

Article

# Family Farms, Agricultural Productivity, and the Terrain of Food (In)security in Ethiopia

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**Abstract:** Despite economic development and social improvements, millions of family farmers in Ethiopia are still struggling with food insecurity. Lack of technology adoption by family farmers is often considered as the root cause for low agricultural productivity and persistence of food insecurity. Based on a study of family farms in southwestern Ethiopia, we show the complex nexus between family farming, food insecurity, and agricultural productivity. We collected qualitative and quantitative data through 300 sample household interviews; expert interviews with elders and village chairmen, agricultural extension agents, farmers' cooperative heads, as well as experts in NGOs, research institutes, and state agencies; and on-farm observations with in-depth interviews and discussions with individual farmers. Our findings illustrate that everyday experiences, culture, knowledge, and priorities of farmers coupled with ecological and political factors play crucial roles—and need more consideration than the classic 'lack of technology' theorem.

**Keywords:** family farming; farmland; food security; rural development

## 1. Introduction

Global demand for food is expected to massively increase until 2050 [1]. The business-as-usual scenarios will even be worse for countries in Africa, the continent with the strongest population increase where a quarter of its people suffer from severe food insecurity. For 'food security', we adopt the definition developed at the World Food Summit in 1996 [2]: "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life." Strengthening the local productivity of the agricultural sector is envisaged a way to decrease food insecurity [3]. At the same time, agriculture is under pressure as it increasingly competes with other sectors for land, water, energy, and labor. Consideration of environmental concerns in agriculture is becoming more and more important. Climate change has become another dimension to consider [4]. While the agronomic and technical questions of how to produce more of what kind of food in which farming systems are well considered in science and extension work, the socio-cultural frames and local capacities of family farms to manage productivity have long been undervalued and are not yet fully understood [5]. According to FAO [6], "Family farming (which includes all family-based agricultural activities) is a means of organizing agricultural, forestry, fisheries, pastoral and aquaculture production which is managed and operated by a family and predominantly reliant on family labor, including both women's and men's." Family farms constitute 98% of all farms worldwide [7]. In the last years, the approach to and discourse on food security shifted from a national "food first" perspective to a more integrated local "livelihood" perspective and from "objective indicators" to "subjective perception".

Ethiopia has been struggling to feed its growing population in the last decades. In the 1970s/80s, the country became internationally synonymous for drought and famine. Despite generally positive

economic achievements in the last two decades, food insecurity still affects about 40–50% of Ethiopia's population [8,9]. Most food insecure people in Ethiopia are those who produce food themselves, namely the millions of family farmers in the countryside. Family farms employ 81% of the total population and produce up to 96% of the total agricultural GDP of the country [10]. More than 40% of Ethiopian family farmers are food deficient [11]. Relevant policies and practices to address the problem in an integrated and locally applicable manner require a solid understanding of the problem context, potentials, and challenges.

Ethiopia is on the eve of a deep agrarian transformation. Large-scale investments into agriculture are being made, and technical innovations such as the adoption of 'modern' fertilizer and 'improved' seed helped to increase agricultural productivity. However, factors such as shortage of land, land degradation, and effects of climate change hold family farmers into food insecurity circles. When it comes to reasons for a low technology adoption, factors such as a lack of purchasing power, lack of a formal credit market, and a lack of knowledge and (formal) education are often mentioned [12–16]. Underlying cultural and socio-psychological concerns that feature the everyday lives of farmers are, however, only rarely brought into the picture.

The Ethiopian state regards agriculture as a major strategic sector in which significant investments have been made. Efforts to improve agricultural productivity focuses on state-run extension work with rather technical and top-down approaches. The country has trained and employed around 50,000 local agricultural extension workers, known as Development Agents (DAs), the highest number in Africa and the fourth largest in the world next to China, India, and Indonesia [17]. The effectivity and efficiency of the extension work, however, proved to remain very low over decades [18].

In this paper, we argue that agricultural productivity and food (in)security should be understood in the context of complex family farming environments. The importance of contextualizing the support towards food security in Ethiopia is underlined [19]. We illustrate and support consideration of farmers' realities on the ground which include cultural and socio-psychological constraints and tradeoffs in research, policy, and practices to realize food security in the country. This paper is an outcome of a study which illustrates agricultural productivity and food (in)security from a bottom-up perspective of family farming households in the Yayu area, Southwest Ethiopia.

