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**THE ROLE OF RELEVANT BASIC EDUCATION IN ACHIEVING FOOD
SECURITY AND SUSTAINABLE RURAL DEVELOPMENT**

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Introduction

Effective poverty reduction policies, programmes and projects require a dynamic interplay between different sectors. These include quality basic education¹, agriculture and sustainable rural development. The challenges in these fields are enormous, especially in rural areas of developing countries where food insecurity, poverty and educational deprivation often create a vicious circle from which underprivileged households and communities are unable to escape (Watkins, 2000). It is therefore timely and essential to explore feasible measures in which the interrelated issues of food security², sustainable development and relevant basic education can be tackled together, focusing on interventions which have the greatest effect on poverty reduction.

Many development strategies have tended to treat equitable access to quality education and food as separate issues. It is still rare to find national strategies which really combine and actively integrate rural development and basic education. This is often due to a division of responsibility, with one ministry having responsibility for basic education, and perhaps several other ministries (rural development, agriculture, forestry, water, health, etc.) addressing their own remits (Vandenbosch et al., 2002;

¹ While the term “basic education” refers to the teaching of basic math, literacy and other skills to children and adults, in formal, non-formal and informal settings, this paper is concerned only with schooling at the primary level. Thus, we use the terms “basic education” and “primary education interchangeably.

² Food security exists when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their daily needs and food preferences for an active healthy life.

Atchoarena and Gasperini, 2003). Many donors have to work through a particular ministry, and hence donor support tends to be fractionated as well.

There is quite some literature available on some aspects of the linkages between education and development. Many studies have looked at the impact of the *number of years* of education on productivity. While there is substantial evidence on the benefits of greater educational attainment for subsequent productivity, evidence on the role played by educational relevance is scarce. This paper looks at how the *relevance* of basic education influences food security and sustainable rural development. There are several recent initiatives around the world aiming to improve the relevance and effectiveness of basic education by linking learning to rural environments with a focus on issues such as agriculture, forestry, land and water management, sustainable development or environmental protection. Some of these experiences would suggest that successful projects in education for rural people have the potential of impacting rural livelihoods. Little is known however on how these programmes aiming at improving educational relevance can contribute to food security and sustainable rural development.

The hypothesis of our study is therefore: “The effects of schooling on food security and sustainable rural development will depend not only on the number of years of exposure to the schooling system, but also on the quality and relevance of the education received”.

Education and rural development

Private economic returns to schooling are substantial. The importance of basic education to improving individual lives has been argued from various perspectives. From a narrow perspective of agricultural improvements, basic education improves farmer productivity. From a somewhat broader perspective of food security and rural development, it facilitates off-farm employment and the economic development of rural areas. Often the returns are highest for primary education, more moderate for secondary education (some studies suggest however that the returns on secondary education are comparable to those for primary education), and lower (but still considerable) for higher education.

Education affects development through its enduring impact on various dimensions of cognitive competence: literacy (reading and writing), numeracy and problem solving (Scribner and Cole, 1999). These cognitive skills affect an individual's productive behavior and ability to use the products of technological change correctly.

Education is a cornerstone of sustainable rural development; primary education is its foundation. It improves the productive capacity of rural societies and their institutions. There are various explanations of why schooling contributes to economic productivity and development (Carnoy, 1995). These include the following:

- Individuals acquire skills in school that enable them to be more productive.
- What individuals learn in school makes them more likely to adopt new technologies and practices.
- Schooling helps individuals function more effectively in modern production organizations.

- Schools socialize people into functioning effectively in modern society.
- The discipline of learning taught in school helps individuals learn new skills outside of school.

Basic education and agricultural productivity

Of particular importance for rural development is the productivity of farmers, since the vast majority of the rural poor depend on agriculture and natural resources for their livelihoods. The direct effect of basic education on agricultural productivity is well documented. Workers and farmers with more education are generally more productive than those with less education. Four years seems to be the threshold beyond which education pays off, at least in rural areas of developing nations, particularly in Asia. Kurosaki and Khan (2004)³ showed that the effects of primary education on crop productivity are positive but the additional gain from higher education is small.

