Available online at
www.agrospheresmagazine.com

ISSN: 2582 – 7022

Agrospheres:e-Newsletter, (2021) *2*(1), 32-34

Agrospheres:
e-Newsletter

Article ID: 178

Need for A New Paradigm Shift in Agriculture

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Article History
Received: 4.01.2021
Revised: 17.01.2021
Accepted: 24.01.2021

INTRODUCTION

We define a new paradigm – called sustainable food security – that is urgently required to provide sufficient and healthy food for all people, without exhausting our planet. This paradigm of sustainable food security requires a focus on local resources. We argue that the best way to achieve this is by means of the local and regional food systems that we see springing up globally.

Worldwide small farms produce a large part of our food. Even in Russia, with its tradition of large farms, half the food production currently comes from small and medium-sized family and private farms The agriculture and food system was a decentralized system, based on family farms and focusing on the regional provision of food. Though not formally certified or registered as such this system could best be described as a 'natural' way of production (i.e. without input of chemical fertilizers and pesticides), mixed farming and short cycles of production.

Micronutrient malnutrition currently affects over 2 billion people worldwide. Poor health, low worker productivity, high rates of mortality and morbidity, increased rates of chronic diseases (coronary heart disease, cancer, stroke, and diabetes), and permanent impairment of cognitive abilities of infants born to micronutrient deficient mothers are all consequences of micronutrient malnutrition sustainable solutions to food system failures through holistic food-based system approaches. The nutrition and health communities have never considered using agriculture as a primary tool in their programmes directed at alleviating poor nutrition and ill health globally. A new paradigm for agriculture and nutrition is now needed. We must consider ways that agriculture can contribute to finding, thereby closely linking agricultural production to improving human health, livelihood, and well being.

THE OLD PRODUCTION PARADIGM

Science-driven progress in agriculture in the last 100 years has resulted in an increasingly technological operation that has shown itself capable of achieving lifts in productivity needed to provide adequate food energy for the world, and even to provide more calories per person.

The technology has included new varieties, chemicals ranging from mineral fertilizers to pesticides to synthetic plant hormones, and machines to supplement and replace the labour force. Many countries benefited immensely from this agricultural revolution, as the problems of inherently infertile soils were resolved by the development of nitrogen, superphosphate, and micronutrient fertilizers, creating a surplus of food that has endured since the early 1980s. We call this technological revolution the "production paradigm."

THE CURRENT PARADIGM

In the mid-1980s, that approach to agriculture and its research base was largely overrun and a new paradigm installed: high productivity while preserving or improving the resource base of agriculture and the environment—the so-called sustainability paradigm. The Green Revolution failed originally to place enough emphasis on the sustainability of its increased productivity (though it must be remembered that the initial focus was to avert the then imminent prospect of mass starvation in many countries).

MICRONUTRIENTS IN FOOD SYSTEMS

Modern agricultural systems are adept at providing calories, but in the process, they have increased hidden hunger among the world's poor by displacing acreage allotted to traditional crops such as pulses, making many micronutrient-rich plant foods less available and more expensive to low-income families. Green Revolution crops successfully increased the per capita availability of food energy but were associated with a decline in the density of dietary iron in the peoples of South Asia, and the incidence of iron-deficiency anaemia there has increased in pre-menopausal women. The cereals, such as rice, that have displaced traditional micronutrient-rich crops, such as pulses, vegetables, and fruits, contain inherently lower amounts of micronutrients.

Under the continuing pressure of population increase, the economic force favouring the dominance of agricultural land by the highly productive and yield stable cereals will continue. Consequently, we advocate, among others, a strategy of increasing the micronutrient content and bioavailability of cereals themselves. Even in developed nations such as the United States, health-care costs associated with poor diet are enormous.

Commonly, policy makers have viewed malnutrition, including micronutrient malnutrition, as a disease that must be "treated." Accordingly, many nations have adopted solutions to micronutrient malnutrition that only stress supplementation and food fortification intervention programmes.

CONCLUSIONs

We need a range of paradigm shifts – of thinking of things differently – across all three areas to meet the challenges of creating a world in which everyone is well fed in fair and sustainable food systems.

"Food and nutrition security exists when all people at all times have physical social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services, and care, allowing for a healthy and active life."

This view of the future sees humans as part of the biosphere who need it to function well for us to thrive. It sees diversity as strength and processes happening in cycles. It seeks to marry the best science with traditional indigenous knowledge about how to farm sustainably. The priorities for scientific research and technological innovation should be to use the revolutions in understanding the

nature of living organisms to work more effectively with ecological systems, rather than to redesign life.

There is a danger that technological innovation today looks for solutions that help avoid the change needed. We need to change social, economic, political, institutional, and legal areas if we are to tackle the roots of the problems we face. It also means dethroning the mantra around competition as a good in itself. Rather, we need to see competing as sometimes useful but not as the dominant need but rather new cooperative, knowledge sharing systems to share best practices, and facilitate a better life for the poorest majority on the planet.