

By the same author:

SOCIOLOGY OF AGRICULTURE
Technology, Labour, Development and Social Classes in an
International Perspective (Concept, 1989)

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THE AGRICULTURAL AND FOOD SECTOR IN THE NEW GLOBAL ERA

CONTRIBUTOR COPY

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CONCEPT PUBLISHING COMPANY, NEW DELHI-110059

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ISBN 81-7022-464-0

First Published 1993

© Alessandro Bonanno 1992
Alessandro Bonanno (b 1954)

Published and Printed by
Ashok Kumar Mittal
Concept Publishing Company
A/15-16, Commercial Block, Mohan Garden
NEW DELHI-110059 (India)

Lasertypeset by
Microtech Advance Printing Systems (Pvt.) Ltd.
H-13, Bali Nagar
NEW DELHI-110015

ACKNOWLEDGEMENTS

Editing a volume such as the present one requires cooperation between a number of individuals. In my endeavor I was very fortunate to be assisted by very talented people. I wish to thank all of them. In particular, I would like to express my gratitude to the authors of the chapters included in the book. They have been prompt to respond to my requests and diligent in the long and, at times, tedious process of revision of the manuscripts. Special thanks go to Julie Brandt and Mary Hendrickson who spent an inordinate amount of time editing and polishing the manuscripts. A part of their sociological talent is certainly reflected in the book. Many thanks to my secretary Pat Nelson for her cooperation in producing the final version of the book. Finally, I would like to thank the Mobay Corporation, Agricultural Chemical Division, for financial assistance to the project from which the papers included in this volume were generated.

ALESSANDRO BONANNO

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BILATERAL CURRICULUM DEVELOPMENT FOR ASSISTANCE IN FOOD SECURITY FOR LUSO-PHONE AFRICA

TIMOTHY L. KOEHNEN, JOSÉ PORTELA and ARTUR CRISTÓVÃO

Introduction

Prior to the development of the major globalization theme of this paper, the authors would like to address briefly the role of extension by extension agents in the improvement and transformation of low and medium resource family farms in developing nations to enhance quality of life. Although the issue of training extension agents will be discussed in some detail, a brief overview of an individual extension agent strategy and philosophy will follow. These ideas have developed from individual study and contacts with international and professional associations. They play a leading role in stimulating dialogue between and within developing nations in order to improve extension education in the context for decreasing the disadvantages from the haves and have nots.

The field level agent is an educator, not a regulatory agent, who also needs adequate communication skills to discuss general agriculture problems or events with his/her constituency. The traditional ideas encountered in these groups and community gatherings require that the agent understand, identify, verify and appropriate catalogues for the further study of endogenous knowledge prior to accepting or rejecting the technologies. The process of informing other potential users of endogenous knowledge or farm activities that are successful or failures only occurs through cultivated linkages with all actors in the agricultural system, including a multidisciplinary subject matter

specialist team. The problems and needs not resolvable by the farming community and field level extension agent require that agents communicate with a subject matter specialist team for a holistic appraisal; and who in turn can be backstopped by regional agricultural research institutions to effectively work in the transformation of the low resource farming community.

The field level extension agents or educators also require skills for assisting the low resource farmers in improving their leadership and organizational skills and thereby empowering farm families in the democratic development process which can improve food security. The low resource farm family communities participate in decision-making to assist policy-makers in visualizing the reality of the situation of these families in the formulation of policy that balances national, regional and local interests.

One other component, outside of the farm community and family (utilize), and yet a part of the agricultural knowledge system, encompasses the preparation of extension educators and other human power resources to work effectively in the development process. The paper will now describe a specific research study within an active participatory curriculum development project in northern Portugal. The project involved the teaching-learning process in the formal educational system, which enhanced the professional knowledge and skills of mid-career extensionist and educators.

The success within the interactive curriculum development process can form a proposed skeletal design for similar types of Luso-American initiatives encapsulating a future vision to design and implement agricultural and rural educational and development programmes for luso-phone Africa. For example, a future bilateral working group (University staff from United States and Portugal) can involve themselves with the host government in a cooperative effort to transform and implement educational programmes that are relevant for the luso-phone African conditions. Specifically, the prudent initiatives can assist to improve the food security for the continent.

