responsive parenting is defined as the capacity to understand what the child needs, or is trying to communicate, and the ability to respond accordingly to the child's needs). A lack of responsiveness in the child-parent interactions is most often attributed to a simple lack of education on how to implement responsive parenting due to poor formal education, early pregnancy, lack of external support, or the absence of responsiveness during the parent's own childhood. However, it can also be attributed to a lack of financial resources to buy books or toys, or mental health issues such as depression or substance abuse.

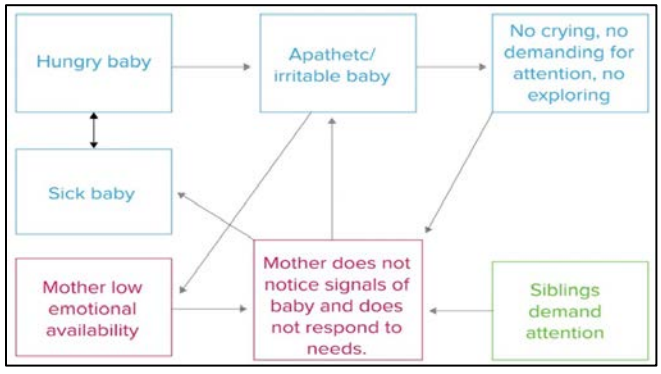

Figure 5. The effects of maternal depression.
Source: Center on The Developing Child, 2014.

Maternal depression, during or after pregnancy, is not only harmful for the mother's well-being but also for the baby (see Figure 5). Among the effects on the baby's well-being, a study in Pakistan (Rahman et al., 2004) determined that children whose mother is experiencing depression are 2.3 times more likely to experience an episode of diarrhea than other children.

Program Implementation

Introducing ECD interventions into the health sector

The Health sector can cover a number of areas for the ECD field, from directly focusing on the health of children (e.g. immunization campaigns) to focusing on nutrition (nutrient supplementation programs), mental health (counseling services in health clinics), parenting (group or home visits to strengthen parenting skills of new families), along with social and child protection programs from competent social services. There are various techniques through which health professionals can support the delivery of early childhood development related information to parents. That can include, but is not limited to:

- Giving leaflets or posters (small media items as take-home reminders to families is useful.)
- Allowing families, the opportunity to practice new activities
- Providing feedback (positive praise).
- Problem solving, social support
- Peer-to-peer learning (group sessions) can also support the advice giving.

In Turkey, a training delivery program to teach pediatricians on how to provide stimulation advice as shown results in only two visits with reported number of parents who started reading to their child more than 4.5 times higher than parents who only received a routine health visit at the clinic centers (Ertem et al., 2006). Other examples include the use of printed health cards with advice to bring home and nation-wide implementation of immunization records in Moldova (Laur & Officer, 2011) , the screening of videos about child stimulation in the waiting room of primary healthcare center in the Caribbean (Walker et al., 2015), and the Reach Out and Read program in the USA (Zuckerman, 2009).

Although contrasted results were found regarding the outcomes of these programs, the main factors for success were skilled staff, effective public targeting, and the large-scale capacity of each program to conserve reach and quality objectives in their respective environments. For example, in Turkey the long-term effects of the project were negatively affected by the lack of resources and the limited out-reach of pediatricians to middle-class and isolated communities in the country. We also need to think about not delivering knowledge-based training but competency-based training by giving health workers, or other delivery agents, the skills to listen, guide and problem solve with families by building on the family strength. For interventions to be effective, delivery agents need to move beyond the simple delivery of advice and really be able to engage in a comprehensive, action-oriented discussion with families.

Securing political support

Finally, and it is of crucial importance, we need to ensure that these interventions are supported by policymakers and lasting policies, as these programmes require resources and investments

to build competencies of workers and provide adequate interventions and material to families. Additionally, countries that provide quality universal early development programs for families with young children tend to out-perform countries in which the early development programs are chaotic (Tinajero, 2009; Mc Cain, Mustard & Shanker, 2007), which is a powerful argument for understanding the importance of further integrating ECD in national policies.

The Education Sector in Early Childhood Development

Pre-primary education has increased since the 1990, but still nearly half of the world's young children have no access to it [10]. In some countries affected by conflict less than 5% of children have access to pre-primary school [11] while it has also been advanced that in countries with twice the levels of educational inequality, the probability of conflict more than doubles [12]. Additionally, great disparities remain in the type of education children will be able to receive between the poorest and richest households within a country.

Early Childhood Care & Education (ECCE) has been the historical main focus of ECD policies and is directly addressed withing the framework of Agenda 2030 under Target 4.2 to "ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education" with the proposed measurement indicator of the "percentage of children receiving at least one year of a quality pre-primary education program". However, if the access to quality pre-primary education is essential, one year is not ambitious enough, especially when considering that in a number of countries primary education starts at age 8 or 9.

Considering the evidence brought forward by science on the development of the brain architecture and early skills in the first years of life, we know that this is therefore obviously not enough. Moreover, A classic study on ECE in Chicago showed that greater duration was associated with larger impacts (Arteaga et al., 2014). A second year of preschool, although not clearly doubling the impact of the first year, appears to add substantial gains in cognitive outcomes (Yoshikawa et al., 2013; Engle et al., 2011) along with substantial return on future earnings and health benefits of up to $10 generated for each $1 invested in an additional year of schooling in low-income countries (Schäferhoff et al., 2016).

Reevaluating the quality of early childhood development.

Preprimary education has been found to benefits all children, no matter their economic background, and yet, as with many other ECD services, those from the most disadvantaged backgrounds benefit the most (McCartney et al., 2007; Hasan et al., 2013). Earlier than the preprimary year, exposure to childcare settings outside the home can also lead to benefits for young children, as long as these settings incorporate emphases. Quality pre-primary education has also been shown to have great positive impacts on both communities and the economy. The US Council of Economic Affairs, in 2014, estimated that the economic benefits relative to cost was $8 saved to society for every $1 spent on high-quality preschool education.

We distinguish between two kinds of quality: structural and process. While structural quality refers to basic health and safety standards, group size, and the degree of qualification of teachers, process quality refers to the responsiveness of teacher-child interactions, the quality of relationships among children, and the form of pedagogy used for engagement & learning practices (Yoshikawa & Kabay, 2014; Bernal & Fernandez, 2013; McCartney et al., 2007). However, both are on average in the low or inadequate range, in both LMICs and high-income countries, reflecting the overall marginalization of the ECD field in public policies (Yoshikawa & Kabay, 2015).

One famous example of a quality preschool program is the Madrasa Early Childhood Program (Mwaura, Sylva & Malmberg, 2008). It began in 1986 as an Aga Khan Foundation initiative and have spread to multiple African countries since then through community-run preschools for 3-6-year-olds. Among the key elements of the schools are an effort to link local cultural values with national and international realities through a comprehensive educational approach while targeting other issues such as physical health through daily check-up. Every day starts with a routine morning circle for traditional songs and dances, then the day is organized according to the child's desire with multiple activity areas within the classroom with the ultimate goal to support both physical, language, and numeracy development along with socio-emotional and creativity development. Teachers also try their best to incorporate the children's home language into the classroom to encourage the use of mother tongue and facilitate the transition to second and/or third national languages. The school are also design in a way that emulates both the home and natural environments of children to stimulate "happy learning".

Building quality ECCE policies

Pathways to improve the quality of pre-primary education include providing curricula and activities for teachers that are focused on specific areas of learning (language, reasoning, socio-emotional skills, etc.) along with on-site mentoring of teachers (observation and supportive feedback from third-party observer) (Reetu, Renu & Adarsh, 2017). Studies also identified the importance of implementing quality standards (nationwide monitoring and evaluation system based on shared standards), professionalizing and raising status/compensation of the ECD workforce (often paid low, if paid at all in most countries), and aligning curriculums with primary education for a smoother transition.

One particular point, common to rich and poor countries alike is the value given to working in pre-service programs. Early childhood educators tend to have lower remuneration and less attractive career paths than primary and secondary school teachers, which consequently makes the early childhood field less attractive to qualified individuals. Countries must rethink their approach to recruit, train, and motivate workers in the field of early childhood care and education. Investments in skilled human resources are the foundation to better outcomes and high-quality ECCE programs.

The duration of training for teachers and caregivers in ECCE seems to matter for children. Comparison of 3 forms of preprimary education in Cambodia, for example, showed a linear relationship between effect sizes on learning and cognitive outcomes for children and the intensity and duration of pre-service training of the teachers (Nirmala et al. 2012). An impact evaluation of an 18-month training and professional development program in Colombia showed positive impacts on

observed quality in the Hogares Comunitarios home-based childcare program, and positive impacts on children's health and behavior (Bernal, 2012).

