

# Policy Brief

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## Improving Dietary Diversity and Child Nutrition among Small-holder Irrigation Farmers

### Highlights of Findings

Improving dietary diversity is important for child nutrition. This policy brief focuses on potential of irrigated agriculture to improve nutrition status among households and children by promoting food security and dietary diversity.

The key highlights include:

- (i) Under-nutrition is a challenge in Kenya but irrigated agriculture can reduce under-nutrition as it has potential to increase household income, ensure consistent food production and improve household diets. Practicing irrigation increases the chances of increasing diet diversity by 8.6 per cent at household level. Children in irrigating households have slightly lower stunting incidence (26.6%) compared to non-irrigating households (27.9%).
- (ii) There is limited inclusion of well spelt out nutrition objectives within national and county irrigated agriculture plans and policies; and irrigation priorities in nutrition policies and plans. To ensure that irrigated agriculture translates to improved nutrition outcomes, intentional inclusion of nutrition as a strategy within both irrigated and non-irrigated agriculture needs to be enhanced.
- (iii) There is low engagement of women in community nutrition programmes implying that decision-making may not be in favour of women in irrigating homes. Further, there is low nutrition education and messaging in community programmes. Women engagement in irrigation interventions through gender mainstreaming in irrigated agriculture is important in improving children nutritional status.

### 1 Introduction

Stunting is a public health concern in Kenya. It is a condition of low height for age, common in children under 5 years and is attributed to chronic food insecurity, chronic poverty and persistent illness among other factors. The level of stunting among children aged below 5 years in 2022 was 18 per cent, having reduced from 26 per cent in 2014 and 39.4 per cent in 1993 (KDHS, 2014 and 2022).

Further, malnutrition of children under 5 years is prevalent among children despite the improvements observed in the recent past. Despite the improvement in children anthropometric measurement, the stunting rate is classified as high, given the Sustainable Development Goal (SDG) of ending malnutrition by 2030, including achieving addressing nutritional needs of adolescent girls, pregnant and lactating women and older persons. Consequently, the benefits of agriculture are projected to have a potential impact on nutrition, with estimates of 2 million fewer cases of child malnutrition by 2050 if the country is able to triple its irrigated agricultural areas. This calls for enhanced action to ensure provision of safe and sufficient diets of acceptable quality and quantity for all citizens, especially children.

Irrigated agriculture in particular has the potential to improve nutrition status by promoting food security and dietary diversity. Practicing irrigation increases the chances of having a higher diet diversity at the household level by 8.6 per cent. However, food insecurity is a persisting national policy issue.

In 2020, 26.9 per cent of the population had inadequate food consumption in Kenya and hence the affected population was not able to meet the energy levels required for a normal, active and healthy life. In essence, this means 3 in every 10 citizens are likely to compromise on the quality of their diets. In 2020, 58 per cent of Kenyans were eating inadequate diets that compromised on quality.

High levels of under-nutrition have implications on the nation's economy, with as much as 6.9 per cent of GDP being lost due to child under-nutrition (Government of Kenya, 2018). Further, nutrition presents an opportunity for the government to make a smart investment as every 1 US\$ accorded to nutrition in Kenya has a potential return on investment of 22 US\$. This means that a development agenda that integrates both irrigated agriculture and nutrition support is likely to benefit both the quality of households' diets and the economy.

This policy brief focuses on the role of irrigation in boosting nutrition status in Kenya. The policy brief was based on a KIPPRRA-KNBS study (Karanja et al., 2023) on diet diversity and child stunting among households practicing smallholder irrigation in Kenya. The brief focuses on the link between diet diversity among smallholder farmers involved in irrigation and implications on nutrition.

## **2 Food Security, Irrigation, Dietary Diversity and Stunting in Kenya**

### **2.1 The State of Food Security in Kenya**

Kenya faces a dual experience of a growing population vis-à-vis a stressed food security sector. Over the last five decades, Kenya's population has increased more than five-fold from 8.6 million in 1962 to 47.6 million in 2019. In addition, the population is also rapidly urbanizing with 31.2 per cent of Kenyans residing in urban areas as of 2019. This represents a population that requires to be fed but does not directly contribute to food production through agriculture, thus placing higher production demands on existing agricultural land.