How does a curriculum development project in northern Portugal relate to the improvement of food security in Africa? We have recently read of the influential cooperative effort by the Luso-American peace effort in Angola. These diplomatic successes are communicated to a world-wide audience overnight. However, the authors believe the less spectacular cooperative efforts within in-

tegrated rural development activities open the door for pressing, African educational and rural development projects for Portuguese speaking nations: Angola, Mocambique, Guiné-Bissau, São Tomé e Príncipe and Cabo Verde. The Universidade de Trás-os-Montes e Alto Douro (UTAD)/Fundação Luso-Americana para o Desenvolvimento (FLAD) educational project initiates a possible continuous Luso-American partnership dedicated to the improvement of the African global food situation.

The vision of the authors is to diversify and extend the Luso-American development effort into Africa. The FLAD, a bilateral foundation, or a similarly structured organization with the assistance of the Portuguese and United States of America agricultural universities can negotiate and implement assistance programmes and projects with the particular African nation government as the partner. A tri-partnership process in the organization of activities can assist the African nations to identify their future development goals and the resources available to them to carry out the development process. The specific types of development programmes to be highlighted by the above proposed institutions fall within the agricultural knowledge system. One example of cooperation can encompass the study of extension's and agricultural research's role in the development process. Early projects must link to educational programmes for the training of the necessary human resources which can expand the knowledge system in luso-phone Africa. This involves the training and development of administrators, technicians, and front-line workers to assist rural populations to increase their food production and consumption. The understanding of the knowledge system for the training of these key development workers precludes indigenous participation in the formulation of a relevant agricultural educational system. The system eventually matches the needs of the nation through human resource development and thereby establishes compatible preparation for the world of work. The process should involve a complex appraisal of the present situation in these countries in order to understand their specific needs. It also requires donor nations which can interact effectively and integrate their experiences in order to begin the many initiatives and actions for the recuperation and development of these countries. The on-going and past cooperative efforts and actions by donor partners can serve as a catalyst to promote additional development in the African luso-phone agricultural knowledge system.

With the above situation in mind, the bilateral experience in northern Portugal points the way for further multilateral projects outside the region. The bilateral effort of UTAD and FLAD in educational and rural development within the less developed region of Trás-os-Montes establishes precedents for cooperation with the countries of Africa lacking food security. The precedent of the interactive initiative suggests a possible form of curriculum development for Africa. The spin-off from the curriculum development project to be discussed and other rural development projects in Portugal can stress a people-oriented process for an innovative multi-lateral development effort for Africa.

Let's take a look at the specific case in which funding from a bilateral foundation has institutionalized an educational programme. The programme will be described briefly in the background context for an interactive curriculum development process for the understanding of the African agricultural knowledge systems.

The UTAD with FLAD consultative and financial assistance has initiated the first Master's Degree in Rural Development and Extension Education in Portugal. The design and implementation of the Master's degree has taken place within a university which had been described until quite recently as a Polytechnical Agricultural Institute with many faculty working toward a doctorate. The recent institutional building involved various established institutions and foreign government donors. After the preliminary institutional building, the University still had no graduate programme with a design involving coursework and thesis. In addition to the lack of an on-going graduate programme within the concept of a European or North American Graduate College, the university had inadequate library materials and computer facilities for graduate research which parallels the disparity of the region in which the university has developed.

The design and implementation of a new degree programme within a relatively new University required additional time and financial resources to get the programme established and fine tuned than is the case, for example, when the curriculum falls within an institutionalized graduate college with adequate library and computer facilities, etc. In this type of implementation process, one cannot piggyback or be backstopped on non-existing infrastructure. Therefore, additional financial resources were required for educational infrastructure such as the purchase of instructional and library materials, capital expenditure for equipment (computers, copier, of-

fice equipment) and transport as well as the hiring of a long and short term staff including expatriates. It was also necessary that a line item for the training of faculty members to a Master and Ph.D. level be considered for educational programme continuity in the future i.e. replacement of expatriate teaching staff. These factors were considered within a proposal developed and approved through a joint-venture between a funding agency, FLAD and the UTAD. This type of joint-venture should be proposed for assistance programmes in luso-phone Africa.