Diversifying ECCE programs

While report show that young people from the poorest 20% of households are almost six times as likely to be unable to read as those from the richest 20% of households [13], according to UNICEF a child whose mother can read is 50% more likely to live past age five, 50% more likely to be immunized, and twice as likely to effectively attend school [14].

Beyond the advantages that literacy and other cognitive skills oriented ECCE programs can have on domains such as health and well-being, ECCE programs that include non-educational services appear to be particularly effective for achieving significant positive outcomes in the domains they focus on. For instance, facilitating immunizations and primary health care in pre-primary programs has been shown to improve health outcomes (Yousafzai & Aboud, 2014) while socio-emotional improvements such as reduced behavior problems are greatly facilitated by an explicit emphasis on this area of development in the training or curricula given to educators and teachers (Schindle & Yoshikawa, 2012).

Early care and education programs can vary greatly, with some mixed evidence on their respective effectiveness to reach their initial objectives, however, the principal elements that have consistently produced positive effects include:

1. highly skilled teachers (Barnett et al., 2005; Gormley et al., 2005; Early et al., 2007);
2. small class sizes and high adult-to-child ratios (NICHD, 1999);
3. age-appropriate curricula and stimulating materials in a safe physical setting (Zill et al., 2003);
4. a language rich environment (McCartney & Phillips, 2006; NICHD, 2000a; Snow et al., 1998);
5. warm, responsive interactions between staff and children (NICHD, 1996, 2000b); and
6. high and consistent levels of child participation (Hill et al., 2003).

This recent set of findings on program evaluations appears to highlight how, beyond a mere access to pre-primary education, quality and focus of core and additional (that is, non-educational) services should be considered central to the construction and implementation of successful ECCE programs, with a particular focus on the importance of early childhood educators in these programs.

The Urban Environment in Early Childhood Development

Smart Cities and Communities (Introduction to the concept and link with ECD)

Developing countries are home to 15 of the 21 largest cities on the planet, 4 of which are located in Central and South America (Figure 6). Megacities have to deal with various issues such as transportation and high levels of noise and air pollution directly linked to congestion and heavy reliance on cars, as well as rapid growth of the demand for housing and public infrastructures such as hospitals and schools. These aspects are exacerbated in developing countries with much lower capacities for private and public investments which often results in poor, if not completely absent, public infrastructures, and poorly constructed homes (i.e. the favelas of Rio de Janeiro, or the Neza-Chalco-Ixta megaslum of Mexico City) where most of the community lives under the poverty line, often lacking basic services such as drinkable water and sanitation coupled with high crime rates and difficult integration with other sectors of the city.

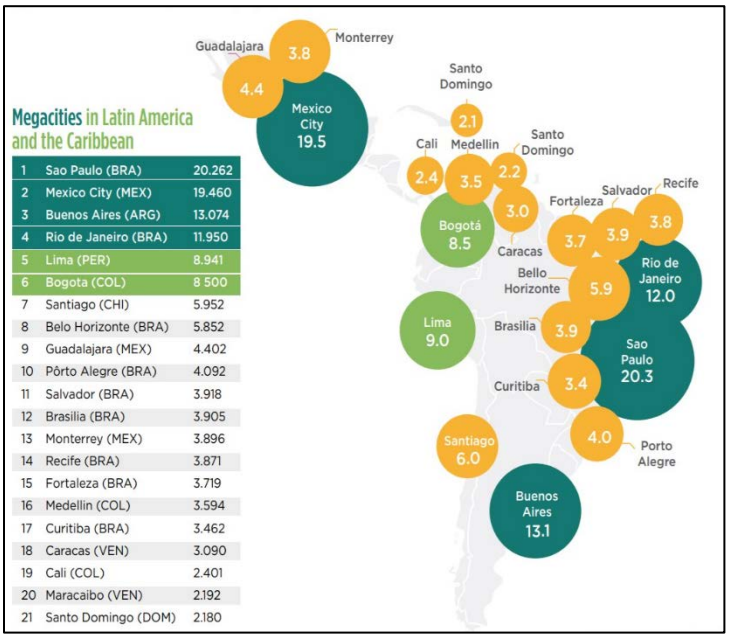

Figure 6. The megacities of Latin America (millions of people)
Source: esa.un.org/unpd/wpp/

Urbanization is a global trend that is only acceleration, with projections that by 2050 nearly 70% of the world's population will be living in an urban environment. This poses two obvious issues: how to meet the growing needs of households living in an urban context, and how to ensure the production of primary resources such as food and raw materials with farms and working lands disappearing at an alarming rate. SDG 11 (Sustainable Cities and Communities) calls for rethinking the urban landscape and way of life. The vision of SCC is to improve livability, preservation, revitalization, and sustainability, of a community (Figure 7, Song et al., 2016).

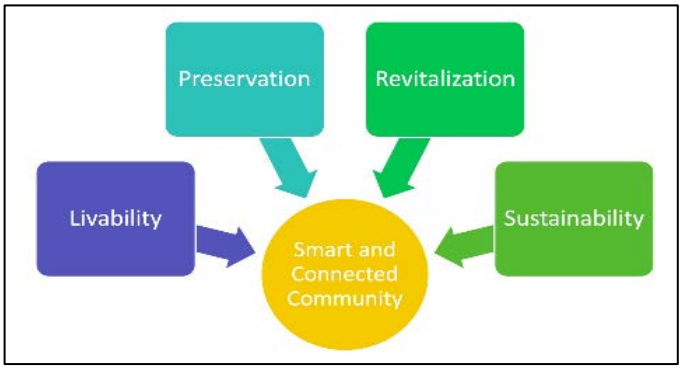

Figure 7. The Vision of Smart and Connected Communities. Source: Sun et al., 2016.

Per Sun et al. (2016), livability would be defined as a "primary characteristic for smart and connected cities" and consist of providing and promoting more economic opportunities, affordable housing, community value, and more transportation choices such as walking, public transport or cycling (Living in the present). Preservation encompasses both the cultural heritage and natural heritage of a place, which constitute sources of identity and cohesion (Remembering the past) and are greatly threatened by physical change (destruction of heritage monument, of natural spaces) and psychosocial changes (loss of local languages, traditions, and ancestral knowledge). Revitalization on its own is about creating new opportunities for rural areas and small towns to become attractive again in the face of a growing decline of their population in favor of megacities. Finally, Sustainability is about defining policies that consider both the current need of the population and the need of future generations through "economic and environmental health, social equity, and broad-based citizen participation" (Planning for the future). Achieving SDG 11 and building resilient, smart, and connected communities and cities relies heavily on two pillars: building human will for change through individual actions and global policymaking on the one hand, and using the immense potential of technologies (Song et al., 2016). It also relies on an integration of the past, the present and the future, and of all communities.

This relates to ECD policies in many ways. First, green spaces provide ground for leisure activities and physical exercise which are both critical to development. Then, health in the early years is very sensitive of environmental factors such as pollution, sanitation, housing conditions but also economic and social stability in the home and in the communities (Costa et al., 2004; Landrigan et al., 2002; McEwen, 1998). Situations of conflicts or economic instability can cause high level of stress, either directly or indirectly through the parents. Finally, lack of access to proper sanitation and clean water is the leading cause of chronic diseases such as diarrhea and a significant risk factor during pandemics (i.e. Malaria, Ebola, Coronavirus).

Finally, the ability to care about others and value social justice and peace is one of the pillars that makes a city become sustainable (Näslund-Hadley et al., 2016). Such behaviors require strong social and emotional skills along with a sense of fairness and justice, which are all skills that build up during the early years of childhood

Poverty, Sanitation and Food Security

Extensive research has shown that children who grow up under conditions of poverty are more likely (relative to nonpoor children) to be less successful in school, less productive as adults in the labor market, have lifelong health problems, and commit crimes and engage in other forms of problematic behavior (Holzer et al., 2007).

Among the various reasons linking poverty to compromised early development and later life conditions are the incapacity of parents to afford providing nutritious meals in sufficient quantity, to assure access to age-appropriate learning experiences both in and outside the home, and to guarantee safe and growth-promoting neighborhood environments (Becker, 1981). Poverty and economic insecurity also can impact of the mental health of parents through depression and other forms of psychological distress, which profoundly affects their capacity to provide sensitive and responsive caregiving in their interactions with their children (Zahn-Waxler et al., 2002; Shonkoff & Phillips, 2000).

Poor housing affects 600 million residents worldwide (poor water, sanitation, or infrastructure such as lack of sewage or dirt floor). Dirt floor expose children to parasites and diseases.

In Mexico, the Piso Firme project, created in 2000 and conducted in urban slums across the country revealed that replacing dirt floors with cement floors had significantly positive effects on children under 6. The follow-up study (Luna, 2019) found significant improvement in expressive and perceptive vocabulary, as well as lower rates of depression and perceived stress for adults in the households, along with a 78% reduction in parasite infections and 49% reduction in episodes of diarrhea.