Lockheed, Jamison and Lau (1980) summarized the findings of eighteen studies containing thirty-one data sets from thirteen developing countries. They concluded that four years of primary education increased the productivity of farmers 8.7 percent overall and 10 percent in countries undergoing modernization (largely in Asia). Education increased the ability of farmers to allocate resources efficiently and enabled them to improve their choice of inputs and to estimate more accurately the effect of those inputs on their overall productivity. Phillips (1994) reviewed an additional 12 studies using 22 data sets (with more recent data and greater representation of Latin

³ This is a study in rural Pakistan.

America), and confirmed these general trends. The average increase in output owing to an additional four years of schooling in the studies he considers is 10.5 percent.

Appleton and Balihuta (1996) point out that these surveys included only two African studies (both on Kenya) and that education was not found to be significant in either. They review several additional African studies and find that the effect of schooling on agricultural output is usually not significant, though in some cases it can be large, indicating that there is substantial variation in returns to schooling both within and between the areas surveyed. The authors suggest several possible reasons for the lack of significance of education in the African studies, including small sample sizes (for a few of the studies), errors in measurement of farm production, and wide variation in the actual effects of education on agricultural output in different areas and under different farming systems. These reviews illustrate the need for further investigation of the effects of education on farm productivity in Africa.

Numeracy and literacy are developed through basic education and are both very valuable skills for rural farmers. Farmers who can read, write, and understand numbers can allocate inputs efficiently and thus increase productivity (Jamison and Moock, 1984). Numeracy helps farmers estimate the profitability of past activities and the risk of future ones. Reading and writing help farmers keep records and properly apply agricultural technologies. Cotlear (1986) stresses the relationship between education and technological innovation by emphasizing the importance of non-cognitive aspects of education - such as receptivity to new ideas - which put the educated farmer more easily in contact with new technologies. A modern or

technically changing agricultural environment is correlated with higher returns to education (Phillips, 1994).

Education also affects production by developing analytic modes of problem solving. Cotlear (1986) notes that education increases the ability of farmers to think abstractly, which enables them to recognize the causal relation between technology and output. An example of this comes from Eisemon's (1989) survey of farmers in Kenya, which examined the effect of primary education on the cognitive skills of farmers. Farmers who had been to school were able to construct causal models of events in the natural world and to demonstrate how these events could be controlled by humans. They were able to observe, diagnose, and correct common agricultural problems better than farmers with fewer years of education. They actively sought to solve problems, while unschooled farmers did not. Farmers' understanding of how technology could improve productivity was enhanced by a primary curriculum that taught science in conjunction with farming practice and that emphasized scientific theory over memorization.

Gurgand (2003) showed that education provides a higher relative advantage – and therefore has a higher economic value – when the environment is more unstable and more difficult to deal with. This gives empirical support to the notion that education improves the capacity to adapt to change and disequilibria, on top of its static technical effects.

Facilitating off-farm employment

Successful rural development goes beyond increased productivity in agriculture and the provision of quality primary education has efficiency enhancing effects on various rural activities. Expansion of off-farm job opportunities, particularly via small- and medium-sized enterprises, is a necessary condition for reducing the size of the agricultural population and labor force (Tollens, 2002; Tollens, 2003). Changes in the occupational composition of the labor force, formal and informal, prevent overcrowding on the land and make possible higher levels of productivity and per capita income (Johnston and Clark, 1982). Youth and adults who seek a transition from farming to off-farm employment often require basic skills in literacy and numeracy, if not the experience of formal learning and discipline that comes from attending school. They need to be able to make business transactions, to weigh and measure, and to read documents.

Increasing the educational attainment of farm households is impacting on off-farm activities, including the reallocation of time away from farm work. Off-farm work has a higher return to education than does farm work (Jolliffe, 2004). Households with better-educated members will therefore act more quickly in devoting more capital and labor to non-agricultural activities (Fafchamps and Quisumbing, 1998; Yang and An, 2002; Yang, 2004). As a result of these allocative effects, education contributes significantly to sustained rural income growth.