The grant from FLAD provided partial funding to reduce the constraints in implementing a degree programme in a newly functioning university. The FLAD, a newly created institution in Portugal, assisted to defray some of these costs for the implementation of a degree programme at UTAD. The FLAD has some innovative characteristics, the major financial source for the foundation are part of a donor assistance package to Portugal. The foundation funds are invested in both money-making activities (to ensure the survival and longevity of the foundation) and development related projects such as the Master's Degree in Rural Development and Extension Education at UTAD. A similar foundation might be appropriate for the African Portuguese speaking countries.

This type of foundation can be a prototype or model for future development programmes in luso-phone Africa. The foundation model allows for a more active participation of the host country in the development process. Also, the host country professionals can be a part of a supervised experienced career entry programme by working with and alongside experienced donor staff placed in the foundation in the early stages of operations. We would suggest that donor and host government (i.e. the foundation) need to collaborate in a partnership mode to layout relevant development policy and strategy. After donor financial and consultative assistance ends, the foundation survivability is strengthened with a continuous agenda for other development projects through the auspices of country personnel. The foundation personnel should have representative perceptions and viewpoints for the development of the agricultural knowledge system.

One specific type of project that is crucial and relevant involves curriculum development for the conditions in Africa. The cooperative effort between Portugal, United States and the African country is more complex, but establishes one important element in the process for the improvement in the agricultural knowledge system in the

former colonies of Portugal. The common language between the luso-phone African countries and Portugal with U.S. consultative and financial assistance establishes a relevant tri-partite developmental action. Every partner has to make sacrifices, investments and contributions in the process, to improve the global food security.

Curriculum Development Study

In the particular research study, the authors explored the perceptions of a population of directors of extension at the local level of the Portuguese rural extension system. In order to visualize where the extension system fits overall, a prior description of the government organization scheme and the interrelationship will follow. The programme has evolved from a highly centralized planned and organized system to one in which continental Portugal has been organized into seven regional services (planning and implementation organizations) with relative autonomy for their region. The seven Direcções Regionais have within each a director/coordinator who is directly linked to the national Minister of Agriculture, Fisheries and Food. The director in each region oversees the offices of regional agrarian planning, administration, staff and farmer training, rural extension, protection and production of animal and plant, agricultural marketing, rural infrastructure and other offices with specific functions. The integrated rural development strategy includes the above components. There is a sub-director responsible for rural extension in each region who has responsibility to administer and promote extension education through and with the Directors of Agrarian Zones. The present system is under discussion and might be changed. The agrarian zones are made up of freguesias and concelhos which are political government units within each region. The agrarian zones represent relatively homogenous geopolitical/farming areas and its numbers differs from region to region.

Population

The national descriptive study was aimed at Directors of Agrarian Zones in continental Portugal, and has assisted in the identification and weighing of the functions and activities of extensionists involved in the development of the agricultural sector. The group that rated the competencies plays a role in communicating new ideas and tech-

nologies to the rural population. They also assist to communicate concerns and needs from the freguesias and concelhos to regional and national developmental agencies. The directors in this group are attempting to assist the rural population to increase their agricultural production and income and to improve the quality of life of the rural family. The daily tasks include the management and supervision of the work of their staff (rural extensionists, sanitation and animal health officers, and support staff), preparation of financial budgets, the planning and implementation of educational programmes and campaigns, and the maintenance of positive relationships with other rural development agencies.

What are the characteristics of these Directors of Agrarian Zones? What are the competencies in extension administration, planning, and evaluation that were perceived as necessary by these Directors of Agrarian Zones for an extensionist? What are the time constraints of these directors for carrying out administration/ supervision, planning and evaluation of their rural development programmes? The paper will present data to answer these questions.