## 2. Agriculture in Ethiopia, Productivity, and the Drive for Food Security

### 2.1. Agricultural Policies and Strategies

Family farms and food (in)security in Ethiopia are situated in a web of interactions in which locally embedded daily practices and perceptions interact with top-down rural and agricultural policies and strategies which define and interpret agriculture in the context of national economic development. In addition to policies addressing rural poverty, most notably the Sustainable Development and Poverty Reduction Program (SDPRP) and the Plan for Accelerated and Sustained Development to End Poverty (PASDEP), Ethiopia has adopted a specific policy response to agricultural productivity and food insecurity, the Agricultural Development-Led Industrialization (ADLI) strategy [20]. The key assumption is that agriculture can develop rural areas by enhancing purchasing power of the rural population, which are mainly family farming households. Through commercialization, it is envisaged that the growth in agriculture will then spur growth in the industrial sector [21]. Subsequently, its Food Security Program (FSP) was incorporated in the national poverty reduction strategy [22]. The FSP contains the Productive Safety Net Program (PSNP) which aimed at enabling family farming households chronically vulnerable to food insecurity to resist shocks, create assets, and become permanently food secure. PSNP uses a combination of income generating measures and capacity building programs together with cash and food transfers based on individual needs, primarily in the most food insecure seasons [23].

The general state approach to increase food security of family farming households in Ethiopia is to 'modernize' farming and increase productivity. To archive this aim, two main paths are followed, namely

technologization and specialization. Technologization largely brings about new inputs such as farming equipment, 'improved' seeds and chemical inputs (fertilizer, herbicides, fungicides, insecticides). Specialization focuses on few crops and practices considered best suited to a certain agro-ecological zone. In the national strategy, the Yayu area belongs to the southwestern region of the country which is defined to be best suited for the production of coffee, spices, and maize.

## 2.2. Analytical Framework

The classic path to achieve food security in Africa is by adoption of agricultural technologies and enhancing agricultural productivity [24]. The types of technologies selected and introduced are based on the 'success' of the green revolution in Asian and Latin American countries. These countries intensified agricultural production by using 'improved' seeds, fertilizer, and agro-chemicals and increased the amount of yield per hectare. Farmers were sensitized primarily through centrally-planned interventions with the state being the main player in the process. The programs were supported by big international donors such as the World Bank and IMF. Emphasis was given to training and capacity building of farmers to enable technology use. Generally, this technology-driven approach enabled Asian and Latin American countries to massively increase food security.

In the Ethiopian context, family farming comprises mixed farming practices which involve crop and livestock production. Agricultural Development-Led Industrialization (ADLI) is the policy direction which guides the national development in which family farming is situated. Ethiopia considers land and cheap labor as its comparative advantage to build its 'rapid' economic growth [20]. This is the main reason for the country to justify its ADLI. Rural and agricultural development policies are framed around ADLI (see Figure 1 for illustration of how the policies are linked to family farming and then to food security). ADLI premises on increasing agricultural productivity to achieve household food security on the one hand and production of industrial and export crops on the other. With this, agriculture is expected to play a leading role in household food security and national economic growth. Intensification of family farms through extension programs aims at household food security while large-scale investments are promoted to produce export and industrial products [25].

In this framework, Ethiopia puts emphasis on the classical agricultural innovation approach with a massive agricultural extension program aiming to transfer technological packages to family farms in order to promote their technologization and specialization. All across the country, Development Agents (DAs) provide farmers with a package of training, 'improved' seeds, and chemical inputs based on the specialization recommended for the region [26].

Family farming households, on their part, have locally-based and culturally-embedded ways of farming and social life [27]. Family farming in Ethiopia is far from mechanization and is often carried out through labor-intensive and locally developed farm tools such as oxen-drawn ploughs. Family farming is much more than an economic activity. It is also the social and cultural basis of livelihoods. It provides identity, living spaces, cultures of solidarity and collaboration, social resilience, and insurance systems [28]. Figure 1 below provides the analytical framework. The arrows in the figure show the direction of influence or feedback loops.

In reality, the state-supported extension services interact—and often clash—with the social and cultural make-up of local family farming systems.