Educational relevance in rural areas

During the past ten years, nearly every developing country has made a concerted effort to get more children into school. In many countries, enrollment numbers and

ratios have increased impressively. Successful strategies for educating children in rural areas, however, remain somewhat elusive. The curriculum⁴ may be overloaded, irrelevant to rural communities and ineffective at teaching such essentials as mathematics and science; or teachers may use little discretion in adapting the curriculum to what students know and what their needs and interests are. This makes learning difficult for rural children, who see little relevance of what is being taught to their own experiences at home and in their communities.

Great inequities in the quality of schooling still exist between rural and urban areas. Results on a test of children in Bangladesh to measure basic skills, for example, found the proportion of urban children satisfying the criteria to be more than double that of rural children (Greaney et al., 1998). Another study in Peru (Cotlear, 1986) found a particularly marked difference in quality of formal education between urban and rural schools. The effects of urban schooling on productivity were found to be much stronger than those of rural schooling.

The quality and relevance of education in rural areas is often lower than in urban areas due to a combination of factors (Vandenbosch et al., 2002):

- Factors relating to the curriculum:
 - Lack of agreement on education for who and for what
 - Problems of participation of the underprivileged and marginalized
 - Urban bias and irrelevance to local needs
 - Minimum focus on skills for life and sustainable development

⁴ Curriculum: the knowledge and skills to be taught and the methods used for teaching.

- Factors relating to teaching and teacher capacity:
 - Traditional pedagogies, underqualification and demotivation of teachers
 - Lack of support to teachers and schools in rural areas and institutional constraints
 - Need for capacity building of teachers, teacher trainers and education advisors
 - The HIV/AIDS pandemic negatively affects the number of teachers, especially in rural areas with relatively small schools, where the death of a teacher may result in the disruption of schooling, if the teacher can not be replaced rapidly (Haacker, 2002)

These rural-urban inequities have severe consequences for rural development.

Basic education that is seen to be relevant to rural people's learning needs and of good quality would better be able to attract and retain learners (Atchoarena and Gasperini, 2003). The type of schooling offered affects parental willingness to incur the costs of education, because most parents are concerned with the relevance of education and the quality of teaching. Parents are more willing to educate their children if they find the curriculum relevant and the quality of schooling adequate (Spohr, 2002).

The role of relevant basic education

The World Agroforestry Centre (ICRAF) and the Catholic University of Leuven (K.U.Leuven) have initiated a research project aimed at understanding the ways by which relevant basic education in rural areas can contribute to achieving food security and sustainable rural development. This is achieved by gathering and summarizing information about basic education initiatives in rural areas which have used

agricultural or environmental experience as a means of making teaching and learning more relevant to the rural situation, and by assessing the impact of this kind of approach on food security and sustainable rural development.

Within this framework, the project is trying to address the following specific research questions:

- What are the characteristics of a relevant education for the rural space?
- What are the skills needed for learners to enhance food security and rural development?
- To what extent is an approach on learning these skills reflected in national policies?
- How are these skills addressed through teaching and learning in primary schools?
- What strategies would allow effective teaching and learning in the rural space?
- What recommendations can be made for policy formulation and implementation?

Methods used in the research include: a global and country-specific literature reviews; interviews with key informants; semi-structured individual interviews with education officials; semi-structured individual interviews with primary school headteachers; semi-structured group interviews, mapping and ranking with primary school teachers; semi-structured group interviews, mapping, ranking and structured individual interviews with primary school pupils; and structured individual interviews with parents. The research team is multi-disciplinary, with experts in educational science, food security and rural economics. Primary school children also act as co-researchers, interviewing their parents.

Although the research is still at its initial stage and most of the actual fieldwork still has to be carried out, we have tried to describe some of the preliminary findings on the following pages.

Characteristics of relevant basic education

We have summarized some of the characteristics of relevant basic education in Table 1. By skills formation we mean the development of social capacity for learning, innovation and productivity (Brown, 1999). Thus, rather than seeing skill acquisition simply as a technical issue, this approach aims to take account of the economic, political and cultural contexts within which skills are defined and learned. Skills themselves are understood to be more than just narrow technical competencies but also include interpersonal, communications, teamwork and creative skills. Both the learning of skills and their practice are acknowledged to be inherently social rather than individual in nature (Tikly et al., 2003). Even the practice of subsistence agriculture is more than just the application of technical skills.