Another priority for both urban and rural communities is the ability to have food security and sovereignty. While the FAO defines the former as "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious foods to meet their dietary needs and food preferences, in order to lead an active and healthy life", food sovereignty is understood as "the right of all people to define their own food and agricultural policies in order to obtain sustainable development and domestic food security objectives by favoring local food production" [15]. These priorities are reflected in the first and second Millennium Development Goals. The reality facing millions of children, however, is that these goals are far from being met.

To that extent, the International Food and Agriculture Organization encourages schools to create learning gardens initiatives which could be easily managed by students, teachers and parents, with a variety of nutritious vegetables and fruits, with simple production methods that can easily be replicated at home.

The objective of such initiatives is to create long-term dietary habits, building the capacity of growing food at home, and reconnecting with natural patterns [16].

Women representation in local Governance

In India, a study on women representation on local councils in communities that applied the 1/3 quota imposed by the 1992 national Law on Female Representation, showed great promises on women local governance for youth in these communities. The study found out that growing in these villages improved children's learning, health, and nutritional environment. With among the reasons offered, beside the societal change that empowering a minority such as women brings, more spending from councils towards education, and clean water-food distribution infrastructures (Jain, 1996).

Safeguarding the world's Intangible Cultural Heritage

The wealth of our common intangible cultural heritage

The UNESCO, recognizes the importance of safeguarding our world's intangible cultural heritage, which is defined in the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage as the "intangible heritage transmitted from generation to generation, as a result of peoples and communities interactions with their environment, nature and history and provides them a sense of identity and continuity through oral traditions and expressions, performing arts, social practices and rituals, knowledge and practices concerning nature and the universe, and traditional craftsmanship".

It is estimated that there are more than 6,526 languages, grouped in 251 distinctive language families, identified around the world (Nettle & Romaine, 2000). According to UNESCO, languages are « the principle vector of cultural expression and of the intangible cultural heritage, essential to the identity of individuals and communities ». However, still according to the organization, these languages are currently disappearing at a rate of one every two weeks [17]. Closely linked to the ability to express one's cultural identity, this rate of disappearance is closely linked with the historical challenges faced by indigenous peoples the world over, and the continued discrimination and disappearance of these community's ancestral knowledge.

Indigenous knowledge

Local and Indigenous Knowledge Systems and Practices, also known as Traditional Ecological Knowledge (TEC) according to UNESCO, is "a set of knowledge, know-how and philosophies developed by societies with a long history of dynamic interaction with their natural environment". It's a set of "dynamic and changing holistic, social and ecological knowledge"[18] integrated in a cultural system based on language, social interactions, rituals and spirituality along with a deep understanding of their natural surroundings and biodiversity reflected in sustainable and co-beneficial resource use practices [19]. It is adapted to local cultures and environments, and can also be referred to as local knowledge, folk knowledge, people's knowledge, traditional wisdom, or traditional science. Generally, it refers to the large body of knowledge and skills that has been developed outside the formal educational system, and that enables communities to survive (de Guchteneire, Krukkert & Liebenstein, 1999).

In Central Africa, per professor Bigombe Logo [20], we can for instance distinguish three major precious climate-related traditional knowledge: (1) the knowledge and science over ecological practices on resource use practices and agriculture; (2) the indigenous systems on biodiversity and ecosystem management; (3) the traditional meteorological science for the observation and forecast of meteorological variations according to atmospheric and biological indicators.

Indigenous societies also have an intimate knowledge of plants that can be used for medicine. They can easily classify thousands of plants and animals' species and recognize their special characteristics. Indigenous peoples even have words for plants and insects that have not yet been identified by the world's botanists and entomologists. For example, the Hanunoo people of the Philippines have distinguished 1600 plant species in their forest, 400 more than the scientists working in the same area. As a result of this deep understanding of their natural environment, nearly 75% of the 121 plant-derived prescription drugs used worldwide were discovered following leads from indigenous medicine (Cabanilla-Pedro, 2005; Burger, J.; 1990).

In an article published in the Philippine Daily Inquirer (2000), Curameng stated that indigenous knowledge enriches learning. He found that students could understand concepts and ideas more easily when they are integrated with community practices. However, considerable differences exist between scientific and indigenous knowledge regarding methods of teaching and learning and the purpose of wisdom. While scientific knowledge (non-indigenous) often turns to rapid acquisition of knowledge through formal didactic education and artificial experiments for the purpose of abstract knowledge and short-term predictions, traditional knowledge (indigenous) turns to lengthier period of knowledge acquisition, sometimes life-long learning processes, through storytelling, real life example and practical daily life experiences for the purpose of gaining a long term oriented wisdom and be able to predict well in local areas (Cabanilla-Pedro, 2005; Ulluwisheha et al., 1997).

The central role of language

According to UNESCO (2018), each language "reflects a unique world-view and culture complex, mirroring the manner in which a speech community has resolved its problems in dealing with the world, and has formulated its thinking, its system of philosophy and understanding of the world around it." But, for the past three hundred years or so, searchers have recorded a dramatic increase in the death and disappearance of languages, at a steadily increasing rate in many parts of the world, leading to a situation today in which "3,000 or more languages that are still spoken are endangered, seriously endangered or dying". Within the framework of early childhood education, it means that half of all children in low- and middle-income countries are not taught in a language they speak [21].

The importance of the use of the child's first language in education is supported by ample recent research showing that students are quicker to learn to read and acquire other academic skills when first taught in their mother tongue. Gonzalez (2001) described the result of his study on the subject as encouraging, with

experimental groups showing slightly better achievement than the control classes, and observations suggested an increased vitality and enthusiasm in those groups. He suggested that children seem to be most comfortable learning in their home language and begin to conceptualize rather than solely memorize teachings faster than when the language they are using is not familiar.

The use of mother tongue in teaching in a multilingual setting also affects the way pupils learn new languages. Studies support that these children can learn a second language quicker than those initially taught to read in an unfamiliar language (UNICEF, 1999; Gonzalez, 2001).

A number of studies have already demonstrated that a school-based learning setting that uses the mother tongue that they speak at home in the early grades strongly enhances children's ability to learn better compared to the use of an unfamiliar second or foreign language (Rai, et al., 2011) with strong results for the acquisition of academic and cognitive skills such as reading, writing and early numeracy skills (UNICEF, 1999) as well as later acquisition of another language (Maclaughlin, 1987; Krashen, 1985; Ndamba 2008 citing Cummins, 1981; Hawes, 1979; Obanya, 2003). It has also been well documented that if young children are primarily taught in a language different from the one they speak at home they are at higher risk to have low academic performance, drop out of school and repeat classes due to a higher failure rate (Yadava, 2007; Awasthi, 2011). However, although some initiatives exist to introduce multi-lingual or local languages into curriculum through "multilingual teaching, utilization of lingua-franca, improvisation of instructional materials written in mother tongue, remediation of instruction, and utilization of literary piece written in mother tongue as motivation", among the problems encountered by teachers in implementing such initiatives are the absence of books and materials available in mother tongue, lack of vocabulary and knowledge of mother tongue by the school staff, and a serious lack of teacher-training (Lartec et al., 2014).

Indigenous knowledge, 500 years of discrimination

issues

For over 500 years, Europeans settlers have invested a lot of thought and efforts in eradicating the traditional cultures of the Americas. In Peru, for example, between 1541 and 1613 alone, there no less than four different successive strategies, or "evangelism waves", from physical punishment and the burning of temples and *mallquis* (mummies of the ancestors) to intensive propaganda to teach the Christian faith to every corner of the country, and back to radical violence. At some point; native communities were even transferred from their traditional lands to concentration camps (reducciones) where they were forced to pay tributes and go to masses were they were both taught about the wonders of the European religion, and how false their traditional beliefs were (Diez Canseco, 1992). The later introduction of modern education by western industrialized countries resulted in the apparent further disappearance, homogenization, and eradication of traditional local knowledge. Colonizers made the implementation of assimilation policies a priority through missionaries and schools they set up in indigenous communities. Since national cultures are often defined by the westernized elite, the few elements of the local culture that were deemed "acceptable" and persisted through their integration into the mainstream culture were often taken out of their initial context and meaning, and either romanticized or stereotyped by non-indigenous (Rovillos; 1999).

Through this process, which has been very similar in the northern, central, southern and Caribbean territories, "most of the indigenous people's way of life – their cultural practices, traditions, arts and languages were virtually obliterated" (Ku Kahakalau; 1992). Yet, the cultural identity of indigenous peoples was never totally lost as many ethnic groups held on to their indigenous way of life in spite of the continued discrimination and threat to their lives it represents (Rovillos; 1999).