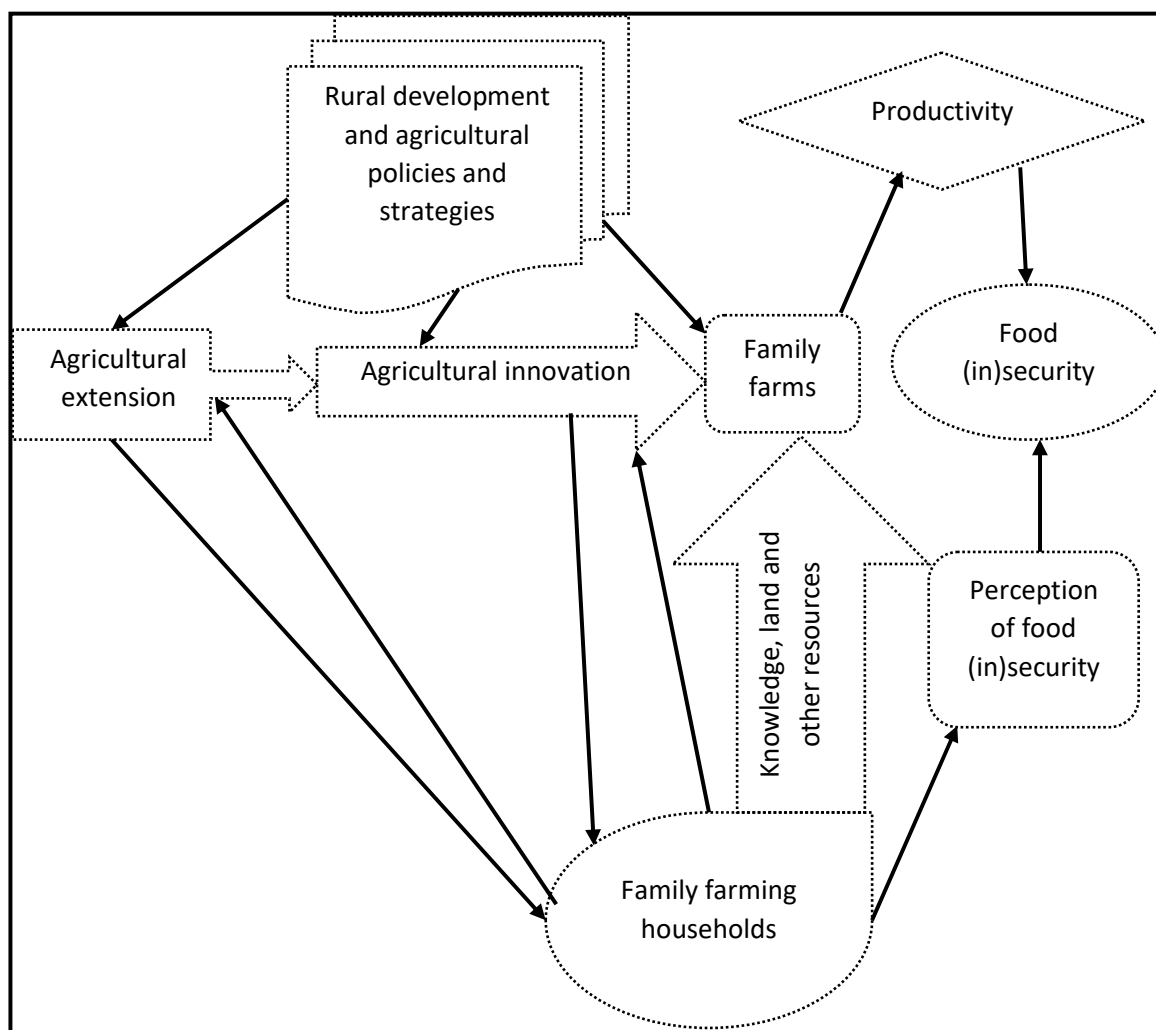


Figure 1. Analytical framework for food (in)security in Ethiopia.