Purpose of the Study

The purpose of the study was to identify necessary competencies through the responses by the Directors of Agrarian Zones within twelve competency categories, but in this paper the authors focus only on the areas of administration, planning, and evaluation. The rating by these administrators can serve as the basis for designing training programmes and curriculum development programmes for change agents within both rural extension and other development agencies. These administrators also estimated their time spent in administration/supervision, programme evaluation, programme planning, and other functions. Secondary attention will be given to the characteristics of the population of these administrators such as educational level, sex, age, and other biographical data.

More specifically, the paper describes the responses of Portuguese Directors of Agrarian Zones to the perceived necessity of 23 distinct individual competencies, using a 4 point scale. The information will be used to alert trainers to the necessary activities to be performed by extensionists. The identification of necessary competencies by the sample will assist in designing and reformulating

educational and training programmes. It can also serve to delineate the individual job description for an extensionist in Portugal. An assumption in the study is that the population of Portuguese administrators has both administrative and extension experience to rate the necessity of various competencies.

Methodology

The population for the study consisted of all Directors of Agrarian Zones in continental Portugal. The population is located in seven regions: Entre Douro e Minho, Trás-os-Montes, Beira Litoral, Beira Interior, Ribatejo e Oeste, Alentejo, and Algarve. The response rate for the study was 79 per cent of the population of 64 administrators for 66 Zonas Agrárias. It occurred that two directors had to manage two agrarian zones at the time of the study (Entre Douro e Minho and Beira Interior). This self-selected sample will be used to describe the responses from the 52 respondents.

The complete questionnaire was (a) developed through a review of literature in rural development and extension, which identified specific duties and tasks and also used competencies from similar survey research studies, (b) translated from English to Portuguese, (c) validated and field tested through Master's degree students at UTAD, in Rural Development and Extension, as well as proofed and edited by two Portuguese extension specialists, (d) mailed to the population of administrators and (e) coded and the data inputted into a desk-top computer and the responses analyzed by a statistical programme.

The mail-out packet consisted of a letter of introduction, the questionnaire, and a self-addressed envelope with postage. The process included a follow-up reminder letter which was sent after four weeks to those who had not returned the questionnaire. After 9 weeks, the study had a 64 per cent response rate. In order to determine if the group that had not responded was different in any way from the group which had responded to the mailout, a questionnaire was sent again to the non-responding group and an appeal was also made to their supervisors in the regional headquarters to request their participation. By this action, the study received an additional 10 questionnaires, which when analyzed did not differ significantly from the group as a whole. The final response rate was 79 per cent, which was calculated by assuming that each administrator was distinct for

the 66 zonas agrárias. The paper describes the responses to only 3 of the 12 competency categories. The other categories were: programme execution, understanding human behaviour, socio-cultural aspects, teaching, communication, participation, farming systems, appropriate technology and young farmer organizations. The study is related to similar professional competency studies which came out of programmes at the University of Florida, Pennsylvania State, University of Arizona and others.

Characteristics of Directors of Agrarian Zones

The participants in this study were Directors of Agrarian Zones in continental Portugal. What are the characteristics of this group who are administrators and in some cases extensionists? In the group that responded to the questionnaire (79 per cent of the population), the study found, that nationally, 70 per cent passed their infancy or adolescence in rural areas. The proportion of female Directors of Agrarian Zones was 23 per cent. The average age of the group was 41 years. The educational level of the group of administrators was that 18 per cent had achieved the Bachelor degree and 82 per cent had achieved the equivalent to the Ingénieur Agronome. The group predominately had their majors within the agricultural sciences, while one had a degree in rural sociology. The work experience of the group shows that 21 per cent have 5 or less years of experience, while 79% have 6 or more years of work experience in extension. The average number of staff that are supervised by these zonal heads is 10. With this data, a calculation was made to determine the number of farms per extensionist in Portugal. The rough data indicate an approximate ratio of 1 extensionist to 900 farms. The number of farms was calculated from the 1979 farm census (INE).

Competencies of Change Agents

The paper will now move into the responses by these directors as to the need of various competencies within programme planning, extension administration, and evaluation. The frequencies and means to be presented can assist in the identification of knowledge and skills necessary to carry out the role as a change agent in these categories. The information obtained can also facilitate the process of identifying educational objectives for extension education curriculum and training programs for extensionist.