From post-colonial period to present, disparities in education persist as children from indigenous communities continuously fail to succeed in mainstream educational systems. Thus, indigenous people perceive the western educational systems as failures. In addition to ignoring traditional learning systems (see *"intent participation"* [22]), education curriculums often do not highlight their histories, and resistance. And so, local people also consider western education as a determinant factor to their marginalization (Cabanilla-Pedro, 2005) as in French Guyana (Alì & Rodica, 2016) where the French government strongly holds on to a history of leaving indigenous people's history out of the national curriculums while pushing for the survival of assimilation policies such as mandatory pension schools in the region.

mutual need

However, since culture is not static bu dynamic, indigenous people also want to be able to learn "modern" science and have access to education, but in the context of their own culture and alternative education systems that would guarantee that "valuable aspects of their traditional culture will be passed on from generation to generation [, so that] their children are not alienated from their cultural identity" (Cabanilla-Pedro, 2005). At the same time, indigenous youth also want to not be stigmatized by society and be able to hold on to their cultural identity while also being able, for some, to access modern technologies and job opportunities inside or outside their ancestral territories. Thus, communities demand more direct involvement in the structure, process, and content of education through consultations and community-based programs (CBPs).

While it is important to preserve and revalue indigenous knowledge and the capacity of indigenous community to care for themselves in their traditional ways. However it is also important to acknowledge that traditional knowledge that has been built over thousands of years based on a specific environment and region cannot face pandemics and illness from the outside on its own and need external support to face external threats such as diseases from other parts of the world, pandemics and natural disasters of frequency and proportion unprecedented in the history of their territories.

In addition to the demand coming from indigenous communities, industrialized nations are currently facing an ecological crisis. While scientific knowledge is generated by professional scientists through systematic scientific research and experiments conducted in laboratories or experimental farms, indigenous knowledge is generated by local people through their day-to-day experiences as they face the challenging and extreme conditions in their environment, and has been proven over thousands of years of experience (Hayden & Wai, 2013).

The compelling evidence put forward by this set of study point to the urgent importance of acknowledging the wealth and authenticity of indigenous knowledge, too often discredited by western scientific approaches. Indigenous knowledge has proven to be a great source of knowledge for humanity and holds a great potential for bringing solutions to many contemporary issues. Yet, few countries admit that they could learn from indigenous people's way of managing their resources, their practices being considered primitive and too crude for the modern societies (Hayden & Wai, 2013).

solution pathways

Work to integrate local beliefs and practices into ECCE programs has been found to be effective in a number of places such as Muslim East Africa through the Madrasa Preschool Program (Mwaura, Sylva & Malmberg, 2008), Turkey (Kagitcibasi, 2007) and Colombia (Super, Herrera, & Mora, 1990; Yoshikawa et al., 2014). Conversely, inability to relate programming to local contexts in certain so-called alternative programs has also been used as a theory to explain why certain interventions are ineffective (Super, 1976) as tensions with western science, the problem of differentiation, and the all too frequent decontextualization of indigenous knowledge by non-indigenous actors (Briggs, 2005) creates an environment of conflict with communities. A study by Hayden and colleagues (2005) on the outcome of a preschool program in aboriginal territories in Australia has revealed low rates of participation from families as a result of a lack of integration of traditional cultural education systems into the programs which led to families deliberately choosing not to take part in these programs that were seen as foreign to their notions of childcare. In light of the raised complexities, Hayden & Wai (2013) suggest that effective outcomes should be defined through community centeredness and empowerment, rather than the auspice under which programs can sometimes operate.

In the Philippines, an initiative to reportedly, "allow the community to take an active role in identifying what the children should learn; develop a culture-responsive basic education curriculum and culture-responsive teachers and school administrators; and increase the capacity of each Indigenous people child for national/global participation while preserving his/her identity (and be able to take pride in it)" through targeted education development programmes in 23 provinces has shown successful decrease of dropout rates and reduced non-enumerates and non-readers among Indigenous People's children. This move toward a comprehensive indigenization of curriculums in these communities has shown that academic performance is closely linked with having a curriculum relevant to the student's culture in both its content and its form (Quijano, 2004; Cabanilla-Pedro, 2006).

The initiatives currently undertaken by indigenous peoples call for a significant paradigm shift towards the integration of indigenous knowledge systems, know-how, and culturally based norms and practices in the policymaking and basic science of early childhood development (Cabanillo-Pedro, 2006). As this shift evolves, it is not only indigenous people who will be the beneficiaries, since many of the issues that are being addressed are of equal significance in non-indigenous contexts and the ripple effects will go far beyond early childhood and the education system (Nader, 1996).

3. A Large-scale Case Study of ECD Policies & Programs: Opportunities and Limits

Around the world

Many interventions have proven successful targeting a range of particular quality dimensions in Latin America (Jamaica, Costa Rica and Chile) [23-25]; South Asia (Bangladesh and Pakistan) [26,27]; East Asia (Cambodia) [28]; Africa (Kenya, Uganda, and Tanzania) [29]; and the United States [30-32]. Several show positive impacts on observed quality measures. In the area of social protection, trials in Mexico and in Nicaragua also showed positive impacts on young children's learning in conditional cash transfer programs (Box 3.2) that included educational components for primary school children (Fernald, Gertler, & Neufeld, 2008; Currie, & Thomas, 1995). In addition to which, when conducted properly, quality policies show return on investment that is greater than up-front costs, as will be discussed later in this paper.

The National Scientific Council on the Developing Child at Harvard University identifies 10 broad "effectiveness factors", or principles, that can enhance positive development in the first years of life:

- Access to basic medical care for pregnant women (nutrition, counseling, mental health services…) and children (nutrition, health check, immunization, early detection of developmental difficulties…).
- Early and intensive support for vulnerable families expecting a first child through home visits by skilled professionals.
- Access to high-quality early education programs for vulnerable children
- Two-generation programs for families in difficult situations that provide support for both parents and children
- Specific and intensive services for children experiencing toxic stress from "recurrent child abuse or neglect, severe maternal depression, parental substance abuse, or family violence".
- Income supplements for working parents living under the poverty level
- Environmental policies to reduce the level of early exposure to neurotoxins
- The diverse nature of ECD requires a range of services and approaches, that no single program can tackle alone
- Quality standards and good planning and monitoring are necessary to successfully "scaling-up" pilot programs to regional or national levels.

What is not known, however, is how much each component contributes to the long-term effects of successful program as most have included nearly all of these elements. The available data does not inform on whether some features of these program are more important than others or whether the full combination is essential to achieve the strongest impacts. Such information is at the center of recent studies on program innovation, with the objective of making early childhood programs more adaptable, successful, and cost effective.

Additionally, there is a global consensus from recent studies on the concept of providing support for parents in addition to high-quality

programs for their children. The rationale for thus blended multi-generational approach is to broaden the focus of early childhood development policies to the environment of relationships of children; which have been known to have a direct impact on cognitive, social, emotional, and health outcomes for vulnerable children (St Pierre et al., 1995; Yoshikawa, 1994). . Program evaluation research indicates that several strategies can be effective for young children and families experiencing significant adversity. Depending on the specific circumstances, these might include intensive home visiting by specialized nurses or highly trained practitioners, skilled counseling for mental health problems, or a mixture of intensive home visiting for parents and high-quality center-based services for children, among others (Sweet & Appelbaum, 2004; Ialongo et al., 2006). This gives policymakers some latitude in choosing among program approaches to address specific objectives.

Finally, the last principle brought forward by this group of scholars is about the capacity of successfully "scaling-up" pilot or small-scale programs without losing the effects achieved at small-scale, and without exacerbating preexisting inequality as reaching out the most disadvantaged populations when implementing at scale has proven to be extremely challenging in a number of cases (Yoshikawa et al., 2007; 2014).

Box 3.1. *Conditional Cash Transfer*, one of the most popular solution to combat poverty, consist in a provision of cash for families under certain conditions such as school attendance, regular clinic visits, or good nutrition. Various countries in Latin America and the Caribbean have built a CCT program, among are Mexico's "Progresa" program (Parker & Todd, 2017) and Colombia's "Familias En Accion" program (Attanasio et al., 2004). For instance, the Mexican initiative focuses on school attendance and nutrition, with cash transfers designed to cover education, health check and food costs while serving as incentives to not put children to work. Results from these programs can provide us with information on outcomes, which had been a significant decrease in malnutrition and early childhood diseases, as well as increases in academic performance, health visits and height. Externalities, as studied by Mejia & Camacho (2014), also include a potential reduction of crime rates. Additionally, the data collected provides a roadmap to better target future infrastructure projects in health, education, and social support sectors.

Other solutions include unconditional cash grants (for low-income families), unconditional child grants (often a certain amount per child in the household), and support from NGOs and grassroot activism toward the inclusion of minorities and socially discriminated populations.