### 3. Materials and Methods

A bottom-up perspective on family farming, agricultural productivity and food (in)security is shown by using the Yayu area, Oromia Regional State, in southwestern Ethiopia as a case. The empirical research was conducted as part of the BiomassWeb WP 2.2 together with WP 4.3. The Yayu area was chosen as a BiomassWeb case study jointly with all partners in a workshop in 2014. The study was conducted in eight *kebeles* (the smallest administrative unit in Ethiopia) (Wabo, Wutete, Sololo, Wangene, Weyira, Werebo, Beteli, Gebcha and Elemo) located in six *woredas* (districts which are divided in *kebeles*) (Yayu, Dorani, Hurumu, Bilo-Nopha, Alge-Sachi, and Chorra) in 2014/15. Selection of these *kebeles* and sample households followed stratification based on access to market in agreement with Jemal and colleagues [29]. The purposive selection of interview partners was combined with random sampling for qualitative and quantitative data collection. Three hundred family farmers were interviewed with semi-structured questionnaires; on-farm observation and discussions were carried out (Figure 2); focus group discussions were held, and expert interviews conducted with elders and village chairmen, agricultural extension agents, farmers' cooperative heads, as well as experts in NGOs, research institutes, and state agencies. Combination of the different data collection tools provided an in-depth and a broader understanding of the family farming practices, opportunities, and challenges on the local level.



**Figure 2.** A farmer showing his farm during on-farm discussion.

## 4. Results

### 4.1. Characteristics of the Study Site and Family Farming Households in Yayu

The study area is situated in southwestern Ethiopia at an altitude between 1140 and 2562 m.a.s.l. The agro-ecological zone is mid-altitude locally known as Woina Dega. The area receives high rainfalls (on average about 2100 mm/year) and is covered by some tracts of Afromontane rainforest. The majority of the households are ethnically Oromo. The area is relatively well accessible via a paved road from Bebele to Metu and can be reached from Addis Ababa by car in one day.

Most family farms in the study area are headed by males (84%) who are on average 44.3 years old. The average family farming household size is 5.2 persons. Our interviewees perceive that the main problems of their farm are lack of land, high costs of agricultural inputs, livestock diseases, and wildlife impact on crops and livestock. Farmlands are primarily obtained through state allocation through the local state (kebele) administration (mentioned by 45% on the question how they got the largest part of their land); 43% mention inheritance, 6% sharecropping, and 2% purchase. The current average farmland holding size is around 1 ha., and 17% of the farmers are landless. The main ways to increase or obtain farmland are sharecropping, land renting, purchase, and entering into the forest.

Generally, family farms in the Yayu area use complex combinations of a large number of different annual and perennial crops, horticulture, agro-forestry, and livestock. Most of the farmers produce both cash and food crops. Coffee is unequivocally the main cash crop in the area. The average income from coffee per year is 11,715 Ethiopian Birr per household. Vegetables and fruits are intercropped around the homesteads for easy management and control against wild animals.

Seasonal food insecurity is a major concern for family farms in the Yayu area. 37% of all sample family farming households face food shortages each year. Most critical is June, July, and August. These months are shortly before the harvesting time, when the stocked food runs low. During times of food insecurity, families eat mostly only once a day, instead of three times a day.

Family farming in the Yayu area is not only about food production, but also provides identity. Those who have lived there for long belong to the area and the social and ecological system there. People know each other well. The young strongly believe that they have a legitimate right to inherit the property from their parents.

#### 4.2. Defining Food (In)security: Global Standards and Local Culture

Food (in)security differs in its external (global) and internal (local) understanding and connotation. The global standards to measure food (in)security are related to the extent of access to safe food of the required quality and quantity at all times in line with the definition formulated after the 1996 World Food Summit in Rome. Food quality implies nutrient content of the food consumed, whereas access implies capacity to have the required food through production and/or purchase.

In the Yayu area, food (in)security is culturally inculcated in a different way. Food security is defined by having the main traditional staple food to eat three times a day. The types of food served also vary depending on the time of the day and age of a family member. In the mornings, adults usually drink coffee and eat roasted maize, barley, or pieces of bread. Lunch is usually eaten at home or on the farmland in a short break. Nevertheless, lunch time is commonly considered as the time for a main dish which constitutes mainly maize bread and vegetables. Similar staples are eaten for dinner. Milk is usually part of the food provided to children in families who are said to be relatively well off. Generally, those who depend on cabbage, vegetables, and root crops are traditionally considered poorer families, whereas those who consume animal products are considered richer families.