The importance of basic skills, notably numeracy and literacy, is recognized in most countries as a foundation for further development and basic education is given a high priority. Low literacy levels are sometimes recognized as a problem in developing agricultural and other basic vocational skills (Tikly et al., 2003). But the role of basic education goes beyond that of laying a foundation for an individual's occupational skill development. There is considerable reference in the literature to the notion of 'externalities', that is, 'the value of a well-educated workforce in general which helps the ability of a nation to adjust quickly to changes in technology and markets' (Kuruvilla and Chua, 2000).

We have listed some of the skills needed for agricultural production, food security and sustainable rural development in Table 2. Not all of these skills will be addressed directly through primary education. The role of primary education is to lay a foundation which will allow for these skills to be developed through non-formal, informal and further education. Most of the skills are interlinked and are used simultaneously in practice.

Recommendations: How to make education relevant to rural people?

The relevance of basic education is a major concern in rural areas of the developing world. When schools are relevant and educate many children well, the process of rural development can occur relatively quickly; when schools are bad and educate few children well, education's impact on development is relatively slow. Sound investment in human and social capital appears to be an essential part of any good economic strategy for broad-based and equitable rural development.

The problems of education quality and relevance in rural areas need to be recognized and addressed through coherent, explicit policies and strategies. There is strong evidence that the quality and relevance of schooling can influence productivity. Efforts to expand basic education programmes to reach more learners in rural areas need to be accompanied by measures to ensure that the content, quality, delivery and relevance of those programmes effectively meet learners' needs. Policymakers and others have to seek ways to make the content and approaches of primary education more meaningful and effective within the context of sustainable rural development.

Although poor-quality and irrelevant education exist at all levels, improvement must begin at the primary school level, where children develop their basic attitudes and approaches to learning. Improving the quality and relevance of education for students in primary schools is a prerequisite for developing the human resource base required to meet the changing demands of rural labour markets. To initiate a deeply rooted and sustainable process of rural development, human capital strengthening must be broadly based and allow a progressively larger share of the general population to participate in the process of economic transformation.

Teachers are the key to effective learning and relevant basic education. Successful educational innovation lies largely with the teacher, as the interpreter and deliverer of the curriculum. Unfortunately, teachers are often inadequately prepared and supported in their work. Increased efforts to reorient teacher education courses and programmes towards relevant teaching and learning can empower teachers to play an important role in making basic education relevant. The capacity of the teacher to interpret the curriculum and relate it to the local rural context will depend on a number of factors, including personal motivation, competence in a range of teaching and learning strategies and professional attitude, especially towards learners. The recruitment and training of teaching staff in villages should be encouraged as this will allow to rely more on available local skills and talent.

While rural schools should not look like urban schools, they must offer the same opportunities as urban schools for children to advance through the school system to higher levels. Though the national curriculum is often poorly suited to rural schools,

modifications must be acceptable to all stakeholders, including ministry officials and parents.

Curricula should be streamlined to avoid or reduce overload from non-essentials and to focus on the main priorities. To increase the pace of rural development in developing countries, schools must teach school-age children the essential skills targeted by the primary curriculum. Curricula should combine core content with local content.

People and learning resources for teaching children about their rural environment, agricultural skills, and other practical skills and knowledge that complement the academic curriculum should be made available to schools. Schools should be encouraged to connect children to their local environment.

Communities should be encouraged to use schools as centers for education and social activities beyond primary school. Schools should be hospitable for adult literacy classes, extension activities, women's groups, community functions, and other activities and events. This not only brings parents into the school, it also helps transform the school into a multi-function learning and meeting center and puts it at the center of the community.

Collaboration is required to train extension agents and primary school teachers to listen and respond to expressions of needs and problems outside of their own professional setting. Extension agents can learn to deal not only with agriculture and teachers not only with schools, but instead, both can deal with the broader rural space.