In addition, the agriculture sector is vulnerable to climate change and extreme weather events, low crop diversification and market fluctuations. Kenya has a land mass of over 582,000 km<sup>2</sup> and Kenyan agriculture is largely rain-fed with about 83 per cent of its land mass classified as semi-arid or arid, representing a need for strategies to enhance agricultural productivity such as irrigated agriculture. It is anticipated that through irrigation and other interventions, food security will be enhanced and eventually impact on nutrition security.

### **2.2 Challenges Facing Small Scale Irrigation Development**

The main challenges facing small scale irrigation in Kenya include insufficient focus of policy and legislative framework on smallholder irrigation; insufficient linkage of the agri-nutrition strategy to nutrition outcomes, and weak management of irrigation schemes.

#### **(a) Insufficient focus of policy and legislative framework on smallholder irrigation**

A review of the policy and legal barriers constraining smallholder farmers revealed insufficient policy and governance focus on smallholder irrigation, especially for farmer-led initiatives (Bancy, 2021). Specifically, the nature of public funding for smallholder irrigation is not well coordinated, resulting in duplication of finance resource pools, which farmer-led smallholder irrigating households tend to exclude.

In addition, water user fees to smallholder irrigators is the same as those charged to large-scale commercial enterprises and industry, leading to an unlevelled playing field. Another challenge is lack of a clear mechanism of channeling a fraction of the remittances issued

to Ministries, Departments and Agencies (MDAs) back to Water User Associations, leading to weak associations. The stated challenges frustrate the efforts of smallholder irrigated farming from a commercial perspective, rendering them vulnerable to adverse economic shocks.

**(b) Insufficient linkage of the agri-nutrition strategy to nutrition outcomes**

The Constitution of Kenya under article 43 (1) (c) provides the right to every citizen to be free from hunger and to have adequate food of acceptable quality, while article 53 (1) (c) provides every child a right to basic nutrition. The irrigation policy broadly captures attainment of food security, employment creation and socio-economic development but nutrition outcomes are not captured within the policy's specific objectives, limiting the likely nutrition outcomes that small-holder irrigated agriculture could contribute to.

**(c) Weak management of irrigation schemes**

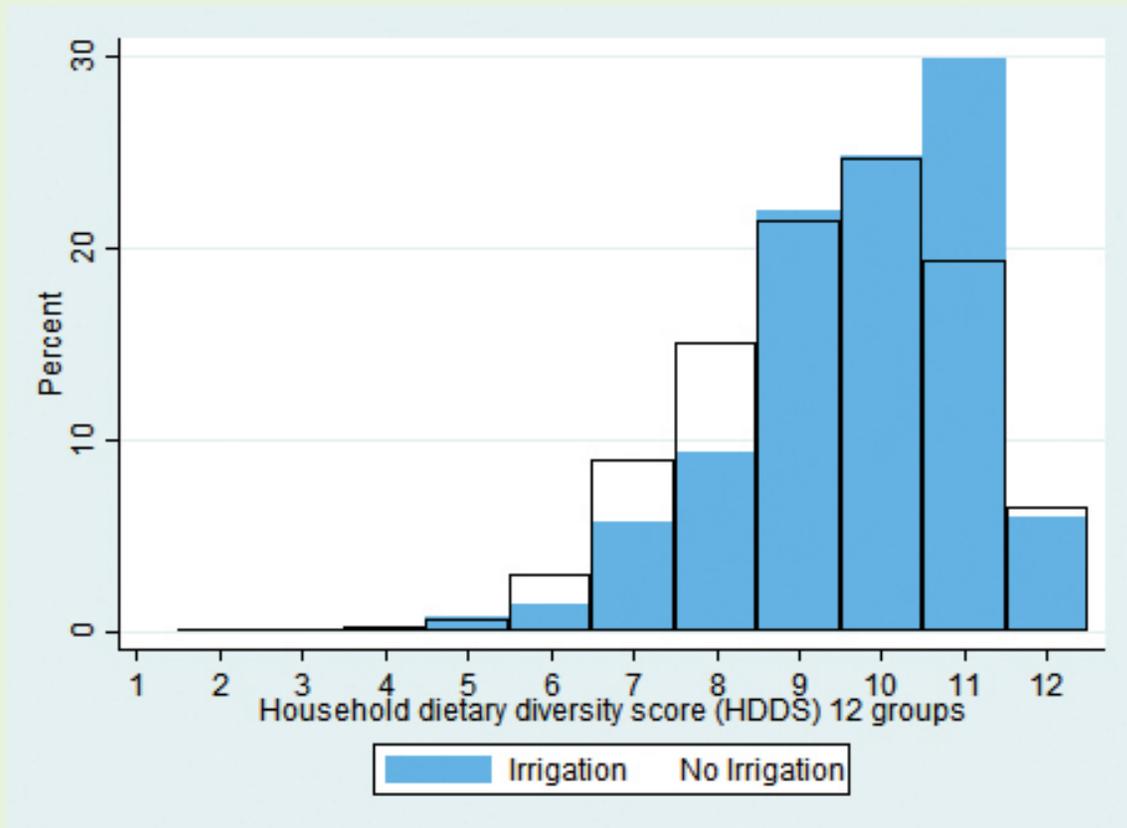
While existing irrigation policies focus on infrastructure development, the management of schemes is equally critical for realization of the aims of irrigation development. A key challenge is inadequate emphasis on scheme management compared to infrastructure development as the measurement indicator for the same is still unclear.