The responses of the Directors of Agrarian Zones were tabulated using a 4 point scale, with degree four coinciding with absolutely necessary, degree three necessary, degree two seldom necessary and degree one not necessary. Some directors refused to rate the competency and for this reason the total (N) varies from competency to competency.

Table 10.1 shows the responses to competencies involving the extension administration category. The responses show that the majority of directors rated the various competencies as necessary or absolutely necessary. However, in competencies *f* and *j*, the data reflect that over 30 per cent of the directors rated the competencies as seldom or not necessary. Competency *f* might reflect that directors perceive this role to be under their influence rather than a role for an extensionist. Also, the authors find it quite unbelievable that 30 per cent of the Directors perceive computer skills to be seldom or not necessary in the age of the computer.

TABLE 10.1: National Proportional Responses by Directors of Agrarian Zones and Means on the Necessity of Competencies Associated with Extension Administration

Extension Administration	Percentages					MEAN	N
	Degree of Necessity						
The extensionist should be able:	4	3	2	1			
(a) to outline procedures for resolving conflicts and maintain staff morale	50	40	6	4	3.4	50	
(b) to outline appropriate staff recruitment	31	49	8	12	3.0	51	
(c) to select and supervise staff	36	42	8	14	3.0	50	
(d) to conduct a needs assessment evaluation for project planning	22	60	16	2	3.0	49	
(e) to outline conditions under which a project programme may need to be adjusted	27	67	6	0	3.2	5	
(f) to determine alternative strategies for overcoming the lack of political power on the part of project administrators.	16	48	20	16	2.6	50	
(g) to identify both the private and public institutions involved in the agricultural knowledge system, devoted to technology development, transfer, and utilization of technology	43	49	6	2	3.4	51	
(h) to revise programmes when necessary to adjust to an emergency situation	35	61	4	0	3.3	51	
(i) to collaborate in budget preparation and elaboration	16	62	14	8	2.9	51	
(j) to utilize micro computer for word processing and other functions	13	57	20	10	2.7	51	

Table 10.2 which shows the responses to the competencies related to programme planning in Portugal. The majority of directors perceived that the programme planning competencies were necessary for an extensionist. However, competencies *d* and *g* were perceived by over 30 per cent to 50 per cent of the directors as seldom necessary or not necessary. They do not agree to the necessity of advisory councils or the historical and philosophical understanding of rural extension by the extension agent. In some respect, it might be necessary to sensitize these directors as to the important role the advisory council can play in identifying community problems and needs as well as in the process of legitimizing the extension programme.

TABLE 10.2: National Proportional Responses by Directors of Agrarian Zones and Means on the Necessity of Competencies Associated with Program Planning

Programme Planning	Percentages				MEAN	N
	Degree of Necessity					
The extensionist should be able:	4	3	2	1		
(a) to formulate realistic goals for the extension programme	76	20	4	0	3.7	51
(b) to consider agricultural policy in preparing programmes	54	42	4	0	2.9	50
(c) to conduct a needs assessment based on clientele needs, interests, and problems	82	16	0	2	3.8	51
(d) to organize and use an advisory committee	20	50	28	2	62.9	50
(e) to prepare an annual and long range plan of work	45	49	6	0	3.4	51
(f) to develop a calendar of events	69	31	0	0	3.7	51
(g) to outline the history, philosophy, and objectives of the extension organization in Portugal/region	2	48	36	14	2.4	50

Table 10.3 shows that there is a high consistency in the response by these directors. The majority rate all the competencies within evaluation at least necessary for extensionists. One concern from the data deals with the directors' perceptions concerning the necessity to interpret research results to the farmer. In competency *d*, 34 per cent of the directors perceived this as seldom necessary for the role of the extensionist. This indicator normally is considered to be important in the necessary institutional interfacing roles between research and extension

(Swanson, 1982). It might be important to question further the reason for not perceiving this as necessary by some zonal heads. The role of a research linker or communicator of research results to the producers has been acknowledged as important in the transfer of technology which is one aspect of extension. Are these directors concerned more with the role of an extensionist as a process facilitator rather than a agency linker? The literature points out that the extensionist needs to perform multi-roles in the rural extension agency.