ECD programs in Conflict Zones

The number of international migrants and refugees has been growing tremendously, and every minute 24 people are displaced due to conflict or war worldwide [33]. In 2016, UNICEF estimated that 87 million children under seven years of age had experienced conflict for their entire lives [34]. Beyond those who die in situations of migration, those who survive experience toxic stress with tremendously negative consequences on the child's developing body and brain.

Various programs have been created, or rather adapted, to provide services to children in these situations. On example is the Learning in a Healing Classroom program, adapted by the International Rescue Committee in preschool classrooms for Syrian children in Lebanon, with the goal to address socio-emotional development and academic skills in an integrated way for children that have been exposed to trauma. Other initiatives include the Emergent Literacy and Math program from Save the Children and UNICEF, which was adapted for young children in areas of conflict and refugees populations, and the Care for Child Development supported by a joint collaboration between UNICEF and the World Health Organization, with the aim to provide support to parents too through a comprehensive parenting program (Kim & Dolan, 2019; Wolf et al., 2016; Richter, Lye & Proulx, 2018).

Latin America and the Caribbean: Colombia

De Cero A Siempre

There is a need for ECD to be multi-sectorial, therefore ECD policies call for an integrated, inclusive and holistic approach to build cross-sectoral and coordination systems, promote innovation, overcome gaps in knowledge, while building cost-effective and culturally appropriate policies. The country of Colombia has been among the first to start investing on ECCE with the first preschools opening in 1962, three years before the Head Start preschool program in the US, and by 1994 the Ministry of Education decided to seriously invest in wide scale preschool education throughout the country for children 4-6. In parallel, the Instituo Colombiano de Bienestar Familiar, the national leading institution for children policies, decided to launch in 1986 the Hogare Comunitarios de Bienestar. This program was designed as a community-based childcare program with volunteer community mothers and an emphasis on community and women's empowerment. At the time it was not paid but the ICBF provided basic training and material resources for the centers. By 1990, the program was serving over 1.5 million children in the country.

Following a national push for decentralization of decisions and budget to regional and local institutions and growth in intersectoral coordination under the National Development Plan for 2010-2014, a cross-ministerial body for ECD was created which led to the fruition of the De Cero A Siempre national early childhood development policy. The national policy was built through an inclusive policy development process, involving thousands of consultations across the diverse communities of the country (Afro-Caribbean, Andean, Amazonian, …). They also did extensive consultations with experts and international agencies, and many ministries and agencies of Colombia (i.e. Institute for Family Welfare, and the Treasury Department). The government created an inter-sectorial boundary spanning entity (Box 3.2), with an explicit mandate to coordinate efforts in a commission focused on ECD to mobilize all the different actors that would be involved in the policy from the private sector and families, to local, regional, and national institutions of the public sector.

The commission ended up creating a policy that guarantees that all children in Colombia shall receive 8 different "attentions" (atenciones), that are needed for children to thrive. Among those attentions are the guarantee of birth registery, access to cultural content, regular doctor checkups, and access to educational programs with qualified teachers. They created new centers (Centros de Desarrollo Infantil, or CDIs) for children's development that are focused on interdisciplinary integration. These centers

provide high-quality preschool education in addition to ensuring a set of diversified services such as mental health, nutrition, and physical health specialists. Moreover, these centers include culturally specific materials and local languages, and ensures the families receive the different aids that are part of the government national policy (i.e. Conditional Cash Transfer program).

In Colombia, the De Cero A Siempre policy also did a variety of actions in the direction of continuous efforts to building up the capacity of a national workforce in ECD. First, by updating standards for service provisions in the Centros de Desarrollo Infantil along with the degree and training qualifications of staff. New mentoring methods such as on-site in-classroom mentoring has proven positive outcomes for quality of teaching improvements.

There are two other interesting examples for follow-up improvements of the Colombian national policy, the certificate program for capacitation of women in the Hogares Comunitarios, and emerging pre-primary education programs such as aeioTU. The first initiative refers to the creation of a part-time 2-year certificate program for mothers from low-income communities running the Hogares Comunitarios and designed to improve the quality of childcare within these settings. The second initiative, aeioTU, started as a social enterprise and is now operating more than 100 centers and growing. This program tackles the issue of quality in pre-primary education, particularly the ability to foster creativity, autonomy, and play that builds learning through quality teacher-children interactions [35]. It was adapted from world-famous Reggio Emilia Italian preschool [36], and centers on art space and project-based learning.

However, in practice several difficulties have emerged, as decentralization offers many opportunities for building more comprehensive curriculums and strengthening local communities, it has shown great disparities in application between rich cities (Bogota, Cali, Medellin) and rural or poorer communities which lack the financial and technical resources to effectively conduct the De Cero A Siempre policy framework (Bernal & Camacho, 2012). There is also a great challenge in data collection and analysis as there is currently no national tool and even if there was, many areas would not have the resources to collect and process related data efficiently.

Governance in Colombia's national ECD policy

Pia Britto et al. (2013), conducted a study on governance in six countries with a focus on ECD policies through horizontal and vertical governance. While horizontal refers to coordination across NGOs and government, and the kinds of coordination across ministries, vertical governance refers to coordination across levels, primarily between national, regional, and local levels. The latter was found to be the weak spot of countries as there often is a block in-between the national and local level that happens at a sub-national level (i.e. regional). There needs to be a flow of information going both downwards (e.g. supervisory, implementation of national policies) and upwards (e.g. feedback, culturally-specific local information) which is often lacking according to the study

In Colombia, horizontal coordination at the national level is represented by the inter-sectoral commission on ECD which sits in the President's office and has a membership across many ministries and NGOs. However, it's also important to have coordination at the village level such as communication between ECD actors (teachers, social protection workers, nurses, doctors, etc.). It's important that each can reach to the others, but also that they coordinate to provide the best services to parents and children by understanding and supporting the work of one another.

Regarding the issue of vertical coordination, it is being handled through two mechanisms. First, improved monitoring and evaluation systems, and second, improved training and supervisory systems across levels that mobilize sub-national resources and efforts.

Box 3.2. *Boundary Spanning Entities (BSEs)*, such as Crece Contingo in Chile (ChCC) and De Cero A Siempre in Colombia (DCAS), are mandated coordination vehicles to coordinate efforts successfully. At the national level, a central unit coordinates action across ministries, while at the regional level, a regional coordinator convenes the regional representatives of the line ministries. Finally, at the municipal level, a local level coordinator manages intersectoral coordination. The idea is to organize services around the comprehensive development and needs of each child and family through both horizontal and vertical coordination. The Chilean program for instance includes (1) specific funds for municipalities to manage local coordination, (2) a data system to track policy implementation, (3) training to municipal officials in intersectoral management. (Berlinsky, & Schady, 2015)

National Program vs. National Policy

Peru has also benefited from a close collaboration between civil society leaders and government, with decentralization also playing a key role in the structure of a comprehensive national ECD policy framework. One critically important aspect of Peru's approach is the recognition that in spite of long-term histories of discrimination, inequity and exclusion, rural areas have powerful strengths and opportunities. (Yoshikawa et al., 2014)

But unlike the program De Cero A Siempre in Colombia, which is a set of coordinated national policies, the Peruvian program Cuna Mas is a single program that focuses on both supporting employment of parents and promoting positive parenting and child development. It targets communities facing poverty and extreme poverty for 0-3-year old through both regular home visits and day care centers.

Rethinking Evidence-Based Interventions

Currently, most tested early childhood development programs around the world are referred to as "evidence-based programs", or "evidence-based interventions". These programs are evaluated based on an average effect determined from a graphic representation of the observed outcomes. An evidence-based program is therefore defined as a program that, on average, produces more positive outcomes than no effect (baseline) or negative outcomes (Figure 8).

However, this method doesn't take into account the fact that it worked differently for some children, on which it produced no or negative outcomes. Or what role each component of the program played in producing those outcomes, as discussed earlier in this paper.

Currently we have access to a number of model approach from group meetings to home-visit or clinic interventions to name a few. Instead of accepting the "average outcome" of program suggested by the current evaluation method for evidence-based interventions, we should challenge the results and wonder why it work better for some, and why it worked negatively or didn't work on others.

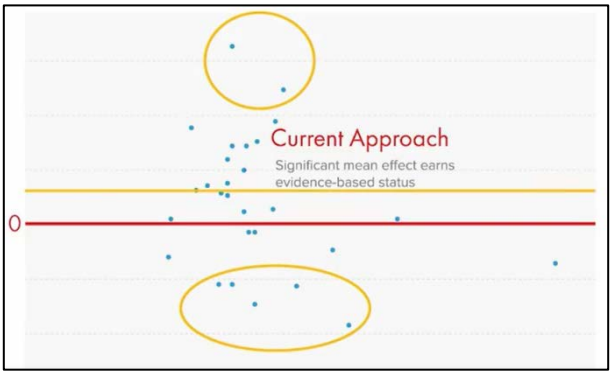

Figure 8. Current approach to ECD program evaluation.
Source: Center on the Developing Child, 2014.