### **2.3 Dietary diversity among irrigating and non-irrigating small holder farmers**

There was low dietary diversity among non-irrigating farmers compared to smallholder irrigating households. The use of irrigation in farming improves farm productivity in the country due to over-reliance on rain-fed agriculture. With more productivity, households have more access to food that have the potential to meet their dietary needs.

The empirical analysis by Karanja et al. (2023) indicates that smallholder irrigating farmers in Kenya have more diverse diets than non-irrigating farmers. The histogram distribution in Figure 1 indicates that a high proportion of irrigating farmers (in blue) have diets with a high diversity index, that is 9 and above. The proportion of non-irrigating farmers surpasses irrigating farmers for household diets with lower scores (6 to 8).

**Figure 1: Food groups diet diversity by irrigation practice**



Source: KNBS (2015/16)

The average Household Dietary Diversity Score (HDDS) for 12 food groups was 9.4 among irrigating households compared to 9.8 for non-irrigating households. For 16 food groups, it is 11.7 for irrigating households compared to 11.0 for non-irrigating households. This means that households that adopt irrigation have higher diet diversity scores, implying consumption of wider variety of foods.

In addition, the analysis indicated that practicing irrigation increases the likelihood of a household having a more diverse diet by 8.6 per cent.

#### 2.4 Dietary Diversity and Income among small-holder irrigating households

In Kenya, smallholder irrigating farmers have both higher incomes and higher crop diversity in their farming land. Table 1 indicates an agriculture production diversity score of 5.74 for irrigating farmers compared to 4.22 in non-irrigating households. This suggests that the irrigating farmers have higher potential of cultivating a wider variety of crops and in addition possess animal species, and therefore have increased physical access to diversified diets from own production compared to the non-irrigating farmers.

Furthermore, irrigating households have higher average total agricultural production and livestock earnings (at Ksh 71,938 and Ksh 37,225, respectively) than non-irrigating households (at Ksh 12,690 and Ksh 13,636, respectively). Notably, irrigating households also have higher agriculture incomes. Therefore, irrigating households seem not only to have more variety of food available to them but also higher income, increasing access to diverse diets through purchase.