#### 4.3. Local Resources: Farming Knowledge and Land Acquisition

Family farming in the Yayu area is an age-old practice inherited through generations. A typical family farm in Yayu consists of a coffee field, a plot for cereal production, a homestead garden with vegetables, forest products such as honey and fruits, and some livestock. This high diversity is crucial for the resilience of family farming households in times of food insecurity. A farmer (interviewed on 1 November 2014), for example, produces the following crops: coffee, maize, sweet potato, potato, chat, apple, avocado, banana, papaya, lemon, mango, orange, tomato, and cassava. He emphasized the importance of having diverse crops: “I collect about 8000–10000 Kgs and 6000–7000 Kgs of sweet potato and potato respectively. The problem with tomato is that, sometimes, leaf disease damages it. But I always have another option. Income from sweet potato and coffee complements each other. I harvest about 35–100 quintals of coffee every year.”

However, diversity is not accommodated in state extension strategies which focus on specialization. In all national and regional rural and agricultural development programs the Yayu area is considered to be specialized in the production of coffee, spices, and maize. In an interview, an agricultural extension officer in Yayu (in October 2014) mentioned that the Yayu area is not an area of attention for national specialization in maize. On the one hand, the officer further noted that the specialization program is not fully operationalized though there are some efforts to support farmers in their production of coffee and spices. On the other hand, there is latent hesitance among the district officers in promoting maize in the area. In practice, however, the national specialization program shows little flexibility and does not pay tribute to particular local practices and needs.

Experiences and intragenerational and intergenerational knowledge exchange is vital for family farming. Farmers evaluate new technologies and compare between different introduced and local options (Figure 3). Based on their assessments, farmers can for example show preference to one ‘improved’ seed variety over another. The statement of one farmer (interviewed on 18 September 2014) is exemplary for such comparisons:

“The maize varieties known as 660, 661 and Shone are introduced to us by the extension service. We prefer Shone and 661. 660 variety does not give a good yield. However, we want to continue producing the indigenous variety as well, though not promoted or supported by the extension. We can sow it earlier with compost, without artificial fertilizer brought to us through the extension service. There is no need for us to wait until the seed comes as it is in our hands. Early seeding means early availability for consumption of the new (pre-mature) maize. It also produces a bigger size maize. One head of maize produces more

than a glass of maize cereals. Further, it withstands dry weather conditions and produces good quality flour.”



**Figure 3.** A farmer in Yayu showing his preferred maize variety.

Farmers also have different perceptions regarding the effect of fertilizer and ‘improved’ seeds on yield. Although they have been trained that the technologies increase crop yield, there are variations among farmers in associating higher yield with technology use. For 40% of the farmers in the Yayu area, the maize yield did not increase between the years 2008 and 2013.

The main problem of family farms in the Yayu area is a lack of farmland, mainly for cereal and coffee production. Over generations, the plots inherited from fathers to their children had become smaller and smaller. At the time of our study, however, the *kebele* administration told us that they had no more agricultural land available to be allocated to a new generation of farmers.

Under these conditions, family farmers see farming in an ambivalent way. Although it is likely to remain a key employer and ‘way of life’ also for the next generation, most farmers do not perceive family farming as a recommendable and sustainable activity that is worth investing in. Our respondents were largely unhappy about depending on farming for their livelihood. Therefore, they do not recommend it as a future economic option for their children. They associate farming with ‘rural life’ characterized by poverty, as well as poor transport facilities, markets, health services, and schools. Living in urban centers is preferred for the diversity of income opportunities and the possibility to generate income in a permanent position throughout the year. Urban life is considered ‘clean’ and ‘modern’. Family farming households largely perceive that achieving ‘better living conditions’ is not possible through farming. Here is an illustrative statement from a farmer during our interview: “I have never advised my children even for one day to become farmers; I advise them to go to school and lead a better ‘urban’ life.” (interviewed on 6 October 2014). Mostly those who have not attended school have been