TABLE 10.3: National Proportional Responses by Directors of Agrarian Zones and Means on the Necessity of Competencies Associated with Extension Evaluation

Evaluation	Percentages					MEAN	N
	Degree of Necessity						
The extensionist should be able:	4	3	2	1			
(a) to carry out inquiries to understand the needs of the clientele	41	43	12	4	3.2	51	
(b) to interpret the impact of change upon the clientele served	63	31	2	4	3.5	51	
(c) to use research findings when making recommendations to farmers	67	31	2	0	3.6	51	
(d) to interpret and evaluate research findings reported by research institutions for extension clientele	30	36	26	8	2.9	50	
(e) to evaluate the performance of the extension staff	38	40	16	6	3.1	50	
(f) to use questionnaires to seek information	18	53	25	4	2.8	51	
(g) to analyze and interpret results derived from a questionnaire	31	49	14	6	3.1	51	

Time Spent Performing Functions by the Directors of Agrarian Zones

What is the time necessary for Directors of Agrarian Zones to plan and execute the rural development programmes? In Table 10.4, the reader can observe the average time Directors of Agrarian Zones spend performing tasks within administration/supervision, programme planning, programme evaluation and other functions (52 directors responded to this question). The data present the average time of all directors in performing these broad functions. In the analysis of the functions, the data verifies that these administrators

spend over half their time in administration/supervision while devoting only 14 per cent of their time to planning and evaluation. In contrast, the data show that they spend 30 per cent of their time in functions outside of that of an administrator. It should be noted that the lack of time spent within planning and evaluation raises important issues and should be studied further. The cycle of planning and evaluation is weak for reasons that might be linked to a dependency situation with regional and national planning organizations.

TABLE 10.4: Estimates in Percentages by Directors of Agrarian Zones for their time spent Performing Specific Functions

Functions	Percent of time devoted to Functions
Administration/Supervision	57
Programme Planning	8
Programme Evaluation	6
Field Demonstrations/Farm Visits	9
Teaching/Training	7
Non-Programmed Extension Activities	7
Other Activities	7

Conclusions from Curriculum Research

The purpose of the research study was to identify professional competencies through the perceptions of Directors of Agrarian Zones for an extensionist in Portugal. In this particular paper, the authors selected three major extension areas (administration, planning, and evaluation) to investigate. The selection was based upon the interest in obtaining a mini-profile for an extensionist, but also to show the reader a contradiction in our results between the perceptions of the Directors of Agrarian Zones for an extensionist and the time directors spent performing various functions in these three areas.

On the whole, the respondents were quite uniform in their appraisal of the necessity for the professional competencies. This consistency in rating competencies as necessary or absolutely necessary should be seen as a positive first step in the curriculum development process. However, a cautionary note is based on two factors: (1) the data show that administrators spend only 14 per cent of their time in programme planning and evaluation, while consistently rating the pre-selected listing of competencies of the survey research instru-

ment positively. These respondents rated competencies without an interactive interview process that did not allow for triangulation of the questionnaire responses with probing interviews which might change the results. (2) the alternative factor is that the administrative and policy structure of the Direcções Regionais allows for minimum time for these functions by Directors of Agrarian Zones. The respondent perceives the importance of the professional competencies, but has no time or there are time management constraints to perform these essential functions by the directors. These zonal heads might be constrained by regional or national policies that interfere in the actual time required for programme planning and evaluation at the level of the agrarian zones.

This study has assisted to develop a profile for an extensionist in Portugal and the information can be utilized to develop training programmes as well as analyze and adjust on-going educational programmes in rural development and extension education within Portugal. The profile itself might serve to develop a national job description for entering extensionist in agrarian zones or other extension services. An additional question needs to be answered and that is which competencies need to be attained and when by the extensionist to determine curriculum programmes for their pre or in-service training. The perceptions of extensionist, specialist and the curriculum developers must also play a role in this job description process.

