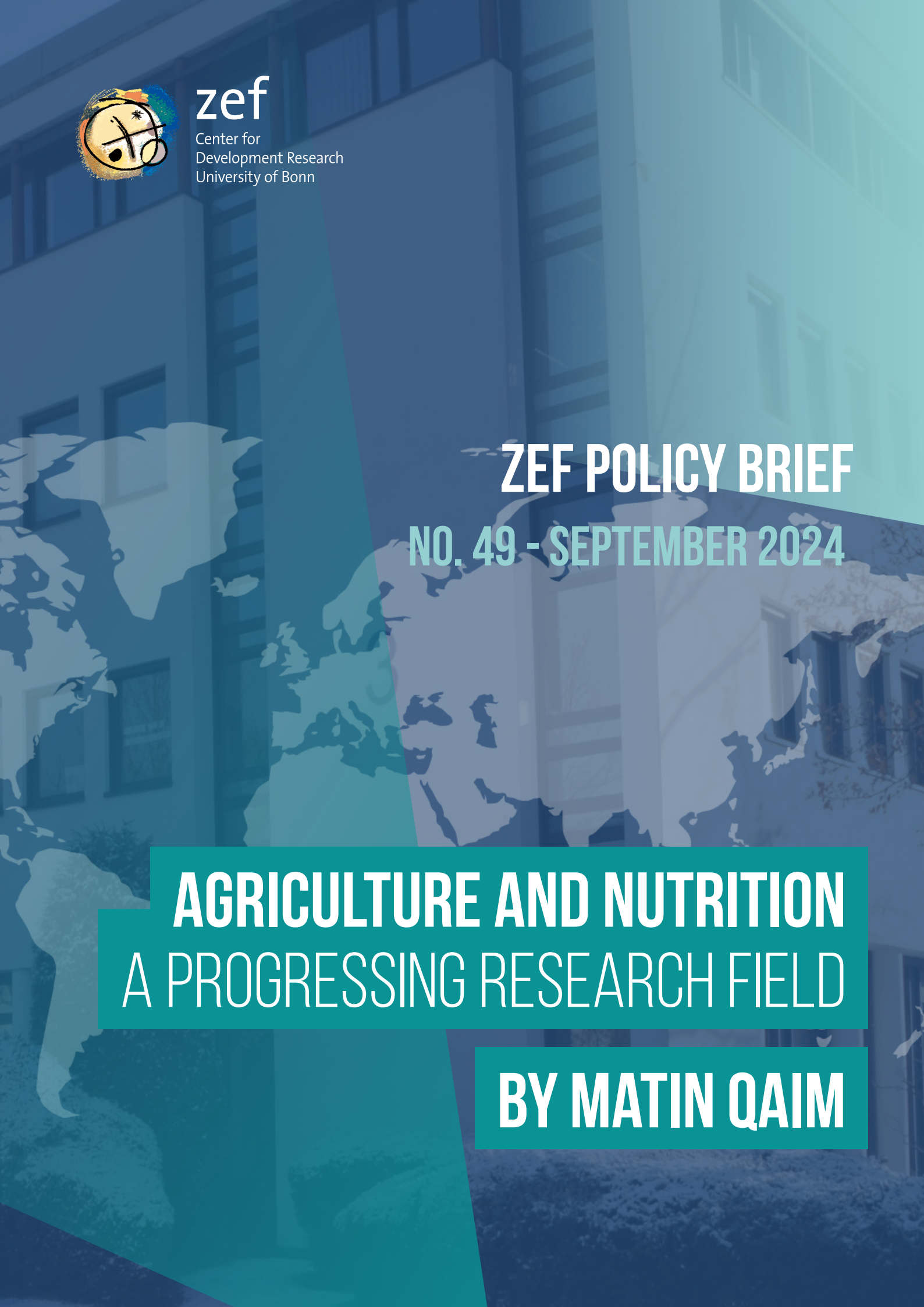

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AGRICULTURE AND NUTRITION
A PROGRESSING RESEARCH FIELD

BY MATIN QAIM

Agriculture and nutrition, nowadays often jointly referred to as “food systems”, play a major role in many dimensions of sustainable development. Close to 80% of the world’s poor and undernourished people live in rural areas, where most of them depend on agriculture, livestock husbandry, and fisheries for their livelihoods. Hence, improving agriculture has to be a major component of any broader strategy to reduce hunger and poverty.

Agriculture and nutrition are also closely linked to human and environmental health. At least 30% of the global burden of disease and premature deaths are directly attributable to malnutrition and unhealthy diets. Food and agriculture account for one-third of all greenhouse gas emissions and for an estimated 80% of global land-use change and biodiversity loss. Thus, the global climate and nature-protection targets cannot be met without significant changes in food production and consumption. At the same time, agriculture is the sector most negatively affected by climate change, entailing serious new challenges for achieving the goal of sustainable food and nutrition security.