There is consensus on the fact that the bigger the issues, the most comprehensive the program to address them needs to be. While for policymakers, comprehensive means "expensive", and for practitioners it means that "all issues cannot be solved with only one intervention method", once again, we need to focus on finding the right balance for each policy, where resources are used efficiently in a way that maximizes outcomes rather than taking the approach of funding the simplest and cheapest program, to the risk of wasting resources on limited outcomes. Policymakers, scholars and practitioners need to identify the "active ingredients" of these multidimensional approaches, along with the "active ingredients" of individual interventions. Identifying these active ingredients means highlighting what is making those interventions successful (maybe some aspects don't have any positive effects and so should be redesigned or abandoned, saving efforts and money that can be redirected to the active ingredients of the intervention), and also identifying what doesn't work (what contributes to negative impacts in some children or communities). Therefore, rather than a comprehensive approach we should turn to a "modular" approach that would allow for better adaptability to particular communities and settings.

The Modular Approach for Autism Programming in Schools (MAAPS) is one promising example of such an adaptative framework (Iovannone, et al., 2019; Anderson et al., 2020). In this program the evidence-based interventions (EBIs) available to schools are contextualized, reviewed, and adapted in function of the individual needs of each student on the spectrum. With the support of a coach, school can identify their own limitations regarding EBIs (e.g. limited resources, personnel training) and their student's needs, to plan the best modular approach possible.

To summarize, if we want to maximize our investments, reach the greatest number of children possible, while also getting the best outcomes for each one of them, we cannot afford to not develop better strategies. If current policies and programs have managed to bring promising results in reducing hunger, poverty, and overall difficulties of children to reach their development potential. Countries such as Colombia, Chile, Peru and the Philippines have demonstrated their ability to implement successful policies and better them in time, many aspects of their policies still need to be challenged, especially when regarding data collection, aggregation and utilization for advancing the ECD field. Other countries must continue their efforts to plan, budget and implement national comprehensive policies targeting the welfare of their youth, with a large body of research supporting the many positive outcomes on global health, welfare and productivity such policies can bring.

4. Conclusion

How to plan, budget and finance Early Childhood Development

Planning for Success

In order to realize the deep transformations called upon by the SDGs, governments need to review and rethink their structure and organization. It calls for cooperation at a national level between ministries and all different stakeholders on both a vertical and horizontal level under a common agenda, as well as cooperation at a supra-national level between governments, international institutions, and civil society

If everything doesn't need to be planned in advance, some elements such as public investments, regulations, and general policies need to be carefully thought through. As advanced by Jeffrey Sachs, President of the SDSN, "asking where we want to be, and finding the path to get us there, is the essence of successful SDG planning". Mass information is a powerful tool for "knowing where we stand and measuring the gaps to where we want to go", which is why, through the use of metrics and data, critical policymaking instrument such as the identification of best practices and backcasting are critically needed.

A case study by Kishita et al. (2017) tried to formalize the use of backcasting applied to resilient futures in a two-part scenario design process. Using a 4-step approach organized in workshops and involving both FTA (Fault Tree Analysis) and narratives to describe, first, collapsed futures, and second, resilient pathways based on identified countermeasures. The details of this study are beyond the scope of this paper, but in essence the idea of backcasting scenarios is to identify a vision of the future and from there build pathways backward that would allow us to reach this vision (desirable future) or avoid it (collapsed future) (Dreborg, 1996; Robinson, 1990). In the field of sustainable development, backcasting scenario design is often the product of a participatory approach that include various stakeholders from both the public and private sectors as well as communities to promote mutual understanding and democratic decision-making as well as grassroot participation (Kasemir et al., 2003; Lang et al., 2012; Carlsson-Kanyama et al., 2008; Robinson et al., 2011). Fault tree, on the other hand, is a deductive and failure-based approach, which starts with an undesired event (collapsed future), followed by determining its causes using a backward-stepping (Kishita et al., 2017; Stamatelatos et al., 2002). In the classic Fault Tree Analysis approach (Stamatelatos et al., 2002), the FTA is constructed from the top-down, that is, starting with generating goals after which risk factors (causal events) and countermeasures are generated.

The resulting fault tree is used for determining the scenario structure, by understanding the threats and planning possible countermeasures to build more resilience in the system. Countermeasures, such as policy options are put on a time axis according to their degree of complexity, first are identified short-term options that could be implemented almost immediately (such as planting a tree), then mid-term options that could be implemented in the near future (such as installing a solar panel), and finally long-term options that require bigger changes or funding to be implemented (such as building a comprehensive national policy for health coverage).

In practice however, governments rarely function on a goal-based manner. They often just seek survival and getting as much as they can for as long as they are in office for themselves and their constituents, with no long-term vision as recommended by Agenda 2030, a goal-based, quantified and time-bound 15-year plan. There needs to be a change of paradigm in policymaking if we want to have a decent future.

The current model has already proven its limits for tackling the threats of global change along with eradicating inequalities of all forms, including extreme poverty and hunger, where only the goal-based Millennium Development Goals plan (2000-2015) has been able to bring concrete improvements on a global scale. At a national level, China offers another example of successful implementation of a goal-based policy: the continuous Chinese "Five Year Plan" policies which are behind the development of the country over the past decades. The latest plan (2020 Goals) is the 13th consecutive goal-based national policy drawn by the national planning agency. It calls for quantified, and easily measurable, improvements in many areas such as infrastructures ("30,000 km of highways built or upgraded"), health ("at least 2.5 registered practitioners for every 1,000 people"), employment ("+50,000 urban jobs created"), environment ("5 million new energy vehicles manufactured and sold"), and food security ("total farmland maintained at 1.24 million km²") [37].

Planning national early childhood policies

As for other goals, early childhood development will require extensive planning and a goal-based approach. While we have already discussed the benefits that ECD policies and programs can have on children and society as a whole, this paper has also brought forward the need to consider every community and the diversity of adversities that families might be facing in each country. Additionally, this paper has evidenced the continued misunderstanding of the value of early childhood development policies for a country. Therefore, of the different steps needed for building quality ECD policies, the first one consists in raising a national level commitment to build an early childhood development national policy. Then there needs to be an extensive set of multi-stakeholders and experts' consultations that will take the final form of a report. Only once the report has been made, can policymakers start considering what the plan would be, based on the findings of the report's consultations. The plan should include various elements such as education policies, indicators of progress, required data systems, workforce to hire, and costing of the policy. It also needs to fit into the budget somehow, otherwise it is never going to happen. Typically, this plan might take one or two years to develop. After the policy plan has been drafted, the finals steps are to elaborate the action plan and concrete implementation across the different sectors involved, which is not necessarily the easiest part of the process. Follow-ups are also an essential part of quality and solid policies, with effective national monitoring & evaluation instruments along with some kind of legal security over the programs created to ensure funding and support in the long run, and make sure it doesn't just last one administration. Indeed, one of the risks with national policies is the change of administrations, and ECD programs need to become long-term commitments that cannot be threaten by changes in governments of ministers. Example of the latter, as discussed earlier in this paper, is the *De Cero A Siempre* policy in Colombia, which gained in 2016 a status similar to law to make it harder to terminate by future administrations.

Chile is one of the various examples of national coordination (Yoshikawa et al., 2014; Torres et al., 2018). In their national program, Crece Contigo, the lead is the Ministry for Social Development and Affairs, but in partnership with the Ministry of Health and the Ministry of Education. The interventions are delivered from prenatal care through to age four, and they are designed to promote health, children's protection, and children's development. In doing so, it requires inputs from all of these sectors, but it also requires those partners to have a shared vision and a shared goal.

Other coordination examples, such as LEAPS in Pakistan (Yousafzai, 2013), have provided sufficient evidence on their ability to strengthen the links between actors at a village or regional level which is crucial to allow communities and local ECD actors to better communicate, coordinate, and express their needs for the community.

Financing Early Childhood Development

Nobel Prize-winning economist James Heckman found that every dollar invested in early childhood education produces a 7-10% per annum return in better education, health, social and economic outcomes (Heckman et al., 2010). At the same time, Jere Behrman and colleagues (2013) estimated that expanding preprimary enrollment to 50% in low-income countries would produce benefits of US$33 billion, with benefit-cost ratios ranging between 8 and 18, depending on assumptions over quality and resources allocated to each programs.