The study can be used to confirm the necessity to prepare multi-purpose extensionists who can perform as dynamic facilitators and educators in the rural development process. The study determined a profile for an extensionist linked to their performance in the three areas. These educational and/or professional competencies that were identified as necessary can serve as a preliminary point for further discussion in the role of a non-formal educator in Portugal.

The curriculum development process has been established in Portugal through a bilateral cooperative action. The formula for the interactive group process established in this particular situation can be used as a starting point to establish similar joint ventures in Africa to improve agricultural knowledge system. The actions can consider institutional development within agricultural knowledge systems which establishes the bridge for inter-institutional communication in the system.

Summary and Recommendations

In light of the above experience, what should be the future cooperative effort in Africa within agricultural and extension education with Portugal? The analysis of past interventions by donors in agricultural and extension education programmes point to the importance of improving the communication network with established government programmes and community-based groups. The projects cannot be an isolated success story without linkages to the present system. We need from the beginning to integrate in order to avoid institutional duplication within various regions. The programmes should be an expansion or improvement in the present agricultural knowledge system.

The generation, proliferation and implementation of a new development project without the intra or inter institutional communication linkages spawn pockets or islands of development projects without the necessary integration into the national agricultural knowledge system. All proposed interventions should involve the various governmental and community institutions in the process. We need to avoid establishing unnecessary projects of alternative extension or research institutional systems which do not integrate with existing development institutions and their staff.

Indigenous knowledge assessment and community participation also prevails as an essential component for the assessment process. It serves to enhance the identification of endogenous needs and assists in relevant policy development for food security. The appropriate understanding of the agricultural food system enhances the institutional development process in which the educational curriculum and research agenda link to the global system. In any intervention we need to ask ourselves, what has to happen and who participates within the coordination of policy, organization, and management within the agricultural research, extension and training system to improve food production and consumption. The total assessment process should be interactive with government agencies and key elements in the community and the "limited resource" agricultural population. The development worker must be oriented to listen and maintain an interactive dialogue with the essential and relevant contacts in the agricultural system.

In order to begin with these assumptions bilateral and multi-lateral projects should be developed, United States universities can

form partnerships with Portuguese agricultural universities to enhance the needs assessment process and the following project implementation stage. The partnership can facilitate the development of luso-phone Africa. The synergistic partnership can speed-up the improvement in food production, processing and consumption for the limited resource agricultural population.

The partnership can improve human capital by expanding educational and employment opportunities through joint efforts at a more rapid pace. The process can also facilitate the training of luso-phone Africans. Higher educational opportunities for motivated young staff can be enhanced through access to both Portuguese and U.S. universities. Those that are not bilingual can enter Portuguese universities which remain more familiar to the African students. The common language allows for a reduced time limit in the training of technicians. The student is not required to learn English prior to entry into a U.S. undergraduate programme. The amount of time in training is reduced and the individual can return to the work place earlier to assist the limited resource farmers. The alternative for more advanced African students is that U.S. Ph.D. educational programmes allows them greater flexibility in the type and number of programmes to enter. The selection process must consider early on key people to be involved in the training of the trainers.

At the present time, English and French languages dominate the agricultural knowledge system literature. The donor and recipient nations must begin to identify and translate scientific papers and key texts, for example, to Portuguese. One of the limitations in development for luso-phone Africa is the scarcity of agricultural instructional materials to facilitate the teaching-learning process. The world needs greater cooperation between the luso-phone, anglo-phone and franco-phone nations in identifying, translating and distributing extension and educational instructional materials for developing nations. The materials should be up-to-date and relevant for the socio-cultural situation in which the front-line agricultural workers attempt to decrease the disadvantages for the limited resource farmer.

The bottom line for greater potential in the development process for Africa will be cooperation by multilateral agencies to improve global food security. These types of programmes should be similar to the past cooperation by nations in the security and reconstruction of Europe and North America during and prior to the cold war. The time is at hand that greater international effort be forthcoming in

agricultural extension and education development projects in Africa. The multilateral effort requires the same enthusiasm, sacrifice, investment and cooperation to assist in the development of Africa. The globalization of these types of development projects to improve food security for the limited resource farmer is at the crossroads of the so called world order.

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