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Table 1: Some characteristics of relevant basic education

	<i>Requirements</i>	<i>Possible indicators</i>
Input factors	Relevance of the curriculum and teaching practices	
	Relevant curriculum content	– Conformity of curriculum to local conditions
	Relevant teaching methods	– Variety in teaching methods used (e.g. active student involvement, group work, practicals) – Application of learner-centered teaching – Use of mother tongue in early years
	Students assessment	– Frequency of students’ assessment – Frequency of feed back on homework and assessment
	Contextualisation of teaching and learning	– Degree of linking theory with practice, related to students’ experience
Facilitating conditions	Parent and community participation in schools	
	Operational support for the schools	– Monetary and/or in-kind contributions – Labor contribution (e.g. construction, site preparation)
	Community participation in school governance	– Activeness of parents, school committees, school boards – Authority, functions and roles of the committees
	Communication between school staff and parents	– Frequency and usefulness of communications between parents and school staff – Frequency of school public events
	Involvement of community in the education process	– Parents assist and monitor students’ homework – Community members serve as information resources
	Enabling school environment	
	Regular communication between school head, teachers and students	– Frequency of staff meetings – Headteacher works closely with teachers and shares responsibility – Frequency of student-teacher interactions
	Positive attitude of students and teachers	– Low absenteeism – Degree of students’ participation in classroom – School day and classes start and end in time
Outputs	Capable teaching force	
	Qualified teachers	– Quality of pre-service teacher education – Frequency and suitability of in-service teacher training – Motivation of teachers – Subject matter knowledge
	Teaching staff stability	– Closeness of teachers to the school – Percentage of teacher turnover – Number of years teachers have taught in the same school
	Skills as learning outcomes	
	Students’ performance	– Examination results – Skills acquired
	Economic returns	– Productivity of students

Skills formation for food security and sustainable rural development

Table 2: Skills for agriculture, food security and sustainable rural development

<p>Basic skills needed for agricultural production</p> <ul style="list-style-type: none">- Literacy (reading and writing)- Numeracy- Basic decision making and problem solving skills- Technical and vocational skills in agriculture; land and water management
<p>Additional skills needed for food security and sustainable rural development</p> <ul style="list-style-type: none">- Planning skills- Management skills- Social, interpersonal and communication skills- Negotiation skills- Facilitation skills- Critical thinking (necessary for fostering innovation and change)- Food preservation and processing skills- Marketing skills- Leadership skills- Business skills- Income-generating skills- Entrepreneurial skills- Awareness about social, political and legal institutions (necessary for the development of skills for effective participation in civil society)

List of Available Working Papers

- nr. 1 BEERLANDT, H. en L. DRIESEN, *Criteria ter evaluatie van 'duurzame landbouw'*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 35 p.
- nr. 2 BEERLANDT, H. en L. DRIESEN, *Evaluatie van herbicide-resistente planten aan criteria voor duurzame landbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 39 p.
- nr. 3 BEERLANDT, H. en L. DRIESEN, *Evaluatie van bovine somatotropine aan criteria voor duurzame landbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 63 p.
- nr. 4 BEERLANDT, H. en L. DRIESEN, *Evaluatie van gemanipuleerde planten met biopesticide eigenschappen afkomstig van Bacillus thuringiensis aan criteria voor duurzame landbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 32 p.
- nr. 5 BEERLANDT, H. en L. DRIESEN, *Evaluatie van haploïde planten aan criteria voor duurzame landbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 17 p.
- nr. 6 BEERLANDT, H. en L. DRIESEN, *Evaluatie van genetische technieken voor diagnosebepaling, immunologische technieken ter verbetering van de landbouwproductie en transgene dieren en planten als bioreactor aan criteria voor duurzame landbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 28 p.
- nr. 7 BEERLANDT, H. en L. DRIESEN, *Evaluatie van verbetering van de stikstoffixatie bij planten aan criteria voor duurzame landbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 17 p.
- nr. 8 BEERLANDT, H. en L. DRIESEN, *Evaluatie van porcine somatotropine aan criteria voor duurzamelandbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, januari 1994, 29 p.
- nr. 9 BEERLANDT, H. en L. DRIESEN, *Evaluatie van tomaten met een langere houdbaarheid aan criteria voor duurzame landbouw*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, februari 1994, 30 p.
- nr. 10 CHRISTIAENSEN, L., *Voedselzekerheid: van concept tot actie: een status questionis*, Afdeling Landbouweconomie, Katholieke Universiteit Leuven, april 1994, 106 p.
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