Based on various evaluation reports, the Center on the Developing Child at Harvard University [38] also indicates that policymakers are more likely to achieve high return on investments in early childhood education than on remedial programs for adults with limited workforce skills and/or chronic health issues. In fact, long-term studies show that model programs for three- and four-year-olds living in poverty can produce benefit-cost ratios as high as 17:1 (Karoly et al., 2005; Aos et al., 2004) and annualized internal rates of return of 18% over 35 years. For individuals, economists estimate that each additional year of schooling can increase future earnings by about 10 percent (Card, 1999), while for society, benefits are often obtained from "decreased expenditures in the juvenile and criminal justice systems, decreased special education costs, increased tax revenues from higher incomes, and decreased reliance on government assistance" [38]. As generalized by the Center's director Pr. Jack P. Shonkoff: "getting things right the first time is more efficient and ultimately more effective than trying to fix them later".

While it is unlikely that all scaled-up early childhood programs will provide such extraordinary returns, it is realistic to assume that benefit-cost ratios will still be considerably higher than 1:1. Also, despite the obvious economical value brought by this data, it is important to recognize that ensuring the health and well-being of young children is an important objective in its own right, regardless of whether financial benefits can be documented in the future. Because brain architecture and skills are built continuously over time, policies that promote healthy development throughout the early years create a foundation for later school achievement, economic productivity, responsible citizenship, and successful parenting.

However, countries have limited resources and securing initial funding for early childhood policies can be difficult. In low-income countries the youth population can represent up to one-third of the total population, which means more investments to reach every children of the country, but also less domestic wealth as one-third of the country's population is not working.

As put forward by the Sustainable Development Solution Network's director Jeffrey Sachs, in high-income countries it can cost up to $10,000/child each year to ensure education from Pre-K up to Secondary Education (K-12). However, due to lower teacher salaries and quality materials, the cost in low-income country might be around $300-$350/child per year. But even finding this amount in low-income setting triggers concern in low-income countries where it would represent about 10% of national income. Additionally, to ensure UHC (Universal Health Coverage), it would once again be around 10% of national income with another $100/person per year. Even if the same coverage can go up to $5,000/person or more in high-income countries, the burden for low income countries of ensuring just health and education already represents a combined 20% of national income according to the organization, when low-income countries don't even raise that amount of money for their total budget.

1. Financing policies

Raising public revenue

Countries that raise relatively low levels of government revenue will lack the government resources to be able to spend adequately on health, education, sustainable infrastructure, climate resiliency, and other core investments. With much lower levels of tax revenue, they necessarily skimp on what is spend in areas like infrastructure and social support, and the result is a great deal of inequality across the society. In order to finance early childhood development, it is estimated that the funding will need to increase by at least six times, just to meet the need for universal access to one year of pre-primary education (Target 4.2), to that have to be added the costs of providing earlier education, parental support or infant support, health and nutrition. All and all, it calls for finding creative financing ideas in the ECD sector, especially for low- and middle-income countries which are not able to raise such funds through taxations. If developing policies to raise more public revenue represent a positive step in showing a government's will to invest in the development of its country, there are many alternative pathways to financing the SDGs aside from domestic budget. All in all, there are many sources of financing for transformation pathways from borrowing in private markets or from development banks such as the World Bank, to official development assistance (ODA), which is aide given by one government to another to promote the welfare of developing countries, and philanthropy (such as the Bill and Melinda Gates Foundation for funding SDG 3 for health). This chapter will cover some additional innovative pathways to funding early childhood development policies, which might be extended to funding other areas of Agenda 2030.

Allocating public revenue efficiently: performance-based budgeting

Before exploring pathways to fund projects, public authorities need to establish ways to minimize and better focus their resources on a manner that is both effective and efficient.

In Peru, in spite of several decades of extensive early childhood legislation and policies there was still a huge issue of chronic child malnutrition (17% of under-5) and no alignment of budget in regions reflecting the actual rates of child malnutrition between each regions. So government officials decided to reevaluate their approach and decided to start by looking at what science was saying regarding the services needed to tackle this issue: vaccination, monitoring growth with data, and education for parents to increase hygiene practices.

Instead of budgeting an increase of each component separately, the Peruvian government "put together the recipe based on the cake they wanted at the end, rather than budgeting each ingredient individually in different ministries". They ended up putting together vaccines, counseling sessions, and education measures along with scalable data systems. The implementation of each component was given a specific budget based on what was needed in order to reduce chronic malnutrition by a specific number of cases per year, instead of setting individual targets to each component.

One important aspect of the plan was to align regional budgets to local rates of malnutrition. Then they gradually increased funding for educational services, vaccines, hiring of nurses, and building a national software platform to get data on children growth from health centers across the country (Marini, Gallagher, & Rokx, 2017). After nearly a decade of stalled progress, the government reported a reduction in stunting rates of nearly 10 points, from 29.8% in 2005 to 18.1% in 2011 (Acosta, & Haddad, 2014).

Global Funds

At a global scale, pooled financing in the form of Global Funds shows great promises to channeling funds and providing aide to developing countries (Ooms et al., 2008). Created within the framework of the MDGs in the early 2000s', the idea of the first two pooled funding mechanisms was to allow all donors to pool their resources in one fund to facilitate the access to funds for low income countries for, respectively, fighting AIDS, tuberculosis and malaria (Global Fund) and providing vaccines (GAVI). The process makes it so that low income countries can concentrate their efforts on one procedure, in return the global fund asks for a detailed national plan that is quantified, technically sound and has precise objectives. For donors it ensures a better monitoring of the fund allocation through both the detailed national plan given beforehand and regular audits conducted to keep programs on track and avoid money embezzlement. These two mechanisms have proven to be very successful, and since then other global funds have been created for funding clean energy (Green Climate

Fund) and protecting biodiversity (Global Environment Facility). But pooled funding for expanding the budget of Education, Water and Sanitation, the Digital Revolution as well as basic infrastructures that governments cannot finance on their own are still needed.

Private investment

The business sector can have a positive influence on ECD policy, either through philanthropy or through individual action. The neuroscience and economic arguments for ECD investment, as developed earlier in this paper, typically are powerful in this community (Bidwell, Parry, & Watine, 2013).

Additionally, there is a strong push from society for businesses to reevaluate their governance and functioning paradigms by integrating sustainability objectives. In 1997, Elkington introduced the concept of the "triple bottom line" (people, planet, profit) as a new business objective. Dyllick and Muff (2015) later went on to define further the key characteristics of Business Sustainability, or BST 3.0. According to the authors it is an economic paradigm based on broadening the business concern (from sole economic concern to a three-dimensional one that prioritizes sustainability challenges), expanding the value created (from shareholder value to creating value for the common good on the basis of the triple bottom line), and changing the organizational perspective (from an internal focus to building inclusive strategies toward the common good of society).

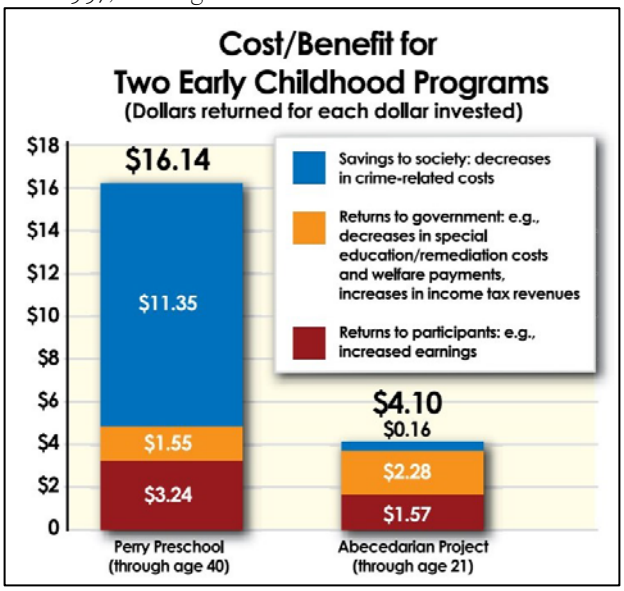

Figure 9. Investing in Early Childhood produces high returns.
Source: Center on the Developing Child, 2007.

Private/Public Partnerships (Social Impact Bounds)

As we have seen, the level of need that exist in the ECD sector cannot only be met by public funding, and it would be unsustainable to expect families to cover all of the costs of ECD services. Following this logic, a new approach, which consist of private investors paying up front for NGO or government services, has been gaining popularity in the finance world. Social impact bonds (SIBs), in simple terms, uses private funds to pay for a social, educational, or health program, and the government repays investors (plus a return) only if the program achieves prespecified results. SIBs are granted on the understanding that financing a specific project, such as early childhood development, will result in savings for society later on (Figure 9). Because ECD services are often creating savings for society, through less need for special education or repeating a grade, they can be great candidates for receiving social impact bounds. Also referred to as pay-for-success contracts, social impact bonds bring together the concepts of lending for a social purpose, return on investment, and payment based on performance (Overholser, 2007; Liebman, 2011). The main benefit of this approach for institutions is that they only have to repay their private investors based on the estimated costs of the savings that were made. If the project ends up failing, then it virtually does not burden the authorities, which has been advanced as an argument for facilitating innovation and testing for institutions that otherwise wouldn't have the budget to test new ideas and improve their programs.