considered to have a very limited economic opportunity and have farming as the only possibility for their livelihood. Another farmer regrets that his life ended up as a farmer: “I have become a farmer since I did not go to school” (interviewed on 7 December 2014). Over a long time in Ethiopia, urban dwellers used to associate farming with backwardness and use the term *gebere* (farmer in Amharic) to insult people from rural communities. Most farmers in the Yayu area do not see the future of their children in family farming, given the experiences from their ancestors, the current conditions and own future outlook. 77% of the interviewed farmers said that they do not recommend family farming as a main source of income for their children in the future. This means that motivations for long term and substantial investments in farm productivity are often weak. In this line, being asked what family farmers would do if they would suddenly win 10,000 Birr in a lottery, direct investments in farm productivity were rarely mentioned. Instead, many farmers wanted to use the money to take a step out of farming. The two most often mentioned answers were that farmers wanted to use the 10,000 Birr prize money to ‘build a house in town’ or ‘build a business center in town’. There are certainly many family farmers who would eagerly like to invest more in their farms’ productivity and many already successfully do it, however, the socio-psychological aspects that limit the intrinsic motivations of family farmers to invest long term and substantially into their own farm have to be recognized. This can also be used to increase the effectivity and efficiency of the agricultural extension service.

## 5. Discussion, Conclusions, and Recommendations

Differences in understanding food security between Ethiopian family farmers and the global development actors show different underlying perceptions and language. In the Yayu area and elsewhere in Ethiopia, farmers perceive food insecurity as the inability to have the usual food during common dining times. The food composition also differs depending on the area, culture, season, and time of the day. The global food security discourse should, therefore, be broken down to the local level and realities. The work on the understanding of the concept should then be supported by approaches that engage the family farmers in using technologies and knowledge developed through joint efforts.

In the classic technology transfer approaches, farmers are rather considered as passive recipients. They are expected to learn from DAs and implement the agricultural technological package as prescribed and trained by the DAs. To increase agricultural productivity, extension works attempt to replace age-old practices of diversification and intercropping by specialization and intensification. Farm intensification is a characteristic feature of technologization. This emanates from the assumption that the problem of lower productivity is a consequence of lack of agricultural knowledge and technology especially among family farmers. Our results showed that such a linear cause–effect relationship is not possible given the complexity of the local realities. Low agricultural productivity is an outcome of an interplay of multiple factors, which include lack of understanding of the culture, knowledge and needs of farmers, and the underlying problems of land shortage, market access, and ineffective extension approaches.

Generally, the path of top-down technologization and specialization remains questionable as it often brings negative consequences to both farmers and the environment. After the introduction of ‘improved’ seed varieties in the Yayu area, for example, farmers have lost the culture of keeping the land races. As a result, they have become dependent on ‘improved’ varieties, although their seeds are often not available at the appropriate time through the extension system nor through private seed supplying companies.

Specialization is also problematic. Farmers in the Yayu area produce multiple crops, vegetables, and fruits throughout the year. Such a diverse production system is a security mechanism for food and nutrition security. Specialization on 1 ha of land, therefore, does not allow for integrated intra- and inter-family farming safety nets. The environmental consequences of agricultural specialization, from land erosion to water shortage, are widely recognized through the world.

‘Farming’ and ‘rural life’ have not been sufficiently supported in Ethiopia over generations. New concepts of rural life—and rural economy beyond family farming—are needed. Our finding goes



in line with a study which shows that smallholder farming in developing countries has a structural image problem and a lack of societal recognition [30]. Especially the young and better educated farm household members often view agriculture as a risky and laborious venture that does not pay well—and is not prestigious.

Family farms in the Yayu area illustrate an interesting bottom-up perspective that contributes to the debate on food insecurity and agricultural productivity. Family farmers traditionally follow a multifunctional agriculture for subsistence and income. The high diversity of products produced strengthens the resilience of family farmers towards food insecurity. However, national and regional agricultural strategies and extension services are rather directed to product specialization and technical approaches.

Our findings further show that the nature of family farming is not static. Cultures and identities in rural Ethiopia are rapidly changing. Many farmers and their younger relatives do not see their (and their children's) future and career in agriculture. Some have little intrinsic motivation to invest long term and substantially into the productivity of their farm. Upon this backdrop, prevailing assumptions that one has to help family farmers to specialize and increase their productivity to attain food security, which will then spur sustainable rural development, need to be challenged. A new dimension on the future of family farming is needed. Specific focus needs to be given to the question of what will happen inter-generationally in few years' time when hundreds of millions of family farmers—not only in Africa but across the globe—will pass their farms over to their children in a few years.

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