**Table 1: Agriculture-related characteristics among irrigating and non-irrigating small-holder farmers**

Agriculture-related characteristics	Irrigating small-holder farmers	Non-irrigating small-holder farmers
Total area of the land (acres)	2.19	1.71
Production diversity	5.74	4.22
Pesticide use	70.30%	27.90%
Cash crops grown	17.93%	12.41%
Horticulture production	38.14%	5.18%
Total earning from sale of agricultural produce (In Ksh)	71,939	12,690
Total gross income from crop and livestock sales (in Ksh)	104,705	24,290

Source: KIHBS 2015/16

## 2.5 Stunting among children in irrigating and non-irrigating small-holder farming households

The role of irrigation in improving nutrition outcomes is pegged on the potential role of agriculture in increasing the availability and accessibility of diverse diets to meet nutrition needs at household level. Despite having a higher agriculture-related income and more diverse diets in irrigating households compared to non-irrigating households, this difference is not registered with child stunting. Figure 2 indicates the linear distribution of child growth. There is minimal difference between the growth curves of children in irrigating households versus non-irrigating households with the peaks of both curves clustering between -2 and -1 Standard Deviation (SD).

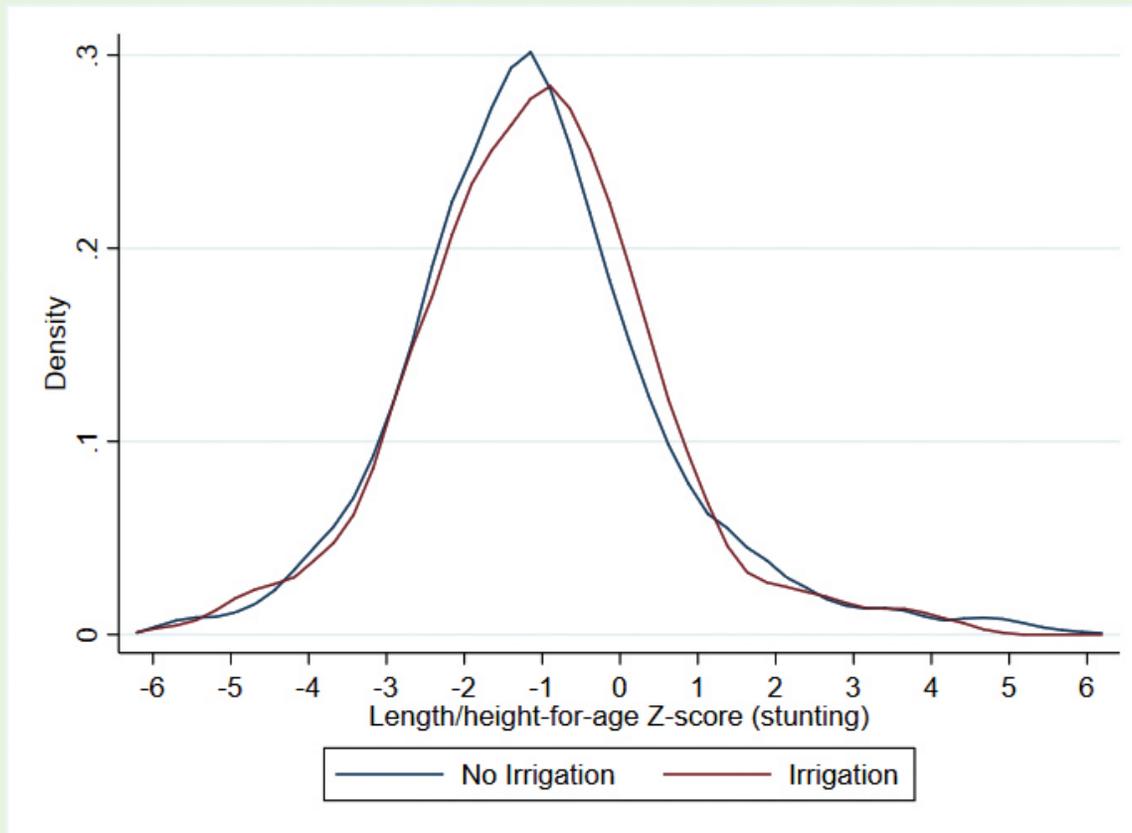
The differences in household dietary diversity noted, therefore, do not translate to prevalence of child stunting. This essentially means that smallholder irrigation needs to be approached differently to translate to nutrition outcomes. This analysis presented in this policy brief indicates practicing irrigation leads to increased household diet diversity. A household practicing irrigated agriculture has an 8.6 per cent increased likelihood of having a more diversified diet than a non-irrigating agriculture household.

However, there is unclear nutrition-integration in small-holder irrigation plans and policies leading to weak link between irrigation and children nutrition outcomes. Furthermore, nutrition outcomes are not captured as policy specific objectives in irrigation plans and policies thus limiting the likely effect of small-holder irrigated agriculture on nutrition outcomes.

A probable reason for unclear evidence between irrigation and child stunting is limited inclusion of women in small-holder irrigation agriculture. Results from means and proportions comparison indicate a lower proportion of mothers from irrigating households make decisions of cropping and input use in irrigating households (24.2 per cent) compared to counterpart households (32.5 per cent). This translates to 1 in 4 women in irrigating agriculture households and 1 in 3 women in non-irrigating agriculture households that participate in decision-making regarding crop farming and input use.

This implies decision-making may not be in favour of women in farming households in general and more so in irrigating households despite the fact that a mother's level of knowledge, empowerment and education is a key determinant of child growth and nutrition outcome.

**Figure 2: Distribution of child stunting by irrigating practice**



## 2.6 Inclusion of women in small-holder irrigation agriculture

There is also limited inclusion of women in small-holder irrigation agriculture. The results indicate low engagement of women in community nutrition programmes, disadvantaging them from decision-making on irrigation. A mother's level of knowledge, empowerment and education is a key determinant of child growth and therefore low engagement and empowerment of women would limit child growth objectives.

There is also low nutrition education and messaging in community programmes. The results indicate sub-optimal participation of women in community nutrition programmes. This means a significant proportion of women with children under 5 years are missing an opportunity of gaining a vital service that could impact nutrition-related knowledge, behaviour and practice.

Low citizen participation within community nutrition programmes was also a likely reason for unclear evidence between irrigation and child stunting. Results from means and proportions comparison indicate that participation in community nutrition programmes is lower for mothers in irrigating households (24.9 per cent) compared to mothers in non-irrigating households (33.3 per cent).

However, the level of participation in both groups is low, representing 1 in 4 women from irrigating households and 1 in 3 from non-irrigating agriculture households. This means a significant proportion of women with children under 5 years are missing an opportunity of gaining a vital service that could impact their knowledge, behaviour and practice regarding infant feeding and their children's health outcomes.

### 3 Policy recommendations

To improve dietary diversity and child nutrition status among small-holder farmers, the following are the recommendations:

- (i) Improve access to water among small-holder farmers by County governments exploring use of aquifers to improve water supply used for irrigation.
- (ii) Undertake irrigation-nutrition analysis based on the four pathways that is increased agricultural production; enhancing incomes; supporting water supply; and women empowerment for improved food security nutrition and health outcomes.
- (iii) Integrate nutrition in individual diet diversity indicators in future irrigation-related household surveys and assessments to strengthen evidence on the influence of irrigated agriculture on the diet practices of women and children as household members with unique socio-cultural and biological needs.

For intentional inclusion of nutrition within irrigation policies and plans the following are the recommended interventions:

- (i) Spell out nutrition objectives within national and county (irrigation) agriculture plans and policies. This will promote the intentional focus on nutrition as an outcome of (irrigated) agriculture in addition to wealth creation, food productivity and food security.
- (ii) Mainstream gender in irrigated agriculture to enhance the opportunity for women to be beneficiaries of the economic empowerment resulting from irrigated agriculture which would translate to improved childcare practices.
- (iii) Exploit opportunities for disseminating agriculture-related knowledge. Agriculture extension services, women groups, farmer field days and other communication channels (radio, TV, WhatsApp, videos) can be harnessed to integrate nutrition messaging such as diet choices, healthy eating, infant feeding, dietary diversification and knowledge on fortified and bio-fortified crops.
- (iv) Intentionally include nutrition as a strategy within both irrigated and non-irrigated agriculture to ensure agriculture translates to improved nutrition outcomes.

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