One example of SIBs applied to the education sector is in Utah (USA) where there was a high-quality preschool program, but long waiting lists due to a lack of resources to scale-up the program. The prediction made by private investor company Golden Sachs was that there might be reduced need for special education brought about by an increase of access to high-quality preschool education. They estimated that for 500 children that wouldn't get access to the program, about 100 (1/5) of them would be placed in special education over the next couple of years. After receiving the social impact bounds, the state was able to provide 600 additional children access to a high-quality preschool education.

A follow-up study conducted by the company revealed that of all the children who benefited from the funds, only on child did enter special education instead of the 1/5 predicted. This final observation was viewed as savings for society that repaid the bound that was laid out by the private investor.

However, multiple studies by scholars (Temple, & Reynolds, 2015; Tse, & Warner, 2018) warned against the limits of this approach. Among the issues raised by these recent papers, the effective benefit to society of SIBs rely heavily on the availability of reliable indicators, realistic goals, and functioning evaluation mechanisms. If one of these parameters is failing, then it's much harder to precisely assess the positive outcomes of the programs, which could then easily be overestimated by private investors.

Closing words

There are several aspects related to early childhood, in terms of actors (child, parents, external caregivers, etc.) and developmental domains (cognitive, socio-emotional, physical, health, nutrition, safety). Because of the broad topic that it is, it appears very important to have multiple sectors involved to be able to focus on each aspect (i.e. health sector for nutrition and depression, and education sector for ECD education programmes) to ensure optimal outputs and promote holistic well-being in children.

While there could be a basic universal care package that includes health, nutrition, and developmental advice, some cases require

more specific measures that only a multi-sectorial approach can implement through targeted interventions.

There needs to be a global strategic thinking that takes into consideration the feasibility of the tasks given to one individual, to not put too much burden on one community health worker, social worker, or educator. But there also needs to be some linkage between first, the existing messages and the new program, and second between the different actors. For example, a teacher that identifies a nutrition issue needs to be able to refer to a health sector professional, and vice-versa.

Therefore, similar to the SDGs, we have come to realize that ECD policies are, more often than not, a multi-stakeholder process (Yoshikawa et al., 2014), as it's a "process in which diverse actors collaborate to achieve common goals". Indeed, if education, which has long been the focal point of the sector, is often under the directory of the Ministry of Education, early childhood development policies often will call upon an inter-ministerial collaboration (Bornstein, & Lansford, 2013), similar to what Colombia did in order to build its national ECD policy.

Likewise, successful policies call for a vertical flow of information (Pia Britto et al., 2013) from ministries to local instances of governance such city councils and community leaders, along with an horizontal flow of information among the different actors on the field (i.e. teachers, nurses, daycare providers, doctors, counselors, and community workers). Furthermore, they obviously require a strong collaboration with communities, with compelling data on the importance of culturally appropriate and inclusive programs (Quijano, 2004; Cabanilla-Pedro, 2006). Besides, NGOs, individuals from civil society and actors from the private sectors have an important role to play to help support, develop and guide the implementation of ECD policies (Mwaura, Sylva & Malmberg, 2008; Liebman, 2011). Businesses especially are essential to finance programs and provide expertise or technologies at fair prices to low and middle-income countries (Ooms et al., 2008). They also play a central role in financing innovation in the sector, either through social impact bounds (SIBs), public-private partnerships, philanthropy, or private small-scale pilot programs, which would be far more difficult to impulse solely on the tight budget and resources of the public sector (Overholser, 2007; . Virtually anyone can therefore become an actor in the ECD sector, either through parenthood, policymaking, research, funding, volunteering, or being a worker on the ground.

However, many aspects of current policies and programs related to early childhood development remain problematic. Besides the recent advances in developmental sciences, public policies fail to prove a real consensus on the potential of investing in human development (Berlinsky & Schady, 2015), especially during the first years of life.

Additionally, the quality of services have been closely linked with higher outcomes (Mc Cain, Mustard & Shanker, 2007; Yousafzai & Aboud, 2014; Schindle & Yoshikawa, 2012, McCartney & Phillips, 2006; Masse & Barnett, 2002), yet many fail to conserve this parameter when implementing at scale (Ertem et al., 2006, Yoshikawa et al., 2007). A core lesson from research in the expansion of ECCE policies in low-income countries shows that poor quality implementation can lead to either no positive effects on children's development, or even negative outcomes in some cases (Yoshikawa et al., 2014). Successful programs call for both service and process quality standards. If safety, duration and group size features are important, the ability of teachers to facilitate learning through rich, reciprocal interactions and responsive caregiving at home have proven to be all the more important in the development process of children which relies heavily on the quality of their environment of relationships.

The potential returns to public investment in early childhood (Cunha & Heckman, 2006; Heckman et al., 2010; Bartik et al., 2012; Yilman et al., 2010) are being compromised by the absence of a systemic understanding of the policy challenges in providing quality services to young children. One framework for developing adequate early childhood development systems proposed by Kagan and Cohen in 1996, and developed further in recent studies (Kagan et al., 2016; Berlinsky & Schady, 2015), is based on four pillars critical to the delivery of quality, equitable and sustainable ECD services: coordinated & multi-sectoral governance, ample & stable financing, high quality standards (and evaluation systems), and skilled human resources.

High quality programs, aside from quality standards indicators, rely on highly qualified staff. But currently there is an overreliance on the use of community members and families as the workforce along with poorly designed staff requirements and policies. Early childhood educators still tend to be treated as a lower tier of workers within the education sector for a variety of reasons, among which low entry requirements, inadequate compensation schemes, and poor in-service professional development. ECCE training programs, if they exist at all, are often considered to be of "low quality" (Yoshikawa & Kabay, 2015; Whitebook, 1999) and the academic requirements for completion are much lower than teacher training programs for educators in primary and secondary school. Early childhood educators also tend to have lower remuneration and less attractive career paths than primary and secondary school teachers. All and all, this doesn't make the early childhood field appealing to more qualified individuals either (Berlinsky, & Schady, 2015; Tavares de Araujo, & Almeida, 2014). Quality outcomes in ECD programs are highly dependent upon quality human resources, consequently, countries urgently need to develop a systematic and competitive approach to recruit, train and motivate workers in the early childhood sector (Nirmala et al. 2012; Berlinsky & Schady, 2015).

Besides, we also need to broaden the scope of services available to policymakers. For example, neuroscience is saying that we need to pay more attention to infants (Repacholi & Gopnik, 1997; Knudsen, 2004; Grantham et al., 1991; Cunha et al., 2005), and periods of life even before children are conceived, by including young women and maternal support during pregnancy among other things (Carroli et al., 2001). There is also a need to focus more on serve & return relationships, as well as improve a multi-generational focus to include both adults (parents/communities) and children in ECD policies.

We also need to put a greater pressure on the inclusion of culturally appropriate approaches that support and promote traditional knowledge and practices (Kagitcibasi, 2007; Super, 1976Briggs, 2005). Comprehensive policies that adapt to communities and help maintain alive traditions and ancestral cultures, in addition to the many benefits that traditional teachings can offer, help children to build their identity and ground themselves to their ancestry and communities, it also validates the right of rural and indigenous

communities to maintain their culture, ultimately leading to thriving communities.

Finally, If we only invest in what has been proven to work, it leaves out the populations on which the current approach has not been working, along with some space for new ideas, which is why we need to actively invest in innovation in early childhood development interventions.

In that sense, science, and scholars (Bhowmik, Selim, & Huq, 2017) can provide new ways of thinking, new ideas that go above and beyond a "try harder" strategy applied to what already exists.

It is expensive for society to deal with the lifelong impact of poor early childhood experiences (i.e. development delays, weak development foundation, chronic disease/weak immune system, toxic stress effects, stunting), but at the same time the way ahead is not easy. There still lacks a political consensus on building ECD policies, and when it exists it often doesn't consider quality as a central component. But if optimizing quality is much more complex than simply broadening the access to services, it's also an effort that low-income and high-income countries alike cannot afford to ignore. As sustainable development becomes urgently needed to confront growing social inequalities and the threat of global change, ECD has the capacity of both achieving Agenda 2030 and building a culture of respect toward one another and the environment, and ultimately thriving, healthy societies through breaking multi-generational cycles of poor human development and enhancing the quality of life of children, families, and all of society. In a few words:

"The possibility for substantial change in our ability to address seemingly intractable problems is real. The price for not aiming high enough will be scientifically indefensible, economically exorbitant, and morally prohibitive."

Jack P. Shonkoff, Director of the Center on the Developing Child, Harvard University

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PART 4: CONCLUSION

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Closing Words

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