INNOVATION IN THE SMALL-FARM SECTOR

ZEF has focused on questions around agricultural development and food security right from its start more than 25 years ago. Through numerous empirical studies in countries of Africa, Asia, and Latin America ZEF research has contributed to a better understanding of the drivers of innovation in the small-farm sector and the effects of innovation adoption on agricultural yields, household income, food security, and environmental outcomes. Much of our work also looks at gender implications, as technological and institutional change can influence gender roles in multiple ways.

ZEF-researchers have analyzed various types of innovations, such as breeding technologies, veterinary services, mechanization, improved agronomy, natural resource management practices, and information and communication technologies. Our researchers also

look into the role of institutional innovations, such as improved training and extension systems, innovative credit and insurance schemes, collective action, and mechanisms that can link smallholder farmers more effectively to markets and newly-emerging value chains. ZEF-projects have also contributed to developing new methods for evaluating nutrition, health, and environmental effects of agricultural innovations.

NUTRITION-SENSITIVE AGRICULTURE

Smallholder farmers are not only important actors in the sense that they produce much of the food consumed in low- and middle-income countries, but they are also the group affected most by undernutrition and low dietary diversity. Hence, a key question is how the small-farm sector can be organized and developed in such a way that it is able to make a contribution to healthier diets. One approach is to diversify crop and farm production. As much of the food produced by

smallholder farmers is consumed locally, production diversity tends to be positively associated with dietary diversity and nutrition. However, these relationships are not linear.

ZEF-research has analyzed these links with data from various countries, looking at crop and livestock diversity, the role of home gardens, and various diet and nutrition outcomes. The results suggest that farm production diversity has positive effects, especially in remote locations, but that improving market access and market functioning is at least as important. Excessive farm diversification can perpetuate subsistence with negative implications. ZEF-research shows that improving the efficiency of markets and supply chains is key in making nutritious foods more accessible and affordable, especially for rural households. Several of our studies also show that women's empowerment is often associated with improved nutrition.

FOOD SYSTEM RESILIENCE

We are living in unstable times with multiple overlapping crises that jeopardize food and nutrition security. Poor people are especially vulnerable, but also the somewhat better-off can be pushed back into deprivation through income and price shocks or situations of acute food scarcity. For young children in particular, even short spells of food and nutrient deficiencies can have serious long-term negative health consequences. An important question is how food systems can be made more resilient, thus reducing the likelihood of hardship and helping households cope with shocks in a better way.

ZEF-research has contributed to conceptualizing the idea of food systems resilience, identifying relevant shocks, their effects on household livelihoods and suitable coping mechanisms. Empirical studies in different countries have analyzed the effects of climate shocks on food production, food prices, household income, and income distribution. We have also been studying the role of access to non-agricultural jobs and income diversification in reducing the negative impacts of agricultural production shocks.

Furthermore, disruptions in national and international food markets and trade relationships can have important food-security effects. ZEF has examined such effects in connection with the COVID-19 pandemic, the Russian attack on Ukraine, and other international price spikes observed over the last 20 years. High-frequency survey data that ZEF-researchers have collected in different countries of Africa and Asia have helped identify links between various types of price and income shocks and people's dietary intakes.

HEALTHY AND SUSTAINABLE DIETS

Many people cannot afford a nutrient-adequate diet, let alone a sustainable diet that promotes both human and environmental health. Others could afford such a diet in principle, but have unhealthy and unsustai-

nable eating habits nevertheless – because of lacking awareness or behavioral constraints. ZEF-research examines the environmental and health implications of different types of diets, as well as the socioeconomic, cultural, and contextual factors that affect different dietary patterns. This also involves analyzing the causes and consequences of obesity – a big and increasingly pressing global health and development issue.

Recent research at ZEF has been paying particular attention to the analysis of food environments, including different types of foods and food retailers that people have access to in the locations where they live, work, or go to school. This research involves the development of suitable metrics and data-collection approaches, to be able to link data from food environments with individual diet and nutrition outcomes. Another recent ZEF-focus has been on the various sustainability implications of livestock, meat, and other animal-sourced foods.

OUTLOOK FOR RESEARCH AND POLICY

There is widespread consensus that, in order to make food systems more sustainable, profound changes at many levels and in all world regions are required. However, there are still knowledge gaps of what types of changes can be most effective in different contexts and how these changes can be implemented efficiently and fairly. ZEF will continue and intensify its food systems research to address these knowledge gaps.

RECOMMENDATIONS

Building on ZEF's work, a few key policy implications can be drawn:

- Agricultural development, nutrition, human health, and environmental health need to be addressed jointly, as there are many potential synergies and tradeoffs.
- The small-farm sector needs particular attention and support. Smallholder subsistence farming must not be romanticized, though: Improving market access is key.
- Technology has contributed to reducing hunger and continues to play a crucial role for improving nutrition and making food systems more sustainable.
- But technology alone will not suffice: Sustainable food systems transformation also requires social and institutional innovations and changes in people's consumption styles and diets.

IMPRINT

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Over the past 25 years, ZEF researchers have aimed to find science-based solutions to promote sustainable development and planetary health. ZEF's research divisions and groups have conducted inter- and transdisciplinary research in, for, and with emerging economies and on global issues with its collaborating research partners around the world. In this special "ZEF 25 Years" Policy Brief series we focus on some of our core research